Martis Valley Trail

Draft Environmental Impact Report

Lead Agency:

Northstar Community Services District
908 Northstar Drive
Northstar, CA 96161

April 2012

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(SCH #2010122057)

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Northstar Community Services District
908 Northstar Drive
Northstar, CA 96161
Contact: Mike Staudenmayer, General Manager

Prepared By:

north fork associates

1167 High Street
Auburn, CA 95603
(530) 887-8500

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CHAPTER 1

INTRODUCTION

CHAPTER 1 INTRODUCTION

1.1 PURPOSE AND TYPE OF THE DRAFT ENVIRONMENTAL IMPACT REPORT

Northstar Community Services District (CSD) proposes to construct the Martis Valley Trail, an approximately 9.5-mile multiple-use trail through Martis Valley and the Northstar California resort and climbing to the ridgeline defining the Lake Tahoe Basin. The trail would be constructed and maintained by Northstar CSD but owned by Placer County. Two potential trail alignments – the Valley Alignment and the Highway Alignment - are being considered. They are evaluated in this Environmental Impact Report (EIR) as separate alternatives at an equal level of detail. In addition, four potential locations for a new parking lot to access the trail have been identified. Each of these locations is also evaluated at an equal level of detail in this EIR.

Purpose of an EIR

The California Environmental Quality Act (CEQA) requires that projects be evaluated for their possible effects on the environment. Northstar CSD, as Lead Agency, determined that the proposed Martis Valley Trail project could have a significant effect on the environment and prepared a Notice of Preparation (NOP) of an Environmental Impact Report (EIR) for public circulation and comment.

The Draft EIR has been prepared in accordance with CEQA (Public Resources Code, Section (§) 21000, et seq.) and the CEQA Guidelines (14 California Administrative Code, §15000, et seq.) and in consideration of the comments received on the NOP. This Draft EIR is an assessment of the impacts that reasonably could be expected from construction and use of the proposed Martis Valley Trail. This Draft EIR identifies mitigation measures that will minimize potentially significant impacts and considers alternatives to the proposed project. As discussed in Section 1.2 below, the scope of this EIR is focused on effects determined to have a potentially significant impact on the environment, in accordance with CEQA Guidelines §15128.

As defined in CEQA Guidelines §15121(a), the Draft EIR is an informational document prepared to provide public disclosure of potential impacts of the project, identify ways to minimize those effects, and describe alternatives to the project. The EIR is not intended to serve as a recommendation of either approval or denial of the project.

Type of EIR

The proposed trail would be constructed in phases. The portion of the trail between the southern limits of the Town of Truckee near the Nevada/Placer County line and the Village at Northstar would be constructed first, over a period of several years. Detailed descriptions of each of the two separate alignments being considered for this portion are provided in **CHAPTER 3 PROJECT DESCRIPTION**. The descriptions are based on the preliminary trail plans for each alignment.

Future phases of trail construction would include trail segments from the Village at Northstar to the ridgeline defining the Lake Tahoe Basin. The trail would terminate along Forest Route 73, a paved Forest Service road near Sawmill Flat Reservoir. This planned trail terminus is at the top of the ridge, in a location known locally as the "Four Corners" area. Preliminary trail plans have not been prepared for these future phases, which would be constructed as funding allows.

Project-Level Analysis: This EIR presents analysis of impacts from construction and use of the trail portions included in the first construction phases at a project-level of detail, meeting the definition of a project EIR provided in CEQA Guidelines §15161 by evaluating the "environmental impacts of a specific development project."

Program-Level Analysis: This EIR also presents analysis of impacts from construction and use of the trail portions in the later construction phases at a program-level of detail, meeting the definition of a program EIR provided in CEQA Guidelines §15168. The programmatic analysis considers the range of environmental impacts that could result from construction and use of these later phases of the trail and identifies and evaluates mitigation measures that may reduce those impacts or provide compensation for them. However, this analysis is presented at a lesser level of detail than the project-level analysis for the first construction phase.

CEQA Guidelines §15168(c) states that use of a program EIR requires that "subsequent activities in the program must be examined in the light of the program EIR to determine whether an additional environmental document must be prepared." As Northstar CSD proposes to construct each future trail segment, the CSD will review the impact analysis presented in the programmatic portion of this EIR in light of the preliminary trail plans to determine whether the EIR adequately evaluates all impacts of the proposed construction or if additional impact analysis and mitigation measure development is necessary.

Both the project-level and program-level portions of this EIR meet the EIR content requirements identified in CEQA Guidelines §§15120 through 15132.

1.2 SCOPE OF THE DRAFT EIR AND EFFECTS FOUND TO BE LESS THAN SIGNIFICANT

Scope

The scope of this EIR, as provided for by the CEQA Guidelines, is focused on those specific resource areas where the proposed project has potential to result in significant impacts, as determined by preliminary evaluations conducted by Northstar CSD. Northstar CSD prepared an NOP for this Draft EIR, which provided a general description of the project and a preliminary evaluation of possible environmental impacts resulting from construction and use of the proposed Martis Valley Trail.

The NOP included a detailed Initial Study, which evaluated only the Valley Alignment as the proposed project. The assessment of environmental impacts presented in the Initial Study was based on available project site information, preliminary alignment and construction plans, evaluation of project characteristics, and review of applicable technical studies. Based on comments received on the NOP, the Highway Alignment has been identified for consideration. The Valley Alignment and the Highway Alignment are evaluated throughout this EIR at the same level of detail (as "equal-weight" alternatives).

A supplement to the Initial Study considering the likely impacts of the Highway Alignment was prepared subsequent to circulation of the NOP. The supplement documents that the conclusions of the Initial Study with regard to the less than significant impacts of the Valley Alignment are also applicable to and valid for the Highway Alignment.

The NOP identified three environmental resource areas in which the project could have potentially significant impacts:

- ❖ Biological Resources
- ❖ Cultural Resources
- ❖ Hydrology and Water Quality

The responses received during the NOP review period, including the comments received at the public scoping meeting held on January 19, 2011, served to refine the focus of this EIR. In consideration of the comments received on the NOP the EIR scope was augmented to also include the following chapters:

- ❖ Transportation and Circulation
- ❖ Recreation
- ❖ Visual Resources

NOP comments were received from many members of the public and several state and federal agencies. The Martis Valley Trail NOP and applicable technical studies are available for review from Northstar CSD and at the project's website at www.martisvalleytrail.com. The NOP, Initial Study, Supplement to the Initial Study, and all comments received on the NOP are included in Appendix A of this Draft EIR.

Effects Found Not to be Significant and Excluded from EIR

The Initial Study analysis concluded that the proposed project does not have the potential to result in significant impacts in several resource areas. Where necessary the Initial Study includes mitigation measures to ensure impacts would be less than significant. The Initial Study was publicly circulated with the NOP from December 17, 2010 to January 17, 2011. With the exception of the topics of transportation and circulation, recreation, and visual resources, no information contradictory to any of the conclusions reached in the Initial Study was received subsequent to public review of the NOP. In accordance with CEQA Guidelines §15128, resource topics for which the project was determined to have a less-than-significant impact are not evaluated in this EIR. A brief discussion of the prior analysis of each resource topic excluded from evaluation in this EIR is given below.

Agricultural Resources

Land within either of the proposed trail alignments is not known to support agricultural resources; nor are properties crossed by either proposed alignment zoned for agricultural uses. Construction and use of the proposed trail would not adversely affect agricultural activities in the project vicinity. While some of the land crossed by the proposed trail alignments is designated Timber Production Zone (TPZ), construction and use of the trail would not convert forest land into non-forest uses. A comment on the NOP was received from the California Department of Forestry and Fire Protection noting that issuance of a Timberland Conversion Permit and/or approval of a Timber Harvest Plan might be required for trail construction. This potential requirement has been added to the list of required entitlements for the project identified in **CHAPTER 2 EXECUTIVE SUMMARY** and **CHAPTER 3 PROJECT DESCRIPTION**.

Air Quality

Without mitigation, project-related construction emissions would exceed the thresholds established by the Placer County Air Pollution Control District. Total trail length is approximately one mile greater under the Highway Alignment compared to the Valley Alignment, so the total air pollution emissions would be slightly higher under that alternative. Compliance with Rule 228 as required by *Mitigation Measure AIR.1* included in the Initial Study would reduce dust particulate emissions from the site during construction. The Initial Study also includes *Mitigation Measures AIR.2* and *AIR.3,* which are measures recommended by Placer County APCD to reduce construction phase air pollutant emissions to a less-than-significant level. Operation of the proposed trail in either alignment would not contribute to non-attainment status for any State or federal criteria pollutants. The proposed trail project does not include any components that would generate objectionable odors.

Geology/Soils

For either alignment, the proposed trail would result in less than significant risks to loss of life or property due to seismic events or landslides. Implementation of required erosion control measures and Best Management Practices (BMPs) would ensure that impacts from erosion and sedimentation would remain less than significant. Impacts associated with unstable soils or geologic conditions, including expansive soils, would also be less than significant. The proposed trail does not include any septic systems or other onsite wastewater disposal.

Greenhouse Gas Emissions

Because greenhouse gas (GHG) emissions for each construction phase and the cumulative total GHG emissions for all four phases would remain below threshold adopted by the Bay Area Air Quality Management District and recommended for use by the Placer County Air Pollution Control District, impacts associated with GHG emissions would be less than significant for either trail alignment. Use of the trail is not expected to generate substantial traffic volumes, and it would not contribute substantial new GHG emissions. The project is not expected to conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases.

Hazards/Hazardous Materials

Use and maintenance of the proposed trail would not result in the routine transport, use, or disposal of hazardous materials. Construction activities for either alignment would include the use of hazardous materials associated with the operation and maintenance of vehicles and equipment. The Initial Study includes *Mitigation Measure HAZ.1,* which identifies measures to avoid spills and reduce the potential for adverse impacts should a spill occur. Implementation of *Mitigation Measure HAZ.1* would reduce risks associated with a release of hazardous materials during construction to a less than significant level.

Construction of the proposed project in either alignment would result in no impacts related to disturbance of any listed hazardous materials site and impacts associated with risks related to proximity to a public or private airport would be less than significant.

Temporary traffic controls during construction would be necessary for either alignment. These could include traffic delays, lane closures, or temporary rerouting of traffic lanes around construction areas on public rights-of-way, including SR 267, Northstar Drive, and possibly Schaffer Mill Road (depending on the selected location for the proposed new parking lot). The temporary traffic controls would ensure a less than significant impact associated with impairment of the implementation of emergency response and evacuation plans.

The proposed project, when complete, would introduce no new source of fire ignition that would subject people or structures to an elevated risk from wildfire. Construction activities associated with either alignment would temporarily introduce potential sources of fire ignition associated with equipment operation and other construction site activities, temporarily increasing the risk of wildfire during construction. However, construction crews would be required to adhere to California Building Code and Fire Code standards for fire prevention during construction activities. Additionally, *Mitigation Measure HAZ.2* requires preparation and implementation of a Fire Safety Plan to further reduce risk of fire. Through compliance with applicable fire safety codes and implementation of *Mitigation Measure HAZ.2,* risks associated with wildfire would be less than significant.

Land Use/Planning

The project is consistent with the land use and zoning designations for the project region and neither alignment would change land use patterns in the area.

Mineral Resources

There are no known mineral resources or mineral extraction activities within the vicinity of either alignment.

Noise

The proposed project does not include any components that would generate substantial noise in the operational phase. Use and maintenance of either trail alignment would not generate substantial increases (temporary or permanent) in ambient noise levels in the vicinity and would not generate ground-borne vibration. Construction activities and use of construction equipment for either alignment would result in a temporary increase in noise levels in the vicinity and could generate noise that could temporarily exceed noise level limits specified in Article 9.36 of the Placer County Code. *Mitigation Measure NOISE.1* requires construction activities be conducted only during days and hours when construction activities are exempt from noise standards contained in the Placer County. Implementation of *Mitigation Measure NOISE.1* will ensure that impacts associated with noise would remain less than significant.

Population/Housing

Neither alignment of the proposed project would create or displace any housing; neither alignment would directly or indirectly contribute to population growth in the region.

Public Services

No new public services would be necessary to support the project and the project would not increase the intensity of use of existing services.

Transportation and Circulation

For either alignment, the proposed trail is not expected to generate substantial increases in vehicle traffic in the project area, alter the mix of vehicle traffic on existing roadways, or conflict with transportation plans in the region. Potential impacts related to an increase in traffic safety hazards and conflicts with established performance criteria for a circulation system are evaluated in **CHAPTER 7 TRANSPORTATION AND CIRCULATION**.

Utilities/Service Systems

No new utilities or services would be necessary to support the project and the project would not increase the intensity of use of existing utilities and services.

1.3 DEFINITION OF BASELINE

Pursuant to CEQA Guidelines §15125(a), the EIR must include a description of the "physical environmental conditions in the vicinity of the project, as they exist at the time the notice of preparation is published." This setting constitutes the "baseline physical conditions by which a lead agency determines whether an impact is significant." Impacts can include direct and indirect physical changes to the baseline conditions. In this EIR, the general baseline conditions within the study area for each trail alignment are identified in **CHAPTER 3 PROJECT DESCRIPTION**, while more detailed information regarding baseline conditions for each trail alignment and the project region are identified in the Environmental Setting section of each individual resource chapter.

1.4 SIGNIFICANCE CRITERIA

Appendix G of the CEQA Guidelines as well as applicable local, state, and federal regulations and ordinances identified in each chapter of this EIR were used to establish the significance criteria for determining whether the proposed project would have a significant impact on the existing environment. Where appropriate, evaluation of impacts against the established significance criteria has been based on the conclusions of technical reports, memos, and surveys, and through consultation with experts in pertinent resource areas. Supporting material is cited throughout the document and listed in **CHAPTER 13 EIR PREPARERS AND REFERENCES**.

1.5 MITIGATION MONITORING AND REPORTING PROGRAM

Mitigation measures are included throughout this Draft EIR to mitigate impacts by avoiding them, reducing them to less than significant levels, or providing compensation for unavoidable impacts. A Mitigation Monitoring and Reporting Program (MMRP) has been prepared in accordance with §21081.6 of the Public Resources Code and is included in Chapter 12 of this Draft EIR. The MMRP describes the implementation program for each mitigation measure included in this EIR to avoid impacts or reduce them to less than significant levels. For each mitigation measure, the MMRP identifies specific implementation and monitoring requirements and procedures.

1.6 ORGANIZATION OF THE EIR AND DEFINITION OF TERMS

Each resource chapter in the EIR includes the following four sections:

- ***Environmental Setting –*** This section describes existing conditions and resources in the project area that could be affected by the proposed project.
- ***Regulatory Framework –*** This section identifies federal, state, and local policies, regulations, and laws that are applicable to the proposed project.
- ***Impacts –*** This section provides a side-by-side evaluation of the potential impacts of each of the equal-weight alternatives (the Valley Alignment and the Highway Alignment) on the existing environment, including the level of significance of the impact before and after implementation of mitigation measures.
- ***Mitigation Measures –*** This section provides the full text of each mitigation measure required to be implemented as discussed in the Impacts section.

In the Impacts section, each impact is numbered with the chapter number followed by the impact number. For example, the first impact in the Biological Resources chapter is Impact 4.1. The mitigation measures specifically associated with that impact carry the same number, and multiple mitigation measures for the same impact are denoted by a letter. For example, the first two mitigation measures for Impact 4.1 are numbered *Mitigation Measure 4.1a* and *Mitigation Measure 4.1b*. The impact numbers and mitigation measures for each are identified in a table format that lists the impact number and title, the significance before mitigation is implemented, the mitigation measures, and the impact significance after implementation of all mitigation measures. If a mitigation measure applies to more than one impact, it is repeated and/or referenced for each impact.

The following are the definitions of the terms used to denote the significance of each impact:

- ***No Impact:*** No change in existing conditions is anticipated if the project is implemented.
- ***Less than Significant:*** No substantial adverse environmental change is anticipated. Mitigation for a less than significant impact is usually not necessary.
- ***Potentially Significant:*** Substantial environmental change may result from implementing the project. Mitigation is identified to reduce the magnitude of the impact, or to avoid or compensate for the impact.
- ***Significant:*** Adverse environmental change is expected to occur. Mitigation is identified to reduce the magnitude of this impact, or to avoid or compensate for the impact.
- ***Significant and Unavoidable:*** Substantial adverse environmental change will occur. This impact cannot be avoided. While the magnitude may be reduced with implementation of mitigation, there is no feasible mitigation that would reduce the impact to a less-than-significant level.

The EIR includes mitigation measures intended to reduce identified impacts. Mitigation measures to be implemented during construction will be incorporated into detailed construction plans, while the MMRP provides details of implementation and monitoring for mitigation measures that apply to long-term use and maintenance of the trail. If the EIR is certified and the project approved (refer to Section 1.7 below), Northstar CSD will implement all mitigation measures included in the EIR as certified. As discussed in CEQA Guidelines §15370, mitigation strategies can include:

- ❖ Avoiding the impact altogether by not taking a certain action or parts of an action.
- ❖ Minimizing the impact by limiting the degree of magnitude of the project and its implementation.
- ❖ Rectifying the impact by repairing, rehabilitating, or restoring the impacted environment.
- ❖ Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the project.
- ❖ Compensating for the impact by replacing or providing substitute resources or environments.

1.7 PROJECT REVIEW AND CEQA PROCESS

CEQA Statute

CEQA was adopted in 1970 with the goal of protecting of the environment.

> *It is the intent of the Legislature that all agencies of the state government which regulate activities of private individuals, corporations, and public agencies which are found to affect the quality of the environment, shall regulate such activities so that major consideration is given to preventing environmental damage, while providing a decent home and satisfying living environment for every Californian. [CEQA Statute §21000(g)]*

This legislative intent is met through the preparation of comprehensive, multi-disciplinary analyses of environmental impacts. The analyses are required to disclose to decision-makers and the public the significant impacts to the environment of proposed activities. The analyses must also identify feasible alternatives and mitigation measures to avoid, reduce, or compensate for impacts. Section 21002 of the CEQA Statutes states that "public agencies should not approve projects as proposed if there are feasible alternatives or feasible mitigation measures available which would substantially lessen the significant environmental impacts of such projects." Therefore, CEQA requires the Lead Agency to adopt feasible alternatives or mitigation measures to reduce environmental impacts.

CEQA Guidelines

In addition to the requirements expressed in the CEQA Statutes, the State Office of Planning and Research developed the CEQA Guidelines (Guidelines) to provide guidance to public agencies in the appropriate implementation of the CEQA Statutes. The Guidelines were adopted by the State Resources Agency at the direction of the Legislature, as expressed in §21083 of the CEQA Statutes. They are updated regularly in response to legislative amendments to the CEQA Statutes and changes in judicial interpretations of CEQA based on recent case law.

CEQA Implementation

CEQA applies to most discretionary activities of public agencies. CEQA Guidelines §15002(i) defines a discretionary action as one in which "a governmental agency can use its judgment in deciding whether and how to carry out or approve a project." In formulating the decisions of "whether and how" to act, the public agency must adhere to the CEQA requirements for evaluating the potential environmental impacts of the action and identifying feasible alternatives and/or mitigation measures to lessen those impacts.

A primary goal of CEQA is to inform decision-makers and the public of the potential environmental impacts of discretionary actions, and to disclose to the public the reasoning used by the agency to reach their decision. To facilitate this disclosure, both the CEQA Statutes and Guidelines establish requirements for public notice and review of CEQA documents, as discussed below. Refer to CEQA Statute §21105, and CEQA Guidelines §§15082, 15083, and 15087 for additional details.

The contents of the EIR are governed by §§21100 and 21100.1 of the CEQA Statutes and by §§15120 through 15132 of the Guidelines. In short, the EIR must describe the proposed project and the existing environmental setting of the project area; evaluate the potential environmental impacts of the project, including cumulative impacts in the project vicinity; and consider mitigation measures and alternatives to the project that could avoid or reduce those impacts.

Public Review Process

Public and agency review of documents prepared pursuant to the mandates of CEQA is an integral part of the CEQA process. The CEQA Guidelines mandate early consultation with trustee and responsible agencies through the distribution of an NOP prior to the preparation of an EIR. The Guidelines also require the public to be notified of the availability of the NOP. For this project, Northstar CSD also held a public scoping meeting during the NOP circulation period to solicit comments from the public. CEQA requires that the Draft EIR be made available for review by agencies and the public and requires the Lead Agency to accept comments on the Draft EIR and prepare a written response to each comment received during the review period. The following discussion provides details of the public review process under CEQA, as well as information on where to direct comments on this Draft EIR.

Notice of Preparation

When the Lead Agency identifies potentially significant environmental impacts of a proposed project or action, an NOP is prepared pursuant to CEQA Guidelines §15082. The NOP, which includes a description of the project and its probable environmental effects, is circulated to the public and to agencies that may have jurisdiction over some aspect of the project or the resources that would be affected by the project. The NOP for the Martis Valley Trail project was circulated between on December 17, 2010 and January 17, 2011. A public scoping meeting to inform the public of the CEQA process and the proposed scope of the EIR was conducted on January 19, 2011. The general public and agencies were thus provided the opportunity to comment on the scope and content of the EIR. CEQA Guidelines §15084(c) requires that "the Lead Agency must consider all information and comments received" from the general public and from other agencies. The comments generated during circulation of the NOP were considered during preparation of this EIR and are included in Appendix A of this Draft EIR.

Draft EIR

In accordance with CEQA Guidelines §15087, Northstar CSD has provided public notice of availability of this Draft EIR and submitted this Draft EIR to the State Clearinghouse for distribution to State agencies. This Draft EIR is being circulated for a 45-day public comment period.

A public hearing regarding the information contained in this Draft EIR will be held during the public comment period, during which verbal comments on the Draft EIR will be accepted. Public notice of the hearing will be provided.

Public comment on the Draft EIR will be accepted in written form and shall be limited to the scope and content of the EIR. All comments or questions regarding the Draft EIR should be addressed to:

Mike Staudenmayer, General Manager
Northstar CSD
908 Northstar Drive
Northstar, CA 96161
mikes@northstarcsd.org

Response to Comments/Final EIR

The Final EIR will be prepared following the Draft EIR review period. The Final EIR will provide direct responses to each comment submitted on the Draft EIR. Should responding to comments require revisions to the text of the Draft EIR, those revisions will also be presented in the Final EIR. The Final EIR will be made available for review by the agencies, organizations, and individuals who commented on the Draft EIR, as well as by the general public.

Certification of the EIR/Project Consideration

Northstar CSD will review and consider the Final EIR. If Northstar CSD finds that the Final EIR is "adequate and complete," Northstar CSD may certify the Final EIR in accordance with CEQA Guidelines §15090. Upon review and consideration of the Final EIR, Northstar CSD may take action to approve, revise, or reject the project. If the EIR is certified, Northstar CSD must also adopt the MMRP (as provided in this Draft EIR) to ensure that mitigation measures required by the EIR to reduce or avoid significant impacts are carried out during project implementation.

CHAPTER 2

EXECUTIVE SUMMARY

CHAPTER 2 EXECUTIVE SUMMARY

2.1 PROJECT LOCATION

The proposed trail is located in eastern Placer County. It would cross through Martis Valley and would end near Sawmill Flat Reservoir at a junction with Forest Route 73, a paved Forest Service road. The trail terminus is located atop the ridge separating Martis Valley from the Lake Tahoe basin and near the road intersection known locally as the "Four Corners."

Two potential alignments of the trail are being evaluated as equal-weight alternatives in this EIR: the Valley Alignment would cross through the Wildlife Management Area portion of the U.S. Army Corps of Engineers (USACE) Martis Creek Lake Project, while the Highway Alignment would traverse the edge of the Wildlife Management Area along the southern side of State Route (SR) 267. The proposed trail alignments are shown on U.S. Geological Survey (USGS) maps in Figure *3-1 Site & Vicinity Map* in **CHAPTER 3 PROJECT DESCRIPTION**. Each alignment would begin near the Town of Truckee/Placer County line near the intersection of Schaffer Mill Road and SR 267 and would meander on the southwest side of SR 267 for approximately 1.75 miles.

After reaching an existing trailhead near the current parking lot for the Martis Creek Lake Project Wildlife Viewing Area, the Valley Alignment would turn southwest, cross Martis Creek, and continue meandering southeasterly towards the Northstar California community. The Valley Alignment would then climb out of the valley to the Village at Northstar and continue eastward through the Northstar California resort to connect with the final trail segments, which would travel southerly towards the ridgeline defining the Lake Tahoe Basin, terminating at a junction with Forest Route 73 near Sawmill Flat Reservoir.

The Highway Alignment would begin with the same 1.75-mile segment as the Valley Alignment. At the existing trailhead near the current parking lot for the Wildlife Viewing Area, the Highway Alignment would turn east, following an existing trail roughly parallel to SR 267, traveling between the highway and the Northstar California golf course. It would then traverse up Porcupine Hill to reach Northstar Drive, cross to the south side of Northstar Drive and head westerly to reach the Village at Northstar. This segment of the Highway Alignment would also connect with the final trail segments, which, as described above, would travel southerly towards the ridgeline defining the Lake Tahoe Basin, terminating at a junction with Forest Route 73 near Sawmill Flat Reservoir.

2.2 PROJECT AREA CHARACTERISTICS

Field work and resource mapping conducted to evaluate conditions within the project area focused on a 50-foot wide corridor around the preliminary centerline for each of the two trail alignments. In one area, a portion of Segment 3F in the Highway Alignment, the field work was conducted on a wider area. The land included in each corridor where field work and resource mapping occurred is referred to in this EIR as the study area(s) and/or the study corridor(s).

Based on the results of the field work and resource mapping, a proposed alignment was identified for each of the project alternatives. Preliminary Trail Plans have been developed for each alignment, provided in Appendix B to this Draft EIR. The plans show trail surface, each of four potential parking lots, trail amenities, locations of wetland crossings, grading and vegetation removal, and portions of existing trails proposed to be abandoned and revegetated. Project impacts have been calculated based on the area of disturbance shown in the preliminary trail plans. The area of disturbance for each alignment is also referred to throughout this EIR as the project site(s).

As shown in *Figure 3-2 Aerial Photograph* in **CHAPTER 3 PROJECT DESCRIPTION**, the proposed trail would be located on the eastern side of the Sierra Nevada Mountains, north of Lake Tahoe and southeast of the Town of Truckee. The topography is gently rolling to generally flat within Martis Valley, and steep outside of the valley through Northstar and towards Sawmill Flat Reservoir. The climate in the area is characterized by mild, dry summers and cold, wet winters. Annual temperatures range from -28 degrees F to 101 degrees F.

Drainage

The primary drainage feature in the project region is Martis Creek. This creek and several drainages that are tributary to the creek cross Martis Valley. On the north side of SR 267, Martis Creek drains into the dammed Martis Creek Lake, then continues below the dam and drains into the Truckee River south of Interstate 80.

Soils

According to the geologic map, the site is underlain by Alluvium (lake, playa, and terrace deposits), Quaternary volcanic flow rocks, and Tertiary volcanic flow rocks (California Department of Conservation 1987). Twenty soil units have been mapped within a 50-foot corridor surrounding the proposed trail alignments (USDA, NRCS 2007), as listed in **CHAPTER 3 PROJECT DESCRIPTION.**

Habitats

The Valley Alignment passes through five distinct habitat types, including riparian, wet meadow, dry meadow, coniferous forest, and sagebrush scrub. The Highway Alignment passes through four of these habitat types – it does not include any wet meadow habitat. The five habitat types potentially affected by the proposed project are described in **CHAPTER 3 PROJECT DESCRIPTION** and **CHAPTER 4 BIOLOGICAL RESOURCES**.

Special-Status Plant Species

Research through the California Native Diversity Database, U.S. Fish and Wildlife Service, and California Native Plant Society indicates that there are a total of 22 special-status plant species that may occur in the project region. Of these, one plant is known to occur within the project site for the first trail segment and five other plants are rated likely or possible to occur because the study area has some areas of suitable habitat or they are known from nearby locations. . Potential impacts to Plumas ivesia (which is the only special-status plant species observed within the project sites) and other special-status plant species are evaluated in **CHAPTER 4 BIOLOGICAL RESOURCES**.

Wildlife

The Martis Valley Trail study area supports a wide diversity of wildlife. Habitat features available in the area include nesting sites for a variety of birds, escape and thermal cover, and abundant food sources. Aquatic habitats in the area, including Martis Creek and its tributaries, provide year-round and seasonal sources of water for wildlife of the area and habitat for various aquatic and semi-aquatic species. Martis Creek Lake is known to support populations of the Lahontan Cutthroat Trout, which is listed as a threatened species under the federal Endangered Species Act. As there are no barriers to upstream movement from Martis Creek Lake, the Lahontan Cutthroat Trout could be present in Martis Creek downstream of and within the study area.

Because of the elevation of the study area, many species are expected to occur onsite seasonally either for nesting purposes or during migration. The conifer forest habitat is known to support many bird species, while the more open sagebrush scrub habitat supports fewer species. Riparian communities associated with the various drainages crossing the study corridor are expected to provide important seasonal nesting habitat for numerous migratory songbirds, including a variety of special-status species. A variety of birds have been observed in these habitat areas, including three raptors – two American kestrels and a solitary osprey.

Various mammals were also either observed or detected throughout the study area. Deer occurring within the Martis Valley are part of the Loyalton-Truckee Deer Herd and the study area occurs within the summer range for this herd.

Waters of the U.S.

A Wetland Delineation prepared for the study area found five categories of waters of the United States, including wetland swale, wetland meadow, perennial stream, intermittent stream, and ephemeral stream. These types of waters of the United States are described in **CHAPTER 3 PROJECT DESCRIPTION** and **CHAPTER 4 BIOLOGICAL RESOURCES**.

Historic and Archeological Resources

The project region is known to have supported Native American activity. The area is the ancestral home of the Washoe Tribe of Nevada and California. Evidence of Native American inhabitance of the project region is present in several individual sites within the study area. The cultural chronology for the north-central Sierra Nevada region and the associated archeological resources are discussed in **CHAPTER 5 CULTURAL RESOURCES**.

The area was also heavily affected by historic activities, including emigrant travel into California and logging, starting in the mid-19th century. Discovery of silver at the Comstock Lode in 1859 and construction of the Transcontinental Railroad influenced the historic settlement and economic activity in the area. Following railroad construction, production of other wood products allowed for self-sufficient communities to establish around larger mills, and logging remained a significant commercial activity in the region throughout the 19th century and into the middle of the 20th century. The historic significance of the region is also discussed = **CHAPTER 5 CULTURAL RESOURCES.**

2.3 CHARACTERISTICS OF SURROUNDING AREA

Land uses in the vicinity of the trail alignments being evaluated include residential and commercial uses at the eastern end of the Town of Truckee, the Lahontan and Northstar golf courses, the U.S. Army Corps of Engineers (USACE) Martis Creek Lake project area which provides boating, camping, hiking and wildlife viewing opportunities, Truckee-Tahoe Airport, the Northstar Community (including Northstar California golf course, Village at Northstar, residential areas of Northstar, and the Northstar California ski area), and undeveloped areas of Tahoe National Forest. Uses in the higher elevations, above the Village at Northstar, primarily consist of resource management (logging) and recreation.

Northstar CSD maintains 14.6 miles of existing trails in the project area. The existing trail network is known as the Tompkins Memorial Trail. The Tompkins Memorial Trail and the study corridor for each trail alignment pass through the Wildlife Management Area of the USACE Martis Creek Lake Project area. Martis Reservoir, which is also part of the Martis Creek Lake Project, is located northeast of the project area, north of SR 267. Martis Reservoir provides flood protection for the Reno-Sparks area. The reservoir is planned to have a 20,000 acre-foot capacity although the lake is maintained at low water levels due to structural and safety issues with the dam (USACE 1977, USACE 2011).

The existing trail along Martis Creek through the Martis Creek Lake Project is one of the most popular trails in the Truckee area. The heavy use of this trail has led to water quality impacts as erosion of the trail and streambanks lead to sedimentation of the creek, and impacts to wildlife from the presence of humans and dogs in the area (Truckee River Watershed Council 2009). The Watershed Council and USACE have conducted restoration activities including "rerouting some portions of the existing trails away from stream banks, meadows and wetlands, restructuring and rebuilding portions of trails, and stabilizing stream banks through extensive revegetation" to reduce sedimentation and enhance natural habitat (Truckee River Watershed Council 2009). In 2010, the Truckee River Watershed Council began an assessment of the Martis Creek watershed. The assessment includes watershed attributes, an existing conditions inventory and identification of additional restoration opportunities. The field assessment has been completed and the final report is anticipated in April 2012. (D. Shaw, pers. comm.).

2.4 PROJECT OBJECTIVES

Objectives represent the overarching goals and purpose of a proposed project. Northstar CSD has developed the following objectives for the proposed Martis Valley Trail project.

- Provide a convenient, safe and accessible non-motorized connection between the Town of Truckee, the Village at Northstar and Brockway Summit and to trails providing access to the North Shore of Lake Tahoe.
- Expand the community, recreational, and transportation opportunities available in Martis Valley.
- Expand and complement existing and planned regional trails; facilitate connections to adjacent residential areas as well as existing and planned trail systems and parking and transit centers throughout the area.
- Provide safe passage for all users, avoiding interface with automobiles to the greatest extent possible.
- Provide a trail that is accessible to the widest variety of potential users during all seasons of the year.
- Ensure respect and protection for scenic, natural, and cultural resources in the area during trail construction and use.

- ❖ Highlight the natural, cultural and social context of the region through interpretive opportunities.
- ❖ Provide an alternative to automobile transportation, creating a continuous route between regional commercial centers.

2.5 TRAIL ALIGNMENTS AND AMENITIES, CONSTRUCTION, AND MAINTENANCE

The trail would be constructed and maintained by Northstar CSD but owned by Placer County. The proposed project is a paved, multi-use recreational trail extending from the southern limits of the Town of Truckee at the Nevada/Placer County line eastward to the ridgeline defining the Lake Tahoe Basin. The trail would terminate near Sawmill Flat Reservoir at Forest Route 73, a paved Forest Service road, near a road intersection known locally as "Four Corners." As noted above and described in detail below, two trail alignments are being considered as equal-weight alternatives in this EIR. Each segment of each alignment is briefly described below, with additional details provided in **CHAPTER 3 PROJECT DESCRIPTION.** Figures showing the proposed trail alignments and some of the proposed trail amenities are also provided in Chapter 3. Preliminary Trail Plans and a memorandum describing each segment are provided in Appendix B to this Draft EIR. The Preliminary Trail Plans and memo measure each segment using stations, where each station represents 100 feet of trail length. For example, Segment 1 begins at Station 0+00 and ends at Station 92+00. The first trail amenity on Segment 1 is a rest area located at Station 10+25. This is approximately 1,025 feet from the beginning of the trail.

Under either alignment, the trail would:

- ❖ provide a regional connection between existing trails in the Town of Truckee and trails in the Lake Tahoe Basin;
- ❖ accommodate pedestrians, bicyclists, and other non-motorized transportation,
- ❖ be constructed to meet the standards of the Americans with Disabilities Act (ADA), including a trail grade that provides for maximum accessibility in accordance with ADA requirements;
- ❖ provide a paved surface generally ten feet wide and two-foot unpaved shoulders on either side.

Valley Alignment Trail Segments

The proposed Martis Valley Trail Valley Alignment has been divided into five segments, as described below, from north to south. Construction and operation of Segments 1, 2A and 2B are evaluated in this Draft EIR at a project-level of detail. Segments 3E and 4 would be constructed in the future as funding becomes available. These segments are evaluated in this Draft EIR at a programmatic level. The total length of the Valley Alignment, including Segments 1, 2A, 2B, 3E and 4, is 9.3 miles (49,272 linear feet).

Segment 1: Town of Truckee/Placer County line to the existing Martis Creek Lake Project Wildlife Viewing Area (±1.8 miles, 9,300 linear feet)

The trailhead would be located near the County line, at the intersection of SR 267 and Autumn Way, allowing for a future connection with the Town of Truckee trail system. The trail would head south and east, crossing Schaffer Mill Road, and meander roughly parallel to SR 267 but separated from the highway for aesthetic and safety reasons. This segment would include a rest area, a picnic area, a wildlife viewing area, a covered Native American interpretive exhibit, and a new parking lot. Four potential locations for the new parking lot have been identified, as shown in the Preliminary Trail Plans and evaluated in **CHAPTER 11 CEQA DISCUSSIONS**. Wetlands along this segment would be crossed with a boardwalk. The covered Native American interpretive exhibit would be constructed near Station 91+00, which is at the eastern end of this segment.

Segment 2A: Existing Martis Creek Lake Project Wildlife Viewing Area southwest to junction with Segment 2B (±1.1 miles, 5,988 linear feet)

This segment would head southwest across Martis Valley primarily following existing dirt roads and trails. Wetlands near the beginning of this segment would be crossed with a boardwalk. The trail would turn south near a historic quarry site, following an old access road through the quarry site. A bridge crossing of Martis Creek would be constructed, and the bridge would transition to a boardwalk section to cross wetlands adjacent to the eastern side of Martis Creek. A third wetland near the end of this segment would also be crossed with a boardwalk. This segment also includes several junctions with existing trails. Segment 2A would terminate at the property boundary between the Martis Creek Lake Project and Northstar California Resort.

Segment 2B: Martis Creek Lake Project/Northstar California Resort property boundary south to Village at Northstar (±2.5 miles, 13,122 linear feet)

This segment would junction with Segment 2A at the property boundary between the Northstar California Resort and the Martis Creek Lake Project. It would ascend easterly through conifer forest and then south to its termination near the existing Village at Northstar bus loop on Village Circle. The trail would cross Northstar Drive at its intersection with Big Springs Drive. Traffic at this intersection is controlled with stop signs. This segment includes crossing an unnamed tributary to Martis Creek, replacing an existing culvert with a larger one. This segment also includes several junctions with existing trails, one requiring retaining walls and stairs, several other retaining walls, and abandonment and revegetation of portions of existing trails.

Segment 3E: Village at Northstar east to junction with Segment 4 (±0.8 miles, 4,398 linear feet)

In its conceptual design, this segment would include one at-grade crossing of Highlands View Road and a crossing of West Martis Creek. The trail would extend easterly from the Village at Northstar to an elevation of approximately 6,500 feet on a forested ridgeline where it would junction with Segment 4.

Segment 4: Terminus of Segment 3E to junction with Forest Route 73 (±3.12 miles, 16,464 linear feet)

In its conceptual design, Segment 4 would head generally south from its junction with Segment 3E and ascend the forested slope with a series of switchbacks following existing dirt roads to the extent possible. The southern terminus of Segment 4 would be its junction with a paved Forest Service road, Forest Route 73, just south of Sawmill Flat Reservoir.

Highway Alignment Trail Segments

The proposed Martis Valley Trail Highway Alignment has been divided into six segments, as described below, from north to south. Segments 1, 3A, 3B, and 3F are evaluated in this Draft EIR at a project-level of detail. Segments 3E and 4 would be constructed in the future as funding allows. These segments are evaluated in this Draft EIR at a programmatic level. The total length of the Highway Alignment, including Segments 1, 3A, 3B, 3F, 3E and 4, is 10.4 miles (54,838 linear feet).

Segment 1: Same as Valley Alignment from Town of Truckee/Placer County boundary to the existing Martis Creek Lake Project Wildlife Viewing Area (±1.8 miles, 9,300 linear feet)

The trailhead would be located near the County line, at the intersection of SR 267 and Autumn Way, allowing for a future connection with the Town of Truckee trail system. The trail would head south and east, crossing Schaffer Mill Road, and meander roughly parallel to SR 267 but separated from the highway for aesthetic and safety reasons. This segment would include a rest area, a picnic area, a wildlife viewing area, a covered Native American interpretive exhibit, and a new parking lot. Four potential locations for the new parking lot have been identified, as shown in the Preliminary Trail Plans and evaluated in **CHAPTER 11 CEQA DISCUSSIONS**. Wetlands along this segment would be crossed with a boardwalk. The covered Native American interpretive exhibit would be constructed near Station 91+00, which is at the eastern end of this segment.

Segment 3A: Existing Martis Creek Lake Project Wildlife Viewing Area west to junction with Segment 3B (±1.15 miles, ±6,092 linear feet)

This segment would junction with Segment 1 at location of the existing Martis Creek Lake Project Wildlife Viewing Area. This segment would follow a portion of the existing Tompkins Memorial Trail in this area between SR 267 and Martis Creek. At the Martis Creek crossing, the existing Frank's Fish Bridge would be replaced. This segment would continue roughly parallel to SR 267, just outside the highway easement and adjacent to the Northstar golf course. One junction with existing trails would be included in this segment. Construction along this segment would also include improvements to the existing drainage ditch adjacent to SR 267.

Segment 3B: Northstar Golf Course to Northstar Drive, traversing Porcupine Hill (±1.65 miles, ±8,699 linear feet)

Segment 3B would begin by heading south on the existing unpaved and unnamed roadway east of the Northstar golf course then heading southeast to traverse Porcupine Hill. This segment would include two junctions with existing trails, several retaining walls and abandonment and revegetation of two small sections of existing trail. This segment would connect to an existing parking lot on the north side of Northstar Drive. A trail map would be provided at this connection point. The trail would continue west along Northstar Drive to the roundabout at Castle Peak Way/Ridgeline Drive. The trail would cross Castle Peak Way and Northstar Drive using existing pedestrian crossing locations. Segment 3B would end at the southwest quadrant of this roundabout.

Segment 3F: Between Northstar Drive and the Village at Northstar(±1.9 miles, 9,885 linear feet)

Segment 3F would begin in the southwest quadrant of the roundabout at Northstar Drive and Castle Peak Way/Ridgeline Drive and would head southwest roughly parallel to Ridgeline Drive. Starting at Station 2030, this segment would include several switchbacks to gain elevation. Two scenic view and rest areas would be provided along these switchbacks. This segment would include several retaining walls and crossings of several unnamed drainages as well as West Martis Creek. Crossings would be accomplished with bridges and culverts. This segment would pass west of the Northstar Property Owners Association tennis courts ending near an existing walkway that provides access to the Village at Northstar.

Segment 3E: Same as Valley Alignment from Village at Northstar to Segment 4 (±0.8 miles, 4,398 linear feet)

In its conceptual design, Segment 3E would include one at-grade crossing of Highlands View Road and a crossing of West Martis Creek. The trail would extend southeasterly from the Village at Northstar and reach an elevation of approximately 6,500 feet on a forested ridgeline where it would junction with Segment 4.

Segment 4: Same as Valley Alignment from Segment 3F to Junction with Forest Route 73 (±3.12 miles, 16,464 linear feet)

In its conceptual design, Segment 4 would head generally south from its junction with Segment 3F and ascend the forested slope with a series of switchbacks following existing dirt roads to the extent possible. The southern terminus of Segment 4 would be its junction with Forest Route 73, a paved Forest Service road just south of Sawmill Flat Reservoir.

Parking

Under either alignment, the trail would include a new parking lot located along Segment 1. The parking lot would include approximately 22 parking stalls and a trailhead with information kiosk. Parking lot drainage would be managed with the use of a pervious surface for the parking stalls, a rain garden, and detention basin. The parking lot would be located in one of four potential one-half-acre sites. A detailed analysis of the impacts of each of the Parking Lot Alternative locations is provided in **CHAPTER 11 CEQA DISCUSSIONS**.

Interpretive Program

Under either alignment, the trail would include interpretive panels and displays to inform trail users of natural, cultural, and physical features. These displays would be combined with seating at overlooks and rest areas. The interpretive features would be developed through a design process that includes property owners and residents, the USACE, the Washoe Tribe, and local historians.

Trail Construction

Construction of the trail segments between the trailhead (Placer County/Town of Truckee boundary) and the Village at Northstar would occur between May and November over a period of several years, depending on funding. As established in the Initial Study and Notice of Preparation, construction activities would occur between the hours of 7:00 a.m. and 6:00 p.m. Monday through Friday and between 8:00 a.m. and 6:00 p.m. on Saturdays.

The trail corridor would be cleared of vegetation to a minimum width of 15 feet. Vegetation removal adjacent to the paved trail section and shoulders would be minimized to the extent possible, but some vegetation removal adjacent to the trail would be needed to provide safe lines of sight. Trees that overhang the trail would be trimmed generally up to between 12 and 15 feet.

Several crossings of creeks and other drainages would be necessary under either trail alignment. These crossings would be accomplished with bridges, and boardwalk sections would be used to cross wetlands. During construction, Northstar CSD will implement a storm water pollution prevention plan (SWPPP) that will include Best Management Practices to minimize potential impacts from soil transportation, erosion, and siltation during trail construction. The SWPPP will be prepared in accordance with Lahontan Regional Water Quality Control Board (RWQCB) procedures and requirements.

Maintenance and Management

The trail would be constructed and maintained by Northstar CSD but owned by Placer County. Maintenance activities including sweeping, crack sealing, surface restoration, vegetation control, and removal of slough would be performed by Northstar CSD staff and/or volunteers, and maintenance would occur annually or as needed. Additional maintenance may be required as a result of weather-related events (e.g., removal of downed trees and slide removal) and acts of vandalism. Depending on the bridge materials used (i.e., wood, steel, or fiberglass) the bridges would require routine maintenance about every eight to ten years.

2.6 AREAS OF KNOWN CONTROVERSY AND ISSUES RAISED

CEQA requires that the EIR "identify areas of controversy" that have been raised by either the public or public agencies (Section 15123, CEQA Guidelines).

At the time that the Notice of Preparation of this EIR was circulated, the project proposal identified only one alignment – the Valley Alignment. Many of the comments received on the Notice of Preparation and during the public scoping meeting raised substantial concern regarding this alignment and suggested that the Highway Alignment would be more appropriate. In consideration of these comments, both alignments are being evaluated as equal-weight alternatives in this EIR.

Additionally, the Notice of Preparation indicated that the topics of aesthetics, transportation and circulation, and recreation would not be addressed in the EIR. In response to comments on the Notice of Preparation raising substantial concerns regarding these issues, these topics are addressed in detail in this EIR. In regards to transportation and circulation, the Notice of Preparation comments raised particular concern with parking and safety of accessing the Martis Creek Lake Project Wildlife Viewing Area parking lot from SR 267. In regards to recreation, the Notice of Preparation comments raised particular concern with the safety of multiple user groups and effects on existing recreational uses.

A comment letter was received from the USACE that raised several concerns with the proposed trail alignment. These concerns included the potential for trail construction to conflict with existing recreational use of the Martis Creek Lake project area and whether the trail is consistent with the 1977 Martis Creek Lake Master Plan.

Other concerns raised in the comments on the Notice of Preparation include the appropriateness of a paved trail in Martis Valley (in consideration of biological, aesthetic, and other effects), considerations of other types of trail surfaces, the increased use of Martis Valley that the trail would generate and the associated effects on biological and cultural resources, and increases in stormwater runoff and adverse effects on water quality.

2.7 PROJECT ALTERNATIVES

In addition to the two equal-weight project alternatives evaluated throughout the EIR, **CHAPTER 11 CEQA DISCUSSIONS** analyzes the No Project Alternative, as required by CEQA. This alternative assumes that neither of the trail alignments are constructed, and no changes to existing trails within the Martis Creek Lake project area and Northstar California resort are made. While detailed impact analyses for each of the equal-weight alternatives are presented throughout the EIR, the range of impacts associated with each is summarized in **CHAPTER 11 CEQA DISCUSSIONS**. A number of other alternatives were considered but rejected as described in Chapter 11.

As noted above, the analysis of project alternatives also includes consideration of each of four potential locations for a new trailhead and parking lot. They are evaluated as four equal weight alternatives. One location will be constructed as a project component. The impact analysis for the parking lot alternatives is presented in Chapter 11 to facilitate comparison of their relative impacts.

2.8 INTENDED USES OF THE EIR

This Draft EIR has been prepared in accordance with CEQA (Public Resources Code, Section 21000, et seq.) and the CEQA Guidelines (14 California Administrative Code, §15000, et seq.). This Draft EIR provides public disclosure of potential impacts of the project. It does not serve as a recommendation of either approval or denial of the project. Section 15121(a) of the CEQA Guidelines states:

> *An EIR is an informational document which will inform public agency decision-makers and the public generally of the significant environmental effect of the project, identify possible ways to minimize the significant effects, and describe reasonable alternatives to the project.*

As required under CEQA, the Martis Valley Trail Draft EIR provides an assessment of environmental impacts associated with construction and operation of the proposed project and presents the means and methods of reducing significant impacts where possible.

Required Permits and Approvals

Based on a review of the proposed project details, the information presented in this Draft EIR, and other available information, the Northstar CSD Board of Directors will consider whether or not to approve the proposed trail. If the trail is approved, Northstar CSD will request the entitlements and approvals listed in *Table 2.1* from each identified Responsible Agency. Following the table is a discussion of each of the entitlements and approvals required.

Table 2.1
Required Approvals/Permits for Martis Valley Trail

Required Permit	Responsible Agency
Trail Authorization	Northstar CSD
Agreement authorizing trail alignment through USACE property	U.S. Army Corps of Engineers
Clean Water Act Section 404 Permit	U.S. Army Corps of Engineers
Water Quality Certification	Lahontan Regional Water Quality Control Board
Federal Endangered Species Act Section 7 Consultation	U.S. Fish and Wildlife Service
National Historic Preservation Act Section 106 Consultation	State Historic Preservation Officer
Streambed Alteration Agreement	California Department of Fish and Game
Minor Use Permit	Placer County
Grading / Improvement Plan Approval	Placer County
Encroachment Permit (may be required)	California Department of Transportation
Timber Harvest Plan and/or Timberland Conversion Permit (may be required)	California Department of Forestry and Fire Protection

Required Entitlements, Permits and Approvals

Trail Authorization. The Northstar CSD Board of Directors must authorize construction and maintenance of the trail.

USACE Agreement: The proposed Martis Valley Trail would cross lands owned and managed by the USACE. For Northstar CSD to construct and operate a trail through USACE lands, the CSD and USACE would need to establish a legal mechanism granting permission for the trail to cross USACE lands and identifying the responsibilities of each party regarding access and trail maintenance. It is anticipated that this mechanism will be in the form of a real estate document, such as an easement. This action would be subject to USACE compliance with the National Environmental Protection Act.

Clean Water Act Section 404: The USACE regulates the placement of fill or dredged material that affects waters of the United States, which include streams and wetlands. The USACE regulates these activities under authority granted through Section 404 of the Clean Water Act. The project site includes wetland resources under the jurisdiction of the USACE that may be impacted by trail crossings. Any discharge of dredged or fill materials to wetlands would require permitting pursuant to Section 404 of the federal Clean Water Act. The amount of wetland impacts anticipated under each alignment is identified in **CHAPTER 4 BIOLOGICAL RESOURCES**. The project would require authorization pursuant to Nationwide Permit 42.

Water Quality Certification: Because approval and implementation of the proposed project has the potential to affect wetlands or other waters of the U.S., the Lahontan RWQCB would need to provide water quality certification of the project in compliance with Section 401 of the Clean Water Act. In providing water quality certification, the RWQCB would review the USACE permit conditions of approval and may require the project to implement additional water quality protection measures.

Federal Endangered Species Act Section 7 Consultation: When a project may affect federally-listed endangered species and requires USACE approval, the USACE will consult with the U.S. Fish and Wildlife Service to ensure that appropriate mitigation measures are incorporated in the project to avoid impacts to federally-listed endangered species. The project's potential to affect federally-listed endangered species is evaluated in **CHAPTER 4 BIOLOGICAL RESOURCES**.

National Historic Preservation Act Section 106 Consultation: When a project requires USACE approval, the USACE must ensure that the project will not substantially affect historic or archeological resources. The USACE will consult with the State Historic Preservation Officer to ensure that appropriate mitigation measures are incorporated in the project to avoid such impacts. The project's potential to affect historic and archeological resources is evaluated in **CHAPTER 5 CULTURAL RESOURCES**.

Streambed Alteration Agreement: The California Department of Fish and Game must approve activities that may alter an area within a streambed or stream zone pursuant to Section 1600 et seq of the California Fish and Game Code. The portions of the project that would alter areas under the jurisdiction of the California Department of Fish and Game are identified in **CHAPTER 4 BIOLOGICAL RESOURCES**.

Minor Use Permit: The trail crosses land within unincorporated Placer County, subject to the Martis Valley Community Plan. Based on the land use and zoning designations of this land, the Martis Valley Community Plan requires that Placer County issue a Minor Use Permit to allow establishment of recreational land uses in this area.

Grading / Improvement Plan Approval: The proposed project would require approval from Placer County of either grading plans or improvement plans. Plan approval must be obtained before commencement of any grading or other site preparation.

Encroachment Permit: Depending on the location selected for the new trailhead and parking lot, some work within the Caltrans right-of-way may be necessary. Any work within the Caltrans right-of-way would require issuance of an encroachment permit from Caltrans.

Timber Harvest Permit and/or Timberland Conversion Permit: Some tree removal will be required for trail construction. If the tree removal meets the permit requirements in California Code of Regulations Section 1103 and Public Resources Code 4581 one or both of the above permits will be necessary.

2.9 SUMMARY OF IMPACTS AND MITIGATION MEASURES

As discussed in **CHAPTER 1 INTRODUCTION**, this Draft EIR is focused on impacts in the areas of biological resources, cultural resources, hydrology and water quality, transportation and circulation, visual resources, and recreation. The impacts and mitigation measures identified in this Draft EIR are listed in *Table 2.2*. The table identifies the level of significance of each impact and presents the mitigation measures necessary to reduce impacts to a less than significant level. Each of the mitigation measures identified in chapters 4 through 10 of this Draft EIR would be required to be implemented for either project alternative – the Valley Alignment or the Highway Alignment. Mitigation measures identified in Chapter 11 are also presented in Table 2.2. Those measures are specific to the parking lot alternatives, and would be required if relevant to the parking lot alternative location selected for construction.

Environmental impacts not evaluated in this Draft EIR were evaluated in the Initial Study (circulated with the Notice of Preparation). The Initial Study included mitigation measures to reduce potentially significant impacts to less than significant levels. *Table 2.3* lists the mitigation measures identified in the Initial Study to address the impacts evaluated in that document. Although the Initial Study was completed specifically in consideration of the Valley Alignment, a supplement to the Initial Study was prepared which demonstrated that the impacts of the Highway Alignment would be similar and the same mitigation measures would apply. Therefore each mitigation measure identified in *Table 2.3* would be required to be implemented under either alternative.

The mitigation measures identified in the Initial Study for impacts to visual resources are not included in *Table 2.3* as the Initial Study analysis for that topic is replaced with the analysis in this Draft EIR. Impacts and mitigation measures for visual resources are addressed in *Table 2.2*.

Table 2.2
Impact Summary Table

Significance Before Mitigation	*Mitigation Measures*	*Significance After Mitigation*
	Biological Resources	
Impact 4.1: Adversely Affect Special Status Species		
PS	***Mitigation Measure 4.1a:*** Northstar CSD shall implement the following: A. Avoid substantially modifying the existing hydrology in the vicinity of identified populations of Plumas ivesia to ensure that areas that support Plumas ivesia are not drained or dried or subject to concentrated flows. B. Flag the limits of disturbance before construction begins to ensure that construction equipment and crews do not enter areas where Plumas ivesia will be protected. C. Periodically monitor areas adjacent to the trail where Plumas ivesia occurs for disturbance associated with trail operations. Monitoring efforts shall include consideration of vegetation health and vigor, changes in hydrology and erosion, and evidence of off-trail activities. If disturbance in these areas is observed, Northstar CSD shall consult with a qualified botanist to determine appropriate measures to implement for the protection of non-impacted Plumas ivesia populations adjacent to the trail. Measures could include fencing along the trail shoulder, signage to identify areas of sensitive species and advise trial users to stay on the trail, drainage modifications, and temporary or permanent fencing of areas where disturbance is observed.	**LTS**
	Mitigation Measure 4.1b: Prior to commencement of any construction activities, including site clearing and/or grading, Northstar CSD shall retain a qualified botanist to conduct floristic rare plant surveys within wetland, riparian, and stream habitats that would be affected by project construction. These surveys shall be carried out during appropriate blooming periods of special-status species with potential to occur onsite. Should any individual special-status plant species be located, the applicant shall retain a qualified botanist to develop and implement a management plan. Appropriate measures could include transplanting, soil/seed salvage and avoidance.	
	Mitigation Measure 4.1c: To minimize impacts to Lahontan cutthroat trout and its habitat or potential habitat, Northstar CSD shall implement BMPs to avoid adversely affecting water quality during and following construction, as identified below and to be consistent with NPDES and Section 404 permitting requirements. Northstar CSD shall also implement Lahontan cutthroat trout habitat restoration at a ratio no less than 1:1. The actual restoration ratio shall be determined	

Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
	by USFWS through consultation with USACE as part of the Clean Water Act Section 404 permitting process. Restoration of Lahontan cutthroat trout habitat could include bed and bank stabilization measures, revegetation, and in-stream habitat improvement, among other measures. Northstar CSD shall also implement any additional measures required by USFWS as identified through USACE consultation with USFWS as part of the Clean Water Act Section 404 permitting process. BMPs implemented to avoid adversely affecting water quality shall be identified on Improvement Plans and subject to approval by the Placer County Planning Department and Engineering and Surveying Department and USACE. BMPs to minimize impacts to Lahontan cutthroat trout and its habitat or potential habitat shall include the following: A. Implement ***Mitigation Measure 6.1a*** which identifies requirements for design of BMPs. B. Implement ***Mitigation Measure 6.1b*** which requires Northstar CSD to prepare a Stormwater Pollution Prevention Plan (SWPPP) and project Grading or Improvement Plans that include detailed provisions for all construction BMPs. C. Implement ***Mitigation Measure 6.1c*** which requires permanent BMPs to be included in the SWPPP and project Grading or Improvement Plans and identifies minimum requirements for permanent BMPs. D. Implement ***Mitigation Measure 6.1d*** which identifies design standards for trail amenities to manage stormwater.	
	Mitigation Measure 4.1d: A biological monitor shall be retained throughout the duration of construction activities in the vicinity of affected aquatic habitat, to ensure that disturbance of Sierra Nevada yellow-legged frog and its habitat is minimized or avoided. If any Sierra Nevada yellow-legged frog are detected within a construction area, work must be halted and the CDFG shall be contacted immediately to determine appropriate avoidance measures including, but not limited to, moving individuals to appropriate offsite locations or limiting construction operating periods.	
	Mitigation Measure 4.1e: All aquatic habitat and wetland areas disturbed by construction activities shall be restored/revegetated to pre-project conditions or as required by the terms and conditions of permits obtained from the USACE, CDFG, or Lahontan Water Quality Control Board.	
	Mitigation Measure 4.1f: To avoid disturbance of active nests, trees should be removed outside the typical breeding season. A survey for active raptor nest sites shall be conducted by a qualified biologist prior to construction activities during the typical raptor nesting season (March 1 through	

Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
	August 31). The survey shall be conducted no more than 30 days prior to initiation of proposed construction activities and shall be coordinated with construction activities to ensure that any area that remains inactive for more than 30 days is resurveyed prior to initiating or re-initiating construction work. Survey results shall be submitted to the CDFG. If active raptor nests are found on or immediately adjacent to proposed construction areas, a minimum 300-foot buffer shall be established from active construction areas and consultation with CDFG shall be initiated to determine protective measures. Protective measures could include buffer zones around active nests and subsequent monitoring of the nest until it is determined to be inactive and CDFG concurrence is obtained. No trees with active nests shall be removed until the nest is determined to be inactive.	
	Mitigation Measure 4.1g: To avoid potential impacts to willow flycatcher, yellow warbler, and associated habitat, the following measures shall be implemented: 1. Prior to any work within 500 feet of any riparian habitat, a qualified biologist shall conduct a habitat assessment to identify areas of potential willow flycatcher nesting habitat. Work may proceed in areas determined to not provide willow flycatcher nesting habitat. 2. Except as provided under item 4, no heavy equipment shall be used and no vegetation shall be altered within 300 feet of potential willow flycatcher nesting habitat during the critical breeding season, which extends from May 1 to August 31. 3. Disturbance and removal of vegetation within riparian areas shall be minimized to the extent possible by clearly field marking the limits of vegetation removal requirements prior to any site disturbance. Vegetation removal from riparian areas shall be kept to the minimum required to allow for construction of the proposed improvements. CDFG shall be contacted prior to any vegetation removal within riparian areas to determine appropriate impact minimization strategies and compensation measures for impacts to vegetation that could occur. Compensation could include revegetation or habitat restoration at a ratio to impacts determined appropriate by CDFG, but no less than 1:1. 4. If work must occur during the breeding season for willow flycatcher, surveys to determine presence or absence of this species shall be carried out by a qualified biologist according to the protocol provided by A Willow Flycatcher Survey Protocol for California or the survey protocol guidance provided by CDFG at the time surveys are conducted. Results of the survey shall be provided to CDFG. With concurrence of CDFG, work may proceed in suitable habitat areas if surveys determine that no nesting birds occur within 500 feet of the proposed work area. Any work carried out during the breeding season shall be monitored by a biologist qualified to identify willow flycatcher individuals and nests and shall be subject to other	

Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
	measures resulting from consultation with CDFG. If surveys or monitoring indicate presence of nesting willow flycatcher within 500 feet of the project site, work within 300 feet of the nesting area shall cease until it is determined that nests are inactive or young have fledged.	
	Mitigation Measure 4.1h: New ground disturbance within areas of riparian vegetation that provide potential habitat for Sierra Nevada mountain beaver and Sierra Nevada snowshoe hare shall be avoided to the extent feasible. If disturbance to riparian vegetation cannot be avoided, a qualified biologist shall be retained to survey the proposed area of disturbance prior to construction. If evidence of occurrence of either of these species is found, a minimum 500 foot non-disturbance buffer shall be established around nest or burrow sites and CDFG shall be contacted to determine appropriate avoidance or impact minimization measures, which could include monitoring, buffer zones, seasonal work restrictions, or other measures.	
	Mitigation Measure 4.1i: Staging areas shall be located in areas that have been previously disturbed, do not include any riparian habitat, do not support Plumas ivesia plants, and do not require any tree removal.	
Impact 4.2: Adversely Affect Riparian Habitat or Other Sensitive Natural Community		
PS	***Mitigation Measure 4.2a:*** Northstar CSD shall obtain a Streambed Alteration Agreement from CDFG to authorize impacts within the bed and bank of drainages and associated riparian habitat within the trail alignment. Northstar CSD and their contractors shall adhere to all conditions and requirements of the Streambed Alteration Agreement. The Streambed Alteration Agreement shall be acquired prior to any clearing, grading, or excavation work on the project site.	**LTS**
	Mitigation Measure 4.2b: Staging areas shall be located in areas that have been previously disturbed and do not include any riparian habitat or other sensitive natural community.	
	Mitigation Measure 4.2c: Northstar CSD shall retain a qualified biologist to update the Biological Resources Assessment for Segments 3E and 4 at the time construction of these segments is proposed.	
Impact 4.3: Adversely Affect Federally Protected Wetlands		
S	***Mitigation Measure 4.3a:*** The project applicant shall obtain the appropriate permits from USACE, the Lahontan RWQCB, and CDFG to authorize impacts to waters of the U.S. delineated on the project site. These impacts would require a Section 404 permit from the USACE, a Section 401 Water Quality Certification from the Lahontan RWQCB, and a Streambed Alteration	**LTS**

Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
	Agreement from CDFG. These permits shall be acquired prior to any clearing, grading, or excavation work on the project site.	
	Mitigation Measure 4.3b: To compensate for impacts to wetlands Northstar CSD shall carry out replacement, habitat restoration, or purchase of mitigation credits at an approved wetlands mitigation bank. Minimum replacement ratios shall be 1:1 for wetland habitat to ensure compliance USACE and Placer County policies requiring "no net loss" of wetlands. If purchase of credits at an approved wetlands mitigation bank is selected, sufficient credits shall be purchased to compensate for loss of wetland or habitat acreage and value, including temporal loss. Evidence of payment, which describes the amount and type of habitat purchased at the bank site, shall be provided to USACE prior to any ground disturbance associated with the project.	
	Mitigation Measure 4.3c: The project applicant shall incorporate BMPs to control erosion and sedimentation of waterways during and following construction. BMPs shall be identified on Improvement Plans and subject to approval by the Placer County Planning Department and Engineering and Surveying Department and USACE. BMPs to minimize indirect impacts to wetlands shall include the following mitigation measures: A. Implement ***Mitigation Measure 6.1a*** which identifies requirements for design of BMPs. B. Implement ***Mitigation Measure 6.1b*** which requires Northstar CSD to prepare a Stormwater Pollution Prevention Plan (SWPPP) and project Grading or Improvement Plans that include detailed provisions for all construction BMPs. C. Implement ***Mitigation Measure 6.1c*** which requires permanent BMPs to be included in the SWPPP and project Grading or Improvement Plans and identifies minimum requirements for permanent BMPs. D. Implement ***Mitigation Measure 6.1d*** which identifies design standards for trail amenities to manage stormwater.	
	Mitigation Measure 4.3d: Staging areas shall be located in areas that have been previously disturbed and do not include any federally protected wetlands.	
Impact 4.4: Interfere Substantially with Wildlife Movement or Native Wildlife Nursery Sites		
PS	***Mitigation Measure 4.4a:*** Bridges and culverts constructed across riparian areas shall be designed and constructed to provide ample space for smaller mammals to move within the riparian corridor without having to travel over the trail surface. Design criteria shall be provided by	**LTS**

Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
	a qualified wildlife biologist and could include spacing of boardwalk supports and free space between the bottom of the boardwalk and bridge decks and the bed and bank of drainages crossed to provide for continuous cover for smaller mammals using such corridors (raccoons, foxes, etc).	
Impact 4.5: Conflict with Local Policies or Ordinances Protecting Biological Resources		
S	***Mitigation Measure 4.5a:*** Northstar CSD shall implement *Mitigation Measures 4.1a* through *4.1i*, *4.2a* through *4.2c, 4.3a* through *4.3d,* and *4.4a.*	LTS
Cultural Resources		
Impact 5.1: Adversely Affect Known Historically Significant and/or Unique Archeological Resources		
S	***Mitigation Measure 5.1a***: Capping of archeological resource site shall occur where feasible. Considerations of feasibility may include consideration of slope and trail surface stability, impacts to biological resources, visual resources, and hydrology and water quality, and construction economics. Capping shall be accomplished by placing a layer of chemically stable fill over the identified cultural resource site and constructing the trail and all associated improvements over the top of this fill. Specific plans for capping resources within the Martis Creek Lake Project shall be approved by the USACE.	LTS
	Mitigation Measure 5.1b: The limits of the area of disturbance in the vicinity of all known archeological resource sites shall be flagged or otherwise demarcated in the field prior to commencement of construction.	
	Mitigation Measure 5.1c: A Research Design and Testing Plan shall be prepared by a qualified archaeologist in advance of project construction. The Research Design and Testing Plan must be approved by the U.S. Army Corps of Engineers if the excavation will occur within the Martis Creek Lake project. The Research Design and Testing Plan shall include the following components: A. Summarize background information, field reconnaissance, and site recordation that has already occurred within the project area; B. discuss the archeological sensitivity of the region; C. identify the important questions that could be addressed by the kind of data that is likely to be contained at each affected site and could not be addressed using data from other	

Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
	sources alone; D. describe the cultural context of each affected site; E. present a Testing Plan that identifies specific areas for subsurface exploration, identifies specific methods – such as extracting soil cores, surface scraping, trenching, or excavating test pits - for conducting that exploration, identifies security measures to protect resources during implementation of the program, and describes handling and inventorying procedures for any resources and artifacts found during exploration; F. outline methods for evaluation of affected sites (including assessing the integrity and research potential of each affected site); and G. provide a Treatment Plan for affected resources that are eligible for listing or qualify as unique archeological resources. The Treatment Plan shall identify specific measures for each site that ensure resources are avoided where feasible. Where avoidance is not feasible, the Treatment Plan may include interpretation and/or data recovery sufficient to provide meaningful public education and extraction of pertinent scientific knowledge. Any data recovery excavation shall include recovery of a statistically-significant sample of the archeological deposit. During the excavation, any features identified shall be drawn and photographed. Recovered cultural material (artifacts) shall be cleaned and catalogued, and a professional analytical report shall be prepared on the findings. The report shall be filed with appropriate agencies and the NCIC of the CHRIS. The recovered artifact collection and catalogue shall be placed in a permanent curation facility for use by future researchers.	
	Mitigation Measure 5.1d: Heritage Resource Inventories shall be completed for potential staging areas located outside boundaries of previous survey areas. Staging areas are prohibited where significant cultural resources are identified.	
	Mitigation Measure 5.1e: Heritage Resource Inventories shall be completed for Segments 3e and 4 prior to approval of Improvement or Grading Plans for those segments.	
Impact 5.2: Adversely Affect Presently Unknown Historic or Archeological Resources		
PS	***Mitigation Measure 5.2a:*** If artifacts, exotic rock, unusual amounts of shell or bone, or other buried archeological resources are encountered during earth-disturbance associated with the proposed project, all soil-disturbing work shall be halted within 100 feet of the discovery until a qualified archeologist completes a significance evaluation of the finds pursuant to Section 106 of	**LTS**

Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
	the NHPA. If the finds are determined to be culturally significant materials (i.e., unique archeological resources or historical resources), subsurface testing shall be conducted. Subsurface testing procedures shall involve shovel testing, augering, or other such techniques designed to identify and/or characterize subsurface cultural deposits. If a resource is determined to be important under CEQA (i.e., because it is a unique archeological or historical resource or it is eligible for inclusion in either the NRHP or CRHR), a qualified professional archeologist shall be retained to conduct data recovery excavation. If data recovery excavation is required, a qualified archeologist shall prepare a data recovery plan that provides for recovering the scientifically consequential information from and about the resource. The data recovery plan must be prepared prior to commencing any excavation activities within 100 feet of the resource discovery. The data recovery plan must be approved by the U.S. Army Corps of Engineers if the excavation will occur within the Martis Creek Lake project. The data recovery excavation shall include recovery of a statistically-significant sample of the archeological deposit. During the excavation, any features identified shall be drawn and photographed. Recovered cultural material (artifacts) shall be cleaned and catalogued, and a professional analytical report shall be prepared on the findings. The report shall be filed with appropriate agencies and the NCIC of the CHRIS. The recovered artifact collection and catalogue shall be placed in a permanent curation facility for use by future researchers.	
Impact 5.3 Adversely Affect Human Remains This impact has been determined to be less than significant. No mitigation is required		
	Hydrology and Water Quality	
Impact 6.1: Violate Water Quality Standards or Waste Discharge Requirements, Provide Substantial Additional Sources of Polluted Runoff, or Otherwise Degrade Water Quality		
PS	***Mitigation Measure 6.1a:*** Water quality treatment facilities (BMPs) shall be designed according to the guidance of the California Stormwater Quality Association Stormwater Best Management Practice Handbook for New Development/Redevelopment and the Erosion and Sediment Control for Development Areas of the Sierra Foothills and Mountains. In addition, BMPs shall be designed to mitigate (minimize, infiltrate, filter, or treat) stormwater runoff in accordance with “Attachment 4” of Placer County’s NPDES Municipal Stormwater Permit (State Water Resources Control Board	**LTS**

Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
	NPDES General Permit No. CAS000004), pursuant to the NPDES Phase II program.	
	Mitigation Measure 6.1b: Northstar CSD shall prepare a SWPPP and obtain coverage under the SWRCB's NPDES General Permit for Storm Water Discharges Associated with Construction Activities. The project applicant shall provide to Placer County ESD evidence of a state-issued WDID number or filing of a Notice of Intent and fees prior to issuance of a grading permit/approval of a grading or improvement plan. The SWPPP and project Grading or Improvement Plans shall identify specific construction BMPs for all components of the construction project, including equipment and material staging areas. For each BMP, the SWPPP shall identify provisions for design, implementation, management and monitoring. BMPs are expected to include the following or equally effective measures: A. Fiber wattles, silt fences, and or water bars; B. Sediment basins; C. Mulching of disturbed soil areas; D. Channel linings and drainage inlet protection; E. Staging areas perimeter barriers; F. Temporary stabilized construction entrances; G. Covering exposed materials stockpiles; and H. Leak or spill response plans.	
	Mitigation Measure 6.1c: Permanent BMPs shall be identified in the SWPPP and included on project Grading or Improvement Plans which are subject to approval by Placer County. BMPs shall be designed to mitigate (minimize, infiltrate, filter, or treat) stormwater runoff. Flow or volume based post-construction BMPs shall be designed at a minimum in accordance with the Placer County Guidance Document for Volume and Flow-Based Sizing of Permanent Post-Construction Best Management Practices for Stormwater Quality Protection. Post-construction BMPs for the project may include, but are not limited to: rock slope protection, vegetated swales, rain gardens, detention basins, rock energy dissipaters, vegetation of disturbed soil areas. Northstar CSD shall provide monitoring, irrigation where necessary, and remedial actions to ensure that vegetation in vegetated swales, rain gardens, and revegetated disturbed areas becomes established within three years following construction. All BMPs shall be maintained as required to insure effectiveness. Northstar CSD shall maintain records providing proof of on-going maintenance.	
	Mitigation Measure 6.1d: Trail amenities including trailheads, trail junctions, rest areas, picnic areas, and wildlife viewing areas shall be constructed using pervious surfaces. These features	

Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
	shall either be designed to provide full infiltration of runoff from the 10-year storm event within 12 hours or include an underdrain system that collects filtered stormwater and releases the runoff downslope as sheet flow at a rate that is a maximum of 90 percent of pre-project conditions. The covered Native American Interpretive Area trail amenity shall be constructed using pervious surfaces in areas that will receive direct rainfall. Runoff from the roof of this amenity shall be routed to an adjacent rain garden sized to detain and infiltrate rainfall from a 10-year event and that includes an overflow system to route runoff from larger events as sheet flow to the downslope areas at a maximum rate of 90 percent of pre-project rates.	
Impact 6.2: Substantially Alter Drainage Patterns; Increase Rate or Amount of Surface Runoff This impact has been determined to be less than significant. No mitigation is required		
Impact 6.3: Contribute Runoff Water Exceeding the Capacity of Stormwater Drainage Systems The project would have no impact with respect to capacity of stormwater drainage systems. No mitigation is required		
Impact 6.4: Place Structures Within the 100-Year Flood Hazard Area This impact has been determined to be less than significant. No mitigation is required		
	Transportation and Circulation	
Impact 7.1: Substantially Increase Traffic or Conflict with Level of Service Standards This impact is determined to be less than significant. No mitigation measures are required.		
Impact 7.2: Substantially Increase Hazards due to a Design Feature or Incompatible Uses This impact is determined to be less than significant. No mitigation measures are required		
	Visual Resources	
Impact 8.1: Adversely Affect a Scenic Vista		
PS	***Mitigation Measure 8.1a:*** Natural or earth tone surfacing shall be used for the portion of Trail Segment 2A extending from the present location of the Wildlife Viewing Area, southwest to the first crossing of Martis Creek. Surfacing colors shall be selected to minimize contrast with the natural colors of the vegetation and soils of the valley, as determined appropriate by a written recommendation from a landscape architect. Color and materials for surfacing the trail shall be	**LTS**

Significance Before Mitigation	***Mitigation Measures***	***Significance After Mitigation***
	approved by the Northstar CSD and the U.S. Army Corps of Engineers.	
	Mitigation Measure 8.1b: Stockpiling of materials onsite shall be minimized during construction. Construction staging areas and stockpile storage locations shall be identified on project plans and located within existing disturbed areas or as close to or within the areas of construction as possible, and shall be located to screen views of staging areas from the Wildlife Viewing Area, Highway 267 and Schaffer Mill Road to the extent feasible.	
Impact 8.2: Substantially Damage Scenic Resources		
PS	***Mitigation Measure 8.2a:*** Natural or earth tone surfacing shall be used for the portion of Trail Segment 1 viewed from SR 267. Surfacing colors shall be selected to minimize contrast with the natural colors of the vegetation and soils of the valley, as determined appropriate by a written recommendation from a landscape architect. Color and materials for surfacing the trail shall be approved by the Northstar CSD and the U.S. Army Corps of Engineers.	**LTS**
	Mitigation Measure 8.2b: The Erosion and Sediment Control Plan prepared as required to obtain a grading permit shall include measures to revegetate areas disturbed by project construction activities.	
Impact 8.3: Substantially Degrade the Existing Visual Character or Quality of the Site and Its Surroundings This impact is determined to be less than significant. No mitigation measures are required.		
Impact 8.4: Create a New Source of Substantial Light or Glare Adversely Affecting Day or Nighttime Views in the Area This impact is determined to be less than significant. No mitigation measures are required.		
	Recreation	
Impact 9.1: Adversely Affect Use of Existing Recreational Facilities		
PS	***Mitigation Measure 9.1a:*** The operating agreement between the USACE and the Northstar CSD shall determine potential USACE operating costs associated with use of the Martis Valley Trail and identify funding sources to meet these costs. These shall include maintenance and operations at the Martis Creek Lake Project Wildlife Viewing Area parking lot, ongoing maintenance of the trail system on the south side of SR 267, enforcement and monitoring of responsible trail behavior and demand for emergency services.	**LTS**

Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
Impact 9.2: Create Conflicts Between Trail User Groups		
PS	***Mitigation Measure 9.2a:*** The operating agreement between the USACE and the Northstar CSD described in *Mitigation Measure 9.1a* shall address enforcement and monitoring of responsible trail behavior, including enforcement of USACE regulations related to dog control.	**LTS**
Impact 9.3: Conflict with U.S. Army Corps of Engineers Martis Creek Lake Master Plan This impact is determined to be less than significant. No mitigation measures are required		
Project Alternatives		
Note – Not all of the following mitigation measures would be implemented. Applicability of these measures depends on the Parking Lot Alternative selected.		
Parking Lot Impact: Violate Water Quality Standards or Waste Discharge Requirements, Provide Substantial Additional Sources of Polluted Runoff, or Otherwise Substantially Degrade Water Quality		
PS	***Mitigation Measure 11.1a:*** Parking stalls within the Martis Valley Trail parking lot shall be constructed using pervious surfaces. Additionally, the parking lot shall either be designed to provide full infiltration of runoff from the 10-year storm event within 12 hours or include an underdrain system that collects filtered stormwater and releases the runoff downslope as sheet flow at a rate that is a maximum of 90 percent of pre-project conditions. The parking lot shall include a vegetated swale and rain garden which must be sized to provide treatment for most or all of the runoff from 2-year and 10-year events. The parking lot shall also include a detention basin sized to handle larger events such that stormwater runoff is released from the basin at a rate of 90 percent of pre-project conditions. Release from the basin must also be routed through an additional vegetated swale or in a manner that reflects existing sheet flow characteristics.	**LTS**
Parking Lot Impact: Substantially Increase Hazards due to a Design Feature Or Incompatible Uses		
PS	***Mitigation Measure 11.1b:*** Final driveway design and required improvements for access to Parking Lot Alternative 3 shall ensure a minimum of 250 feet of sight distance to the northeast for drivers waiting to make a left-turn movement onto Schaffer Mill Road. These improvements could include removing some of the low hill located along the northwest side of Schaffer Mill Road between the planned driveway location and SR 267.	**SU for Parking Lot Alternative 1, LTS elsewhere**

Significance Before Mitigation	Mitigation Measures	Significance After Mitigation
Parking Lot Impact: Substantially Damage Scenic Resources		
PS	***Mitigation Measure 11.1c:*** Natural or earth tone surfacing shall be used for the parking lot surface, walkways, trail connection and trail kiosk at Parking Lot Alternative 4. Surfacing colors shall be selected to minimize contrast with the natural colors of the vegetation and soils of the valley, as determined appropriate by a written recommendation from a landscape architect. Color and materials for surfacing the trail shall be approved by the Northstar CSD and the U.S. Army Corps of Engineers.	**SU for Parking Lot Alternative 4, LTS elsewhere**
	Mitigation Measure 11.1d: A revegetation plan shall be prepared and implemented for all areas disturbed by construction at Parking Lot Alternative 4. The plan shall specify native vegetation and provide monitoring and maintenance of plantings for a period of time appropriate to ensure their survival.	
Parking Lot Impact: Create a New Source of Substantial Light or Glare Adversely Affecting Day or Nighttime Views in the Area		
PS for Parking Lot Alternative 2, LTS elsewhere	***Mitigation Measure 11.1e:*** A planting plan for Parking Lot Alternative 2 shall be provided that includes native conifers, spaced appropriately to be consistent with native tree cover in the vicinity, as determined appropriate by a written recommendation from a landscape architect. Planting of trees would be required as part of the improvements at the time of construction of this lot.	**LTS**

Table 2.3
Initial Study Mitigation Measures

AIR QUALITY
MM AIR.1 Prior to approval of Grading/Improvement Plans, Northstar CSD shall submit a Construction Emission / Dust Control Plan to the Placer County APCD. Northstar CSD shall provide written evidence, provided by APCD, to Placer County that the plan has been submitted to APCD. It is the responsibility of Northstar CSD to deliver the approved plan to Placer County. Northstar CSD shall not break ground prior to receiving APCD approval of the Construction Emission/Dust Control Plan, and delivering that approval to Placer County MM AIR.2 Prior to approval of the Grading Plan, the applicant shall provide a written calculation to the Placer County APCD for approval by the District demonstrating that the heavy-duty (> 50 horsepower) off-road vehicles to be used in the construction project, including owned, leased and subcontractor vehicles, will achieve a project-wide fleet average 20 percent NOX reduction and 45 percent particulate reduction as required by CARB. Acceptable options for reducing emissions may include use of late model engines, low-emission diesel products, alternative fuels, engine retrofit technology, after-treatment products, and/or other options as they become available. MM AIR.3 In order to control dust, operational watering trucks shall be onsite during construction hours. In addition, dry, mechanical sweeping is prohibited. Watering of a construction site shall be carried out in compliance with all pertinent APCD rules. All disturbed areas and unpaved haul routes shall be watered with adequate frequency to maintain soil moisture (a minimum of twice daily). MM AIR.4 Any soil or materials transported onsite or offsite shall be covered or a minimum of two feet of freeboard on all haul trucks shall be maintained. MM AIR.5 All soil stockpile areas shall be covered. MM AIR.6 Northstar CSD shall ensure that at completion of each construction phase, all graded areas are revegetated or surfaced to minimize soil erosion. MM AIR.7 Northstar CSD shall ensure that the Grading Plan for each construction phase includes the following notes: a. The prime contractor shall submit to the District a comprehensive inventory (i.e., make, model, year, emission rating) of all the heavy-duty off-road equipment (50 horsepower or greater) that will be used an aggregate of 40 or more hours for the construction project. If any new equipment is added after submission of the inventory, the prime contractor shall contact APCD prior to the new equipment being utilized. At least three business days prior to the use of subject heavy-duty off-road equipment, the project representative shall provide the District with the anticipated construction timeline including start date, and name and phone number of the property owner, project manager, and onsite foreman. b. Construction equipment exhaust emissions shall not exceed Placer County APCD Rule 202 Visible Emission limitations. Operators of vehicles and equipment found to exceed opacity limits are to be immediately notified by APCD to cease operations and the equipment must be repaired within 72 hours. c. The prime contractor shall suspend all grading operations when wind speeds (including instantaneous gusts) are excessive and dust is impacting adjacent properties. d. The contractor shall apply water or use another method to control dust impacts offsite. Grading vehicles and equipment are expected to remain onsite for the duration of the project. Any vehicle or equipment leaving the site shall be cleaned to prevent dust, silt, mud, and dirt from being released or tracked offsite. e. In order to minimize wind drive dust during grading, the prime contractor shall apply methods such as surface stabilization, establishment of a vegetative cover, paving, or another method approved by Placer County. f. During grading, no open burning of removed vegetation shall be allowed unless permitted by Placer County APCD. All removed vegetative material shall be either chipped on site or taken to an

appropriate recycling site, or if a site is not available, a licensed disposal site. g. During grading, traffic speeds on all unpaved surfaces shall be limited to 15 miles per hour or less. h. During grading, the contractor shall minimize idling time to a maximum of 5 minutes for all diesel powered equipment. i. During grading, the contractor shall utilize existing power sources (e.g., power poles) or clean fuel (i.e., gasoline, biodiesel, natural gas) generators rather than temporary diesel power generators. j. The prime contractor shall be responsible for keeping adjacent public thoroughfares clean of silt, dirt, mud, and debris, and shall "wet broom" the streets (or use another method to control dust as approved by the individual jurisdiction) if silt, dirt, mud or debris is carried over to adjacent public thoroughfares.
CULTURAL RESOURCES
MM CUL.1 Should any evidence of paleontological resources (e.g. fossils) be encountered during grading or excavation either onsite or offsite as a result of project construction, work shall be suspended within 100 feet of the find, and the Northstar Community Services District shall be immediately notified. At that time, the Northstar Community Services District shall coordinate any necessary investigation of the site with a qualified paleontologist as needed to assess the resource and provide management recommendations, such as avoiding the resource and/or excavating and recording data on the resource. The contractor shall implement any measures deemed necessary by the Northstar Community Services District for the protection of the paleontological resource.
HAZARDS & HAZARDOUS MATERIALS
MM HAZ.1 The following measures shall be implemented prior to and during construction. a. All equipment will be inspected by the contractor for leaks immediately prior to the start of construction, and regularly inspected throughout project construction. b. The Storm Water Pollution Prevention Plan (SWPPP) shall contain BMPs for spill prevention. c. A spill kit shall be maintained onsite throughout all construction activities. d. The SWPPP and project plans shall identify construction staging areas and designated areas where equipment refueling, lubrication, and maintenance may occur. Areas designated for refueling, lubrication, and maintenance of equipment shall be at least 50 feet from any spring/seep/wetland/marsh areas and 100 feet from creeks and shall be approved by the Northstar Community Services District. e. In the event of any spill or release of any chemical during construction, the contractor shall immediately notify the Northstar Community Services District. MM HAZ.2 Prior to commencement of site disturbance for each construction phase, the Project Contractor shall prepare a Fire Safety Plan for construction, which shall include construction best management practices for fire prevention. The plan shall be reviewed and approved by the Northstar Community Services District and the Northstar Fire Department. The plan shall include emergency contact numbers for CAL FIRE and the Northstar Fire Department. The plan shall address appropriate hours of operation, fire safe equipment use guidelines, onsite fire suppression equipment requirements, and identify appropriate vehicle parking areas away from flammable materials. The Fire Safety Plan shall be implemented during construction and shall be available onsite at all times during construction.
LAND USE
MM LUP.1 The Northstar Community Services District shall enter into an agreement with the U.S. Army Corps of Engineers to allow construction, use, and maintenance of a segment of the Martis Valley Trail within the Martis Creek Lake Recreation Area.
NOISE
MM NOISE-1 Construction contractors shall comply with the following measures: ♦ Construction activities shall be limited to between the hours of seven a.m. and six p.m. Monday

through Friday, and between the hours of eight a.m. and six p.m. on Saturday. Noise-generating construction activities during the days and hours specified are exempt from noise standards by Section 9.36.030 of the Placer County Code.

- All construction vehicles, heavy equipment, and stationary noise sources (such as diesel generators) shall be equipped with mufflers.
- Equipment warm-up areas, water tanks, and equipment storage areas shall be located as far as practical from existing residences and in no cases closer than 50 to any existing residence.

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CHAPTER 3

PROJECT DESCRIPTION

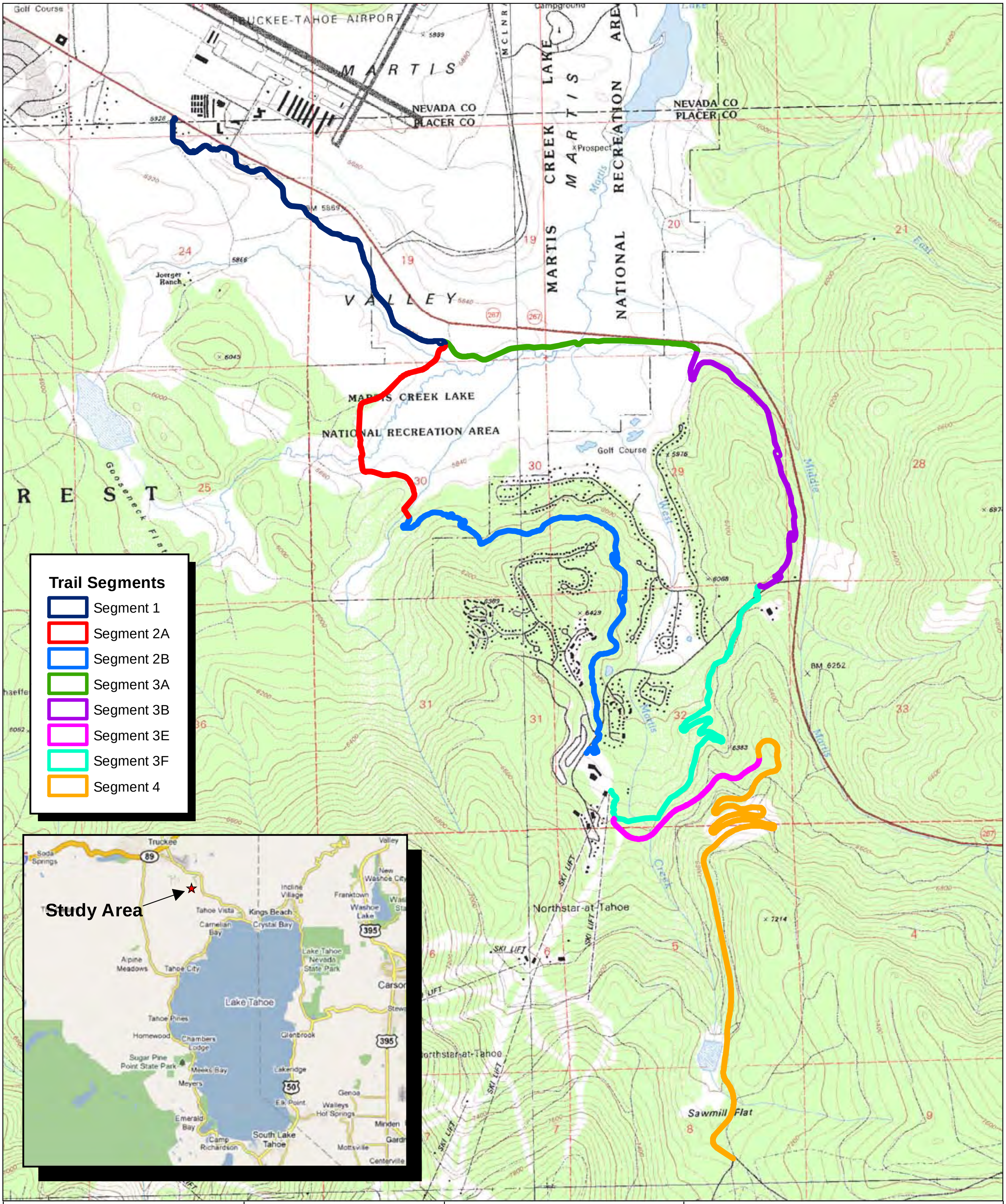
CHAPTER 3 PROJECT DESCRIPTION

The proposed Martis Valley Trail is a multiple-use paved trail proposed by the Northstar Community Services District (CSD). The trail would be constructed and maintained by Northstar CSD but owned by Placer County. Two potential trail alignments have been defined and are evaluated in this Draft EIR as equal-weight alternatives. The first and last segments of both alignments would be the same – the trail would begin near the Town of Truckee/Placer County boundary and end at a junction with Forest Route 73 (a paved Forest Service Road) near Sawmill Flat Reservoir. The Valley Alignment would primarily follow the existing Tompkins Memorial Trail through Martis Valley to the Village at Northstar while the Highway Alignment would run along the southern side of State Route 267 and up Porcupine Hill to Northstar Drive before continuing to the Village at Northstar. Both trail alignments run through private property and property under the jurisdiction of the U.S. Army Corps of Engineers (USACE) and constructing either would entail widening and paving portions of the existing Tompkins Memorial Trail alignment as well as constructing new trail segments.

This chapter provides background information on the proposed trail; defines existing conditions along both trail alignments; summarizes existing land uses and habitat types in the project vicinity; and provides a detailed description of specific parameters of the project such as the project objectives, the alignment for each trail segment, construction techniques, interpretive and signage elements of the trail, public access, anticipated ongoing trail maintenance activities, and permitting requirements. Figures are provided to facilitate a thorough understanding of the project's regional location, site characteristics, and project components. The description of the project included in this chapter sets forth the characteristics for each of the equal-weight alternatives upon which the evaluation of potential impacts in the EIR is based.

3.1 PROJECT LOCATION

The proposed Martis Valley Trail stretches from the southern limits of the Town of Truckee southeastward through Martis Valley, reaching the Village at Northstar and continuing south to Brockway Summit, terminating at its junction with Forest Route 73. As shown in *Figure 3-1*, the proposed trail corridors are within the Truckee and Martis Peak U.S. Geological Survey 7.5 minute quadrangles. The study corridor for the Valley Alignment is within Sections 13 and 24 of Township 17 North, Range 16 East; Sections 19, 29, 30, and 32 of Township 17 North, Range 17 East; and Sections 5 and 8 of Township 16 North, Range 17 East. The study corridor for the Highway Alignment is within Sections 13 and 24 of Township 17 North, Range 16 East; Sections 19, 20, 28, 29, and 32 of Township 17 North, Range 17 East; and Sections 5 and 8 of Township 16 North, Range 17 East. Latitude and longitude coordinates of the northern terminus of the proposed trail are 120°9'10.67" west, 39°18'59.53" north, while the southern terminus is at 120°6'36.77" west, 39°15'5.30" north. Elevations along the proposed trail range between approximately 5,880 and 7,280 feet above mean sea level (msl). State Route (SR) 267 provides the primary vehicular access through the project area. Both the Valley Alignment and the Highway Alignment are shown on an aerial photograph provided in *Figure 3-2*. Locations of each of the proposed trail alignments and existing trails within the Truckee-Tahoe region are shown in *Figure 3-3*.



N

0 750 1,500 3,000

Scale in Feet

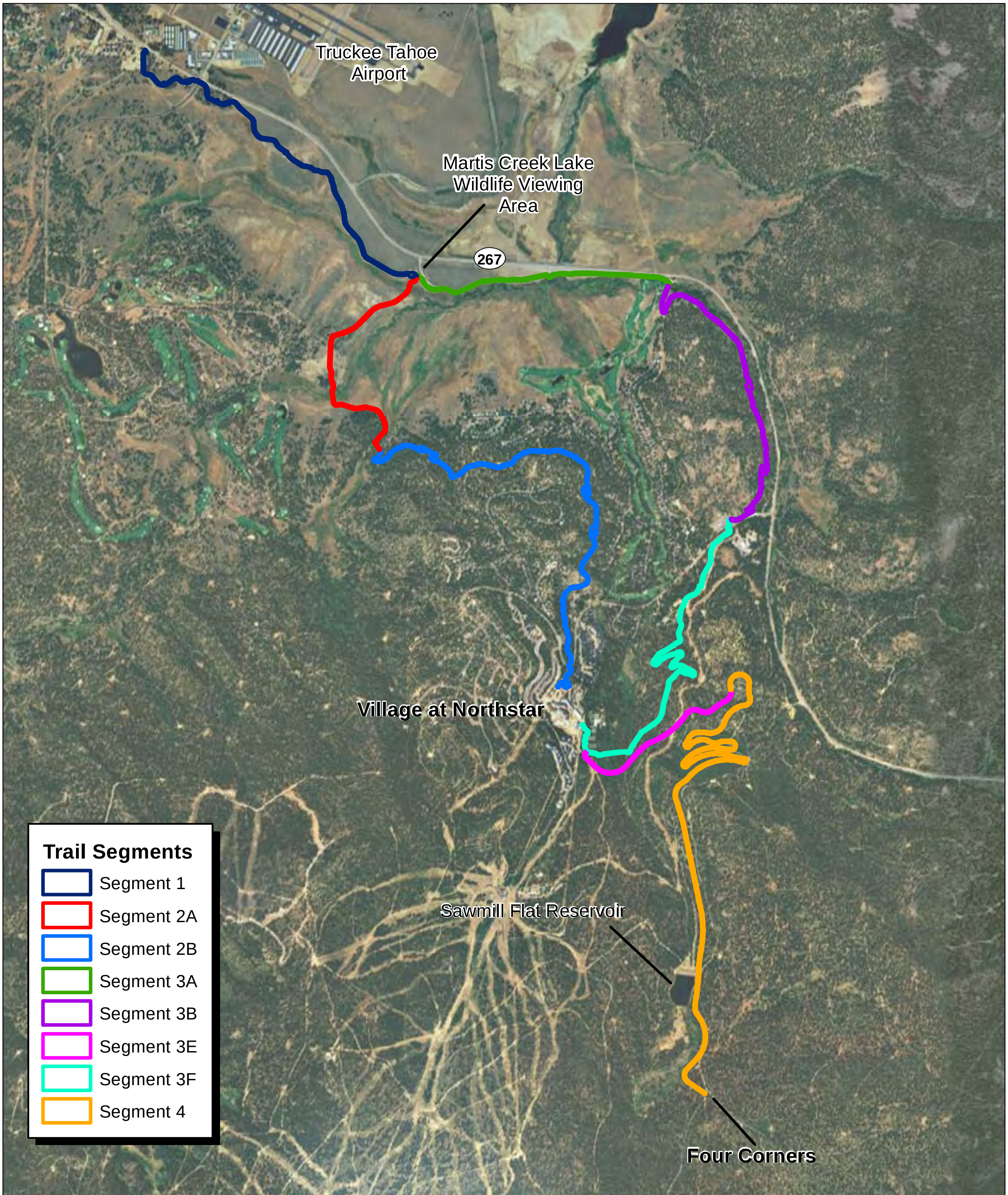
USGS Base Map:
Truckee & Martis Peak, CA
7.5 minute topographic quadrangle
Sections:
5,8,13,19,20,24,28,29,30,32,33
Township: 16N,17N
Range: 16E,17E

Figure 3-1

SITE & VICINITY MAP

Martis Valley Trail

Placer County, California



north fork associates

N

0 1,500 3,000

Scale in Feet

Total length of all trail segments is approximately 13.5 miles.

Aerial Photo: NAIP 2009

Figure 3-2

AERIAL PHOTO

Martis Valley Trail

Placer County, California

3.2 PROJECT BACKGROUND

Local agencies and advocacy groups have supported a regional multiple-use trail system to connect the communities of Truckee, Northstar, Kings Beach, and Tahoe City. Segments of trail are currently being planned along the Truckee River between Tahoe City and Truckee, and between Tahoe City and Kings Beach. In addition, the Town of Truckee is in the process of implementing their Trails Master Plan, one element of which will connect their downtown core to the Placer County line near the Truckee-Tahoe Airport. The proposed Martis Valley Trail would provide another key connection in this regional system, linking the Town of Truckee to Northstar and Northstar to trails that access Kings Beach and Tahoe City.

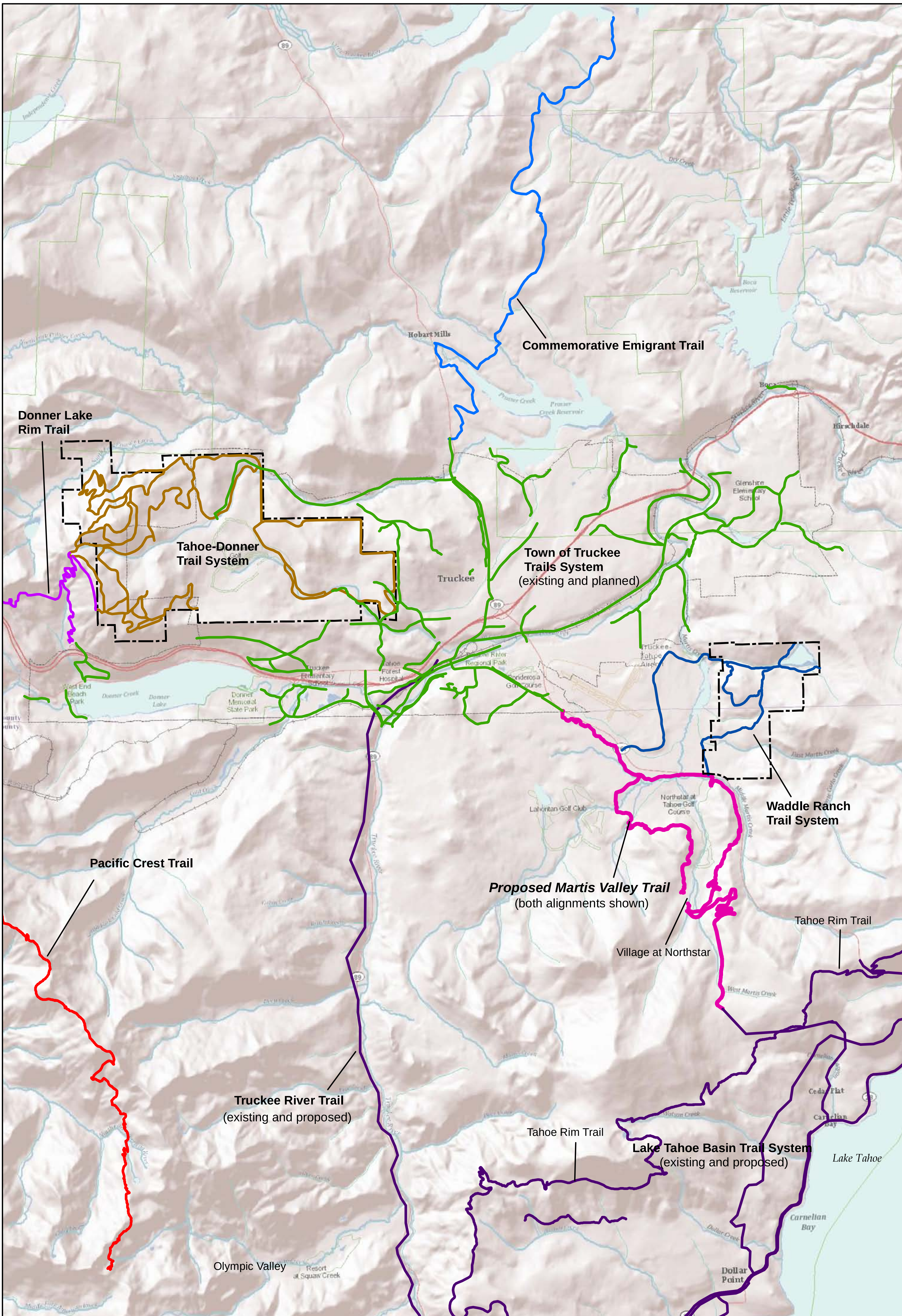
When completed, the overall trail system would connect the communities mentioned and provide access to other existing and planned recreational trails throughout the eastern portions of Placer and Nevada counties.

The proposed trail is anticipated under the Martis Valley Community Plan, which recognizes that recreation planning in the area must consider the area's permanent residents and seasonal visitors. These populations have varying needs for recreation facilities, but the community plan notes that "an extensive trail system that accommodates pedestrians, equestrians, and bicyclists" benefits both populations. The Community Plan's Recreation Plan (Figure 3 of that document) indicates a proposed trail parallel to the south side of SR 267 between Schaffer Mill Road and the existing trails in the Martis Creek Project Wildlife Viewing Area and the Community Plan text notes that the County plans to add five miles of off-road, multipurpose trails between Northstar and Truckee. Further the Community Plan recognizes that public easements would need to be granted across private land to allow public use of this trail.

3.3 PROJECT AREA CHARACTERISTICS

The proposed trail is located on the eastern side of the Sierra Nevada Mountains, north of Lake Tahoe and southeast of the Town of Truckee. The topography is gently rolling to generally flat within Martis Valley, and steep outside of the valley through Northstar and toward the junction with Forest Route 73. Adjacent land uses include the Northstar California Community (including Northstar California golf course, the Village at Northstar, residential areas of Northstar, and the Northstar California ski area), Lahontan residential development and golf club, Martis Camp residential development, Truckee-Tahoe Airport, the USACE Martis Creek Project, and undeveloped areas of Tahoe National Forest. In addition, the Tompkins Memorial Trail, shown in *Figure 3-4,* consists of 14.6 miles of existing trails within the Martis Creek Project area and the Northstar California community.

The potential trail alignments travel through five distinct habitat types and cross several drainages within the Martis Creek watershed, including the main stem of Martis Creek. Historic and prehistoric cultural resources occur in the project vicinity. The climate in the area is characterized by mild, dry summers and cold, wet winters, during which most precipitation falls as snow. Annual temperatures range from -28 degrees Fahrenheit to 101 degrees Fahrenheit.



Notes:
Map depicts existing and proposed trails. Preliminary alignments are shown for proposed or planned trails. Trails shown include paved and unpaved trails. Some trails shown are for pedestrian use only. Map depicts major trails and trail systems; additional trails and trail links exist that are not depicted.

Trails data: Auerbach Engineering Corp., USFS Lake Tahoe Basin Management Unit, Truckee Trails Foundation, Town of Truckee, Tahoe Regional Planning Agency, MapMyRide.com.
Basemap: USGS, ESRI, TANA

N

0 3,600 7,200 Feet

Scale in Feet

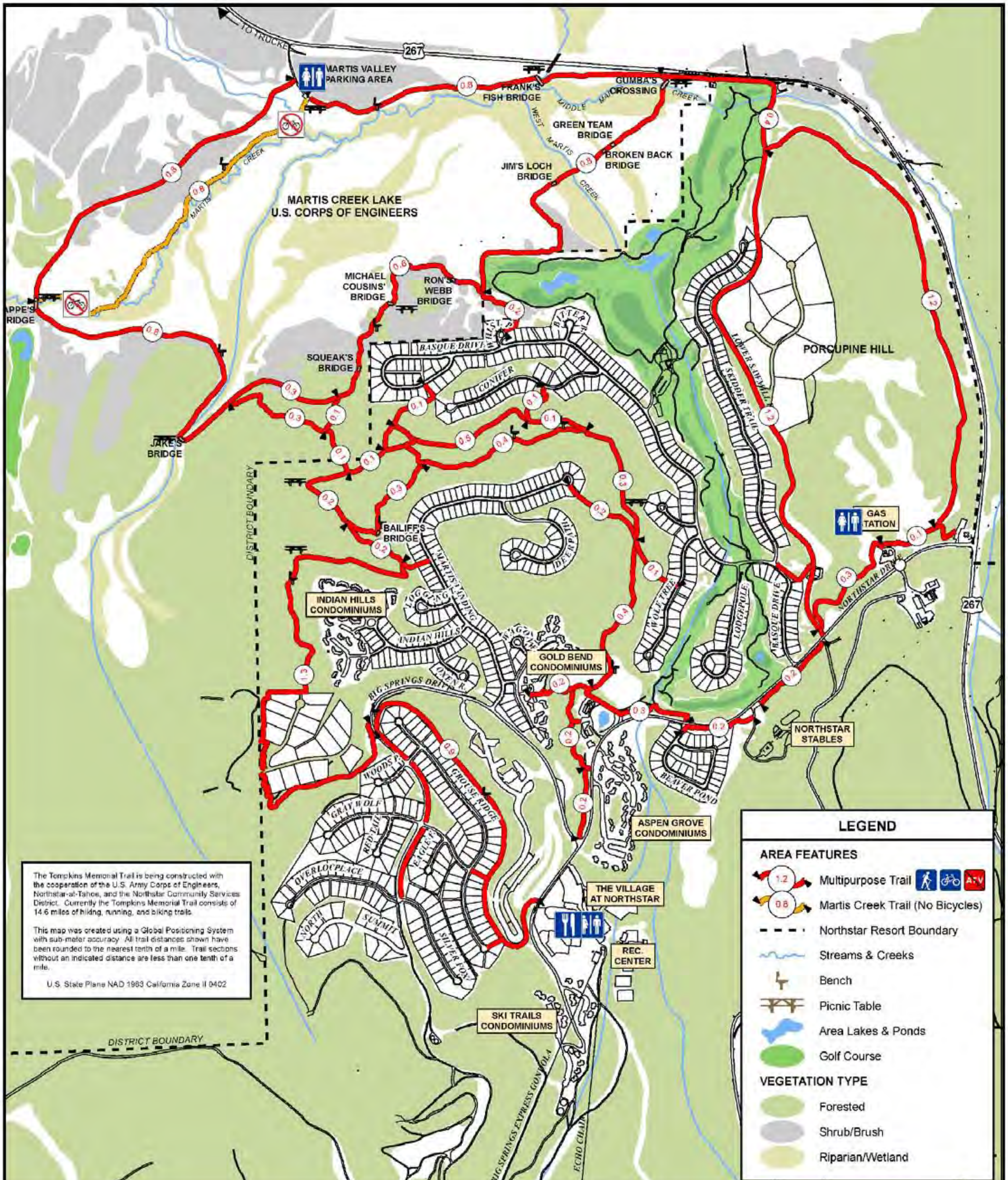
north fork associates

Figure 3-3

REGIONAL TRAILS MAP

Martis Valley Trail

Placer County, California



north fork associates

Source: Northstar Community Services District

Figure 3-4

TOMPKINS MEMORIAL TRAIL

Martis Valley Trail

Placer County, California

Field work and resource mapping conducted to evaluate conditions within the project area focused on a 50-foot wide corridor around the preliminary trail centerline. In one area, a portion of Segment 3F, the field work was conducted on a wider area. The land included in the corridor where field work and resource mapping occurred is referred to in this EIR as the study area and/or the study corridor.

Based on the results of the field work and resource mapping, a proposed alignment was identified for each of the project alternatives. Preliminary Trail Plans have been developed for each alignment. The plans show trail surface, trail amenities, locations of wetland crossings, grading and vegetation removal, and portions of existing trails proposed to be abandoned and revegetated. The Preliminary Trail Plans also indicate each of four potential parking lot locations and designs. These plans are provided in Appendix B of this Draft EIR. Project impacts have been calculated based on the area of disturbance shown in the preliminary trail plans. The area of disturbance is also referred to throughout this EIR as the project site.

Drainage

The primary drainage feature in the project area is Martis Creek. This creek and several drainages that are tributary to the creek flow through Martis Valley. The Martis Creek Basin covers 26,204 acres (Truckee River Watershed Council 2011). On the north side of SR 267, Martis Creek drains into the dammed Martis Creek Lake. Martis Creek continues below the dam to a confluence with the Truckee River south of Interstate 80. The Truckee River empties into Pyramid Lake in the Great Basin in Nevada. Other hydrological features in the area include wetland swales, wetland meadows, and ephemeral and intermittent streams.

Soils

The site is underlain by Alluvium (lake, playa, and terrace deposits), Quaternary volcanic flow rocks, and Tertiary volcanic flow rocks (California Department of Conservation 1987). Twenty soil units have been mapped within a 50-foot corridor surrounding the proposed trail alignments (USDA, NRCS 2007):

- AQB Aquolls and Borolls, 0 to 5 percent slopes
- EUB Euer-Martis variant complex, 2 to 15 percent slopes
- EUE Euer-Martis variant complex, 5 to 30 percent slopes
- EWB Inville-Riverwash-Aquolls complex, 2 to 5 percent slopes
- FTE Fugawee-Tahoma complex, 2 to 30 percent slopes
- FUC Kyburz-Trojan-Sierraville complex, 2 to 9 percent slopes
- FUE Kyburz-Trojan complex, 9 to 30 percent slopes
- JSE Jorge-Cryumbrepts, wet-Tahoma complex, 2 to 30 percent slopes
- JTE Jorge-Tahoma complex, 2 to 30 percent slopes
- JTF Jorge very stony sandy loam, 30 to 50 percent slopes
- JUG Jorge-Rubble land complex, 30 to 75 percent slopes
- JWF Jorge-Waca-Tahoma complex, 30 to 50 percent slopes

- KRE Kyburz-Rock outcrop-Trojan complex, 2 to 30 percent slopes
- KRF Kyburz-Rock outcrop-Trojan complex, 30 to 50 percent slopes
- MEB Martis-Euer variant complex, 2 to 5 percent slopes
- PX Pits, borrow
- STG Rubble land-Jorge complex, 30 to 75 percent slopes
- UME Umpa stony sandy loam, 2 to 30 percent slopes
- UMF Umpa stony sandy loam, 30 to 50 percent slopes
- UOE Umpa-Rock outcrop complex, 2 to 30 percent slopes

Characteristics of these soil types are varied. Most of these soil types are well-drained, while the Aquolls soils of the valley floor are often saturated for much of the year. Base material and permeability varies among the soil types. A Preliminary Soil Evaluation and Stormwater BMP Design Report was prepared for the project by Holdrege & Kull. This report provides additional description of each soil type in the study corridors.

Habitats

A Biological Resources Assessment prepared for the study area found that the Valley Alignment passes through each of the five distinct habitat types described below while the Highway Alignment passes through four of these habitats (no wet meadow areas occur within the Highway Alignment).

- ***Riparian:*** Riparian shrub habitat is associated with Martis Creek and its tributaries. The riparian habitat is generally a patchy band approximately 10 to 20 feet wide along each bank of the creek, dominated by compacted, rounded willow shrub species 10 to 15 feet high. Small lodgepole pine trees also occur throughout the riparian habitat. Other associated plant species are similar to the species found in the wet meadow.
- ***Wet Meadow:*** The wet meadow habitat is a large area in Martis Valley that supports wetland vegetation due to hydrological influences from Martis Creek (and its tributaries) and/or a seasonally high water table. This habitat is dominated by herbaceous wetland species while some marginal wetland species also occur in the wet meadow.
- ***Dry Meadow:*** The dry meadow habitat type is typically found in the transition zone between wet meadow or riparian and upland sagebrush scrub and coniferous forest habitat types. Dry meadow habitat type is dominated by many of the same species as found in the wet meadow (a wetland flora) but trending towards species that are more tolerant of dryer conditions. Perennial species of sedges, rushes, and grasses are the primary occupants of these areas.
- ***Coniferous Forest:*** The coniferous forest occurs in the higher elevations rimming Martis Valley and throughout the upper portions of the trail, around the Village at Northstar and along the sections of the trail leading to Forest Route 73. The dry coniferous forest areas support mostly Jeffrey pine, while lodgepole pine is most common in areas with more moisture, particularly in the lower landscape positions of Martis Valley. On the

slopes around Northstar, white fir is common. This habitat also supports a variety of understory shrubs, while the herbaceous cover in this habitat is relatively light.

- ***Sagebrush Scrub:*** This habitat occurs below the coniferous forest in elevation and is dominated by big sagebrush; secondary shrub dominants include antelope brush and rubber rabbitbrush. Areas dominated by low sagebrush also occur in the study area. This lower-stature shrub is the sole shrub in these areas. Plumas ivesia, which is considered rare and fairly threatened in California, also occurs in some areas where low sagebrush is the dominant species.

Special-Status Plant Species

Research through the California Natural Diversity Database, U.S. Fish and Wildlife Service, and California Native Plant Society indicates that there are a total of 22 special-status plant species that may occur in the project region. Of these, one plant is known to occur within the study corridors and five other plants are rated likely or possible to occur because the study corridors have some areas of suitable habitat or the plants are known to occur nearby.

Plumas ivesia (*Ivesia sericoleuca*) was the only special-status plant species observed within the study area. This species was observed at several locations within the sagebrush scrub habitat along the proposed trail alignments north of Martis Creek (Segments 1 and 2A). In particular, Plumas ivesia is located in areas in the sagebrush scrub that are dominated by low sagebrush, where antelope brush and big sagebrush are absent. Potential impacts to this species and other special-status plant species are evaluated in **CHAPTER 4 BIOLOGICAL RESOURCES**.

Wildlife

The Martis Valley Trail study area supports a wide diversity of wildlife. Habitat features available in the area include nesting sites for a variety of birds, escape and thermal cover, and abundant food sources. Aquatic habitats in the area, including Martis Creek and its tributaries, provide year-round and seasonal sources of water for wildlife of the area and habitat for various aquatic and semi-aquatic species. Historic occurrences of Lahontan cutthroat trout, which is listed as a threatened species under the federal Endangered Species Act, are documented from Martis Creek. The California Department of Fish and Game includes this species in the stocking program for Martis Creek Lake and no barriers exist to its movement into Martis Creek upstream of the dam (K. Thomas 2011, pers. comm.).

Because of the elevation of the study area, many species are expected to occur onsite seasonally either for nesting purposes or during migration. The conifer forest provides habitat for many bird species, while the more open sagebrush scrub habitat supports fewer species. Riparian communities associated with drainages crossing the study corridor provide important seasonal nesting habitat for migratory songbirds, while large trees in the area provide appropriate nesting habitat for raptors.

Various mammals were either observed or detected throughout the study area during surveys conducted on the project site. Deer occurring within the Martis Valley are part of the Loyalton-Truckee Deer Herd and the study area occurs within the summer range for this herd.

Waters of the U.S.

A Wetland Delineation completed for the study area mapped six categories of waters of the United States; each type is described below:

- ***Wetland Swale:*** Wetland swales are water conveyance features that do not develop the bed-and-bank morphology typical of streams. They have wetland soils and are vegetated with wetland species. Wetland swales are similar to wetland meadows in that they are the product of a high groundwater table and/or a hydrologic connection to adjacent streams; however, as a result of being on steeper slopes, swales are linear water conveyance features.
- ***Wetland Meadow:*** As discussed in the Habitat section above, wetland meadow in the study area supports wetland vegetation due to hydrological influences from Martis Creek (and its tributaries) and/or a seasonally high water table. Wetland meadow is abundant in the areas adjacent to Martis Creek and along the tributaries to Martis Creek. The wetland meadow is dominated by herbaceous wetland species and also supports some marginal wetland species.
- ***Perennial Stream:*** Perennial streams, unlike ephemeral or intermittent streams, flow year-round. They exhibit well defined bed-and-bank morphology. Within the study corridors, Martis Creek and one of the tributaries to Martis Creek meet the definition of perennial streams.
- ***Intermittent Stream:*** Intermittent streams begin flowing sometime during the rain/snowmelt season and usually continue to flow through the end of the rain/snowmelt season. Intermittent streams also have a groundwater component that allows them to flow during periods of dry weather within the rain/snowmelt season. West Martis Creek and several other drainages crossed by the proposed trail alignments meet the definition of intermittent streams.
- ***Ephemeral Stream:*** Ephemeral streams flow only during periods of rainfall/snowmelt or for a short time thereafter. Ephemeral streams do not have a groundwater component. There are three ephemeral streams mapped within the study area for both trail alignments.
- ***Seasonal Wetland:*** Seasonal wetlands are low-lying areas where runoff and precipitation collect during precipitation events. They typically do not remain inundated throughout the dry season in years with normal precipitation. They are typically dominated by non-native flora. There are two seasonal wetlands mapped within Segment 2A.

Historic and Archeological Resources

The project region is known to have supported Native American activity. The area is the ancestral home of the Washoe Tribe of Nevada and California. A cultural chronology for the north-central Sierra Nevada region has been developed based on many different research efforts. This chronology identifies six distinct phases, ranging from 10,000 years before present to 150 years before present. Native populations in the earliest phases were small and highly-mobile, and relied on game hunting for sustenance. Activities supporting a less-mobile lifestyle, such as milling hard grains and foraging/collecting increased over time. This led to establishment of larger population groups. Evidence of Native American inhabitance of the project region is present in several individual sites within the study area. The chronological phases of human occupation of the area and the associated archeological resources are discussed in greater detail in **CHAPTER 5 CULTURAL RESOURCES**.

The area was also heavily affected by historic activities, including emigrant travel into California and logging, starting in the mid-19th century. Several emigrant parties entered or traveled through the area along a trail that became known as the California Trail or the Truckee Pass Emigrant Road. The most famous use of this pass was by the Donner Party. In November of 1846, approximately half of the original party of 89 people died while snowed-in along the pass. In addition, present-day SR 267 follows the alignment of an historic route connecting Lake Tahoe to surrounding areas. The road was first shown on a GLO survey plat from 1861/1865.

Large-scale logging began in the area after the discovery of silver at the Comstock Lode in 1859, and logging continued in support of construction of the Transcontinental Railroad. As the railroad construction demands decreased, production of other wood products was emphasized, and logging remained a significant commercial activity in the region throughout the 19th century and into the middle of the 20th century. The historic context of the region is also discussed in greater detail in **CHAPTER 5 CULTURAL RESOURCES.**

3.4 CHARACTERISTICS OF SURROUNDING AREA

Land uses in the immediate vicinities of each alternative trail alignment include SR 267, residential and commercial uses at the eastern end of the Town of Truckee, the Lahontan and Northstar golf courses, existing trails and wildlife viewing in the USACE property, residential uses throughout the Northstar California property, commercial uses in the Village at Northstar, and Northstar California recreation uses. Uses in the higher elevations, above the Village at Northstar, primarily consist of resource management (logging) and recreation.

Northstar CSD maintains 14.6 miles of existing unpaved trails in the project area. The existing trail network is known as the Tompkins Memorial Trail. A portion of the Tompkins Memorial Trail passes through the Martis Creek Lake Project area, which is managed by the USACE. Under either alternative, the proposed trail would also pass through the Martis Creek Lake Project area, replacing portions of the Tompkins Memorial Trail and other existing paths and roads.

Martis Reservoir, which is also managed by the USACE as part of the Martis Creek Project, is located northeast of the project area, north of SR 267. Martis Reservoir provides flood protection for the Reno-Sparks area. Martis Creek Dam, which was completed in 1972, consists of a 113-foot-high rolled zoned earthfill dam across Martis Creek and associated features. The reservoir is planned to have a maximum 20,000 acre-foot capacity and "future water storage was authorized as the project's secondary function, although this use has never been pursued by a local sponsor or USACE because of significant safety issues associated with maintaining high water levels behind the dam" (USACE 2011). USACE has identified three deficiencies with the dam that prevent attainment of the reservoir's full planned capacity, including "significant seepage through the dam's foundation that increases as the water level in Martis Creek Lake rises, an undersized spillway that could cause water to overtop the dam during extremely large flood Events, and a previously unknown earthquake fault line underlying the dam site" (USACE 2011). In consideration of these deficiencies, USACE maintains the dam's outlet gates in an open position to prevent high water levels in the lake and USACE has prepared the Martis Creek Dam Safety Modification Report which identifies recommended actions to correct these problems. Improvements to the dam are not expected to include raising its height. The current operational lake level places the lake surface elevation at approximately 5,810 feet msl, while the maximum elevation of the dam is 5,838 feet msl. In its current condition, Martis Creek Lake provides storage of approximately 5,000 acre feet of water (AEC 2011).

The existing trail along Martis Creek through the Martis Creek Project is one of the most popular trails in the Truckee/North Tahoe area. The heavy use of this trail has led to water quality impacts as erosion of the trail and streambanks lead to sedimentation of the creek, and impacts to wildlife from the presence of humans and dogs in the area (Truckee River Watershed Council 2009). The Watershed Council and USACE have conducted restoration activities including "rerouting some portions of the existing trails away from stream banks, meadows and wetlands, restructuring and rebuilding portions of trails, and stabilizing stream banks through extensive revegetation" to reduce sedimentation and enhance natural habitat (Truckee River Watershed Council 2009). In 2010, the Truckee River Watershed Council began an assessment of the Martis Creek watershed. The assessment includes describing watershed attributes, an existing conditions inventory, and identification of additional restoration opportunities. The field assessment has been completed and the final report is anticipated in April 2012 (D. Shaw, pers. comm.).

3.5 PROJECT OBJECTIVES

Objectives represent the overarching goals and purpose of a proposed project. Northstar CSD has developed the following objectives for the proposed Martis Valley Trail project.

- Provide a convenient, safe and accessible non-motorized connection between the Town of Truckee, the Village at Northstar and Brockway Summit and to trails providing access to the North Shore of Lake Tahoe.
- Expand the community, recreational, and transportation opportunities available in Martis Valley.
- Expand and complement existing and planned regional trails; facilitate connections to adjacent residential areas as well as existing and planned trail systems and parking and transit centers throughout the area.
- Provide safe passage for all users, avoiding interface with automobiles to the greatest extent possible.
- Provide a trail that is accessible to the widest variety of potential users during all seasons of the year.
- Ensure respect and protection for scenic, natural, and cultural resources in the area during trail construction and use.
- Highlight the natural, cultural and social context of the region through interpretive opportunities.

- Provide an alternative to automobile transportation, creating a continuous route between regional commercial centers.

3.6 PROJECT DESCRIPTION

The proposed project is a multiple-use paved trail extending from the southern limits of the Town of Truckee at the Nevada/Placer County line to a junction with Forest Route 73 (a paved Forest Service Road) near Sawmill Flat Reservoir. The trail would provide a regional connection between existing trails in the Town of Truckee and trails in the Lake Tahoe Basin. The trail would allow for pedestrian and bicycle use, and would be constructed to meet the standards of the Americans with Disabilities Act (ADA). The maximum grade of the trail would be five percent, and the width of the paved trail surface would generally be ten feet, with two-foot unpaved shoulders on either side.

The project also includes construction of a new parking lot. Four potential locations for this parking lot have been identified – on the south side of SR 267 approximately 500 feet east of Autumn Way, on the north side of Schaffer Mill Road near the SR 267/Schaffer Mill Road/Truckee Tahoe Airport Road, on the north side of Schaffer Mill Road approximately 900 feet south of SR 267, and on the south side of SR 267 approximately 500 feet east of Martis Creek Road.

The proposed trail would be accessible from the new parking lot and from the existing Martis Creek Lake Project Wildlife Viewing Area parking lot. No improvements to the Wildlife Viewing Area parking lot or access are included in the proposed project.

Development of Potential Trail Alignments

Northstar CSD and consulting engineers used standard procedures for identifying each potential trail alignment, including field reconnaissance, review of aerial photos, analysis of topography, and consideration of constraints and opportunities presented by the natural landscape, property ownership, and the existing built environment, including existing trails and SR 267. To meet ADA requirements the design team analyzed potential alignments to ensure that, to the extent feasible, trail grades would be less than five percent. Biologists surveyed all alignments to delineate wetlands and other sensitive habitats, and to identify and map rare plant populations. Potential alignments were also surveyed for prehistoric and historic cultural resources and the Native American Heritage Commission and local Native American Tribal Representatives were consulted regarding the existence of sacred sites. All constraints identified were mapped and considered in determining the proposed alignments analyzed in this Draft EIR.

The two potential alignments have been divided into eight trail segments for analysis and project phasing purposes. These are identified as Segments 1, 2A, 2B, 3A, 3B, 3E, 3F, and 4, and are described in detail under the description of the Valley Alignment and Highway Alignment below. (Two other trail segments, Segments 3C and 3D, were contemplated during the planning process, but are no longer under consideration.)

Valley Alignment Trail Segments

The proposed Martis Valley Trail Valley Alignment has been divided into five segments, as described below and shown in *Figure 3-2*. Construction and operation of Segments 1, 2A and 2B are evaluated in this Draft EIR at a project-level of detail. Preliminary Trail Plans for these segments are provided in Appendix B1 and are available for review upon request at the Northstar CSD offices located at 908 Northstar Drive. Appendix B2 provides a memorandum prepared by the trail engineers describing each trail segment. Segments 3E and 4 would be constructed during future construction phases as funding becomes available and are evaluated in this Draft EIR at a programmatic level. The total length of the Valley Alignment, including Segments 3E and 4, is approximately 9.3 miles (49,272 linear feet).

Segment 1: Town of Truckee/Placer County line to the existing Martis Creek Lake Project Wildlife Viewing Area (±1.8 miles, ±9,300 linear feet)

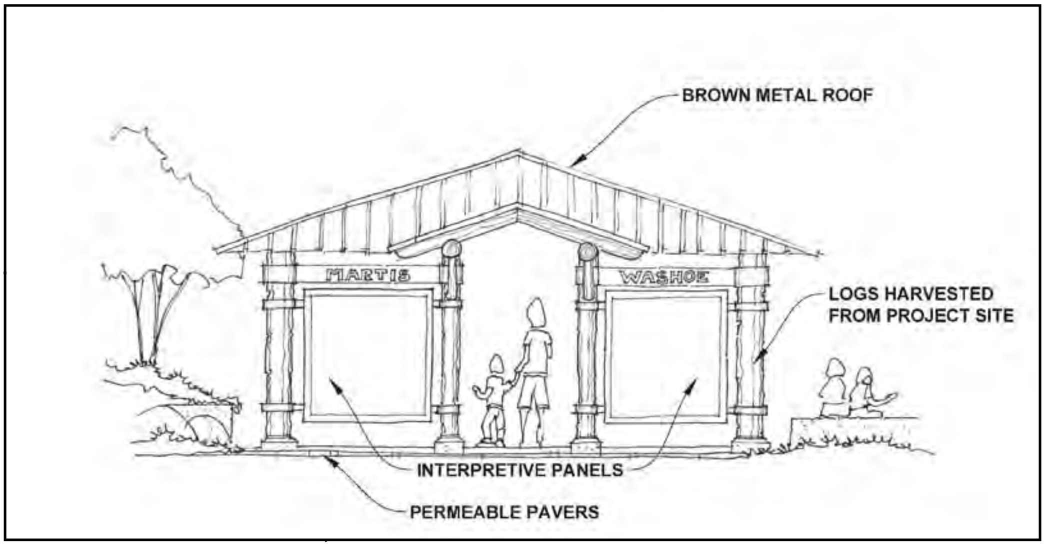
The trailhead would be located near the County line, at the intersection of SR 267 and Autumn Way, allowing for a future connection with the Town of Truckee trail system. The trail would trend southeast to a junction with Segment 2A near the existing Wildlife Viewing Area. The crossing of Schaffer Mill Road would be accomplished with a pedestrian signal system integrated into the existing intersection signal controls. The trail would meander roughly parallel to the highway but would be separated from the highway for aesthetic and safety reasons. This segment of trail would be constructed following topographic and other natural features.

A small trailhead information area would provide trail maps and a rest area for trail users at the northern terminus of this trail segment. A small rest area would be constructed at Station 10+25, a picnic area would be constructed at Station 26, and a small wildlife viewing area would be constructed at Station 42+50. A new Native American Interpretive Exhibit, as shown in *Figure 3-5,* would be constructed near Station 91+00, at the eastern end of this Segment. Wetlands along this segment would be crossed with a boardwalk.

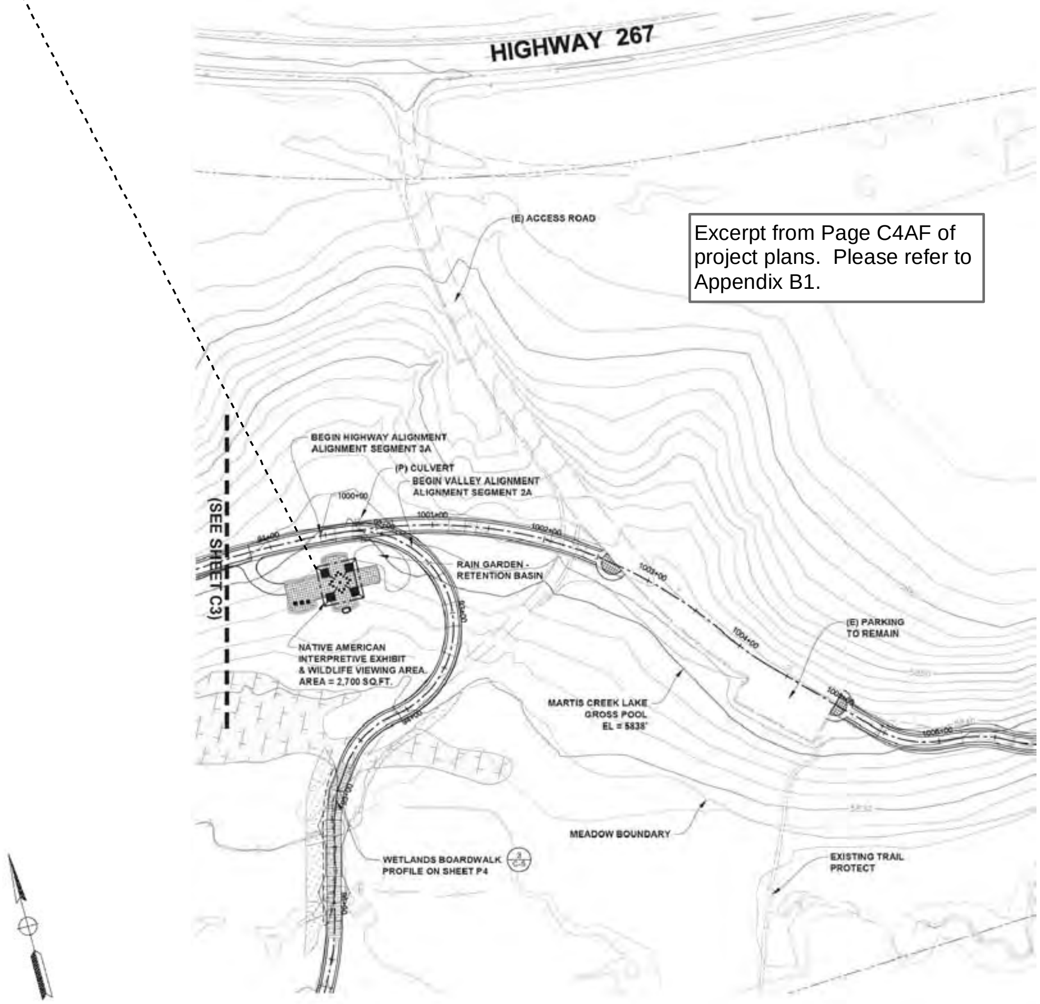
A parking area to serve the trail would be constructed within this Segment. Four potential locations for the new parking lot have been identified, as shown on *Figure 3*-6, shown in the Preliminary Trail Plans and evaluated in **CHAPTER 11 CEQA DISCUSSIONS**.

Segment 2A: Existing Martis Creek Lake Project Wildlife Viewing Area southwest to junction with Segment 2B (±1.1 miles, ±5,988 linear feet)

This segment would head southwest across Martis Valley primarily following existing dirt roads and trails. Wetlands near the beginning of this segment would be crossed with a boardwalk. The trail would turn south near a historic quarry site, following an old access road through the quarry site. A bridge crossing of Martis Creek would be constructed, and the bridge would transition to a boardwalk section to cross wetlands adjacent to the eastern side of Martis



Proposed design for exhibit that would provide information regarding Native American use of the Martis Valley and other natural history information.



Excerpt from Page C4AF of project plans. Please refer to Appendix B1.

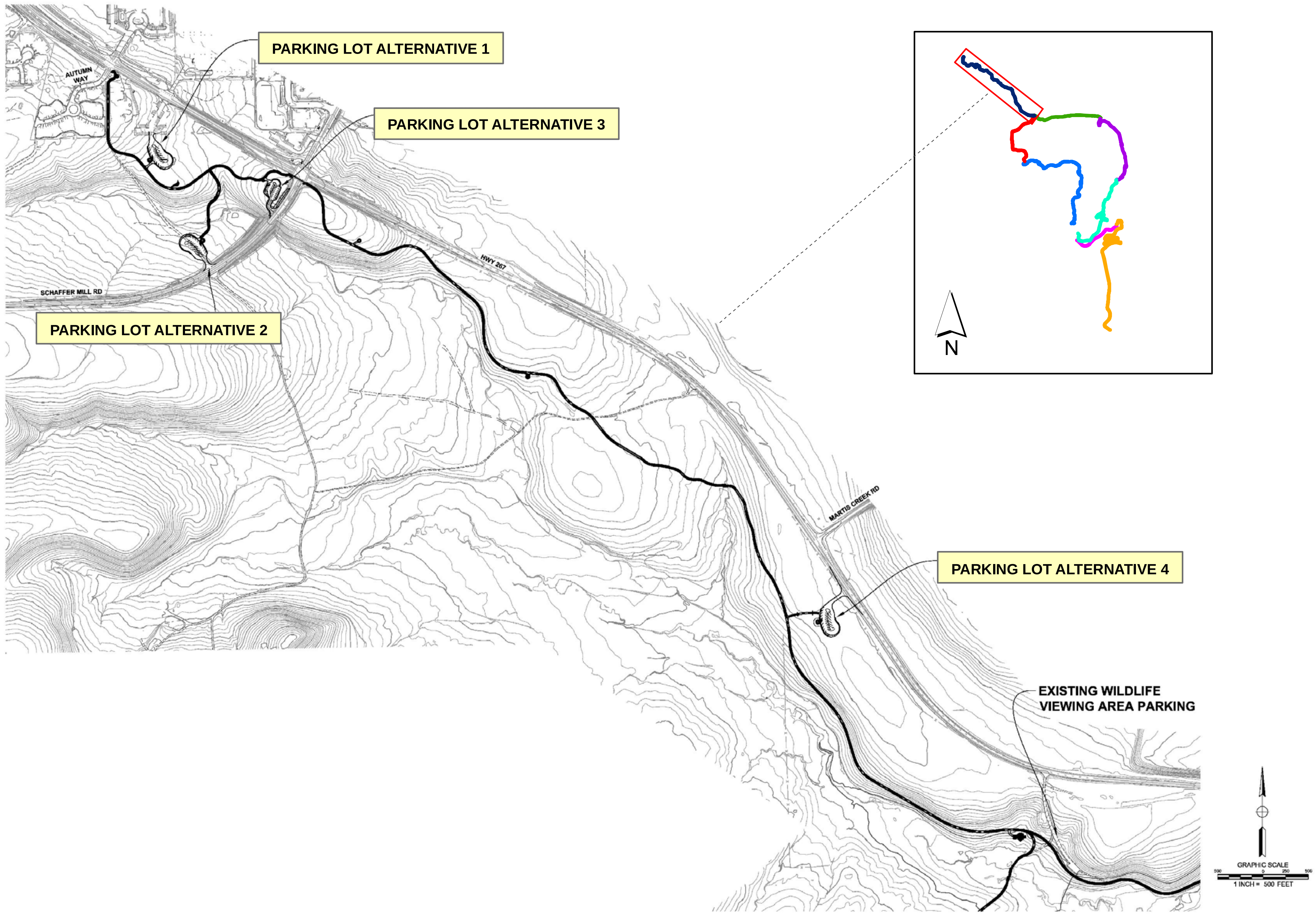
Source: Auerbach Engineering Corp.

Figure 3-5

INTERPRETIVE EXHIBIT

Martis Valley Trail

Placer County, California



NOT TO SCALE

Source: Auerbach Engineering Corp. 2012

Figure 3-6

POTENTIAL PARKING LOCATIONS

Martis Valley Trail

Placer County, California

Creek. The design and typical cross-sections for the bridge and boardwalk are shown in *Figure 3-7*. South of the boardwalk section, the trail would junction with existing dirt roads and trails and continue to the south and east. Trail information and maps would be provided in an exhibit at the junction with theexisting trails. Segment 2A would terminate where it meets Segment 2B at the property boundary between the Martis Creek Lake project area and Northstar California Resort.

Segment 2B: Martis Creek Lake Project/Northstar California resort property boundary south to the Village at Northstar (±2.5 miles, ±13,122 linear feet)

This segment would junction with Segment 2A at the property boundary between the Northstar California Resort and the Martis Creek Lake Project. It would ascend easterly through conifer forest and then south to its termination near the bus loop on Village Circle in the Village at Northstar. Segment 2B approaches the Village at Northstar from the west side of Northstar Drive, crossing Northstar Drive at its intersection with Big Springs Drive. Traffic at this intersection is controlled with stop signs. The trail segment also crosses North Village Drive and ends on the east side of Northstar Drive at Village Circle.

This segment includes a crossing of an unnamed tributary to Martis Creek, replacing an existing culvert with a larger one. The segment generally follows an existing portion of the unpaved Tompkins Memorial Trail and also junctions with other existing trails in the area. Portions of the existing Tompkins Memorial Trail would be abandoned and revegetated, as shown on *Figure 3-8*. As this segment ascends steep terrain, it requires more grading than flatter areas traversed by Segments 1 and 2A. It also includes switchbacks and rockery retaining walls. The conceptual design for one switchback area as well as typical cross sections for the rockery walls are shown in *Figure 3-9*. The junction with an existing trail at Station 559+00 requires a retaining wall and stairs.

Segment 3E: Village at Northstar east to junction with Segment 4 (±0.8 miles, ±4,398 linear feet)

In its conceptual design, this segment would include one at-grade crossing of Highlands View Road and a crossing of West Martis Creek. The trail would extend southeasterly from the Village at Northstar to an elevation of approximately 6,500 feet on a forested ridgeline where it would junction with Segment 4.

Segment 4: Terminus of Segment 3E to junction with Forest Route 73 (±3.12 miles, ±16,464 linear feet)

In its conceptual design, Segment 4 would head generally south from its junction with Segment 3E and ascend the forested slope with a series of switchbacks following existing dirt roads to the extent possible. The southern terminus of Segment 4 would be its junction with the paved Forest Route 73 just south of Sawmill Flat Reservoir. Forest Route 73 is known locally as the "Fibreboard

Freeway," and extends to the west and east for several miles along the ridgeline defining the Lake Tahoe Basin. Segment 4 travels through heavily forested slopes previously disturbed by logging activities.

Highway Alignment Trail Segments

The proposed Martis Valley Trail Highway Alignment has been divided into six segments, as described below and shown on *Figure 3-2*. Construction and use of Segments 1, 3A, 3B, and 3F are evaluated in this Draft EIR at a project-level of detail. Preliminary trail plans for these segments are provided in Appendix B1 and are available for review upon request at the Northstar CSD offices located at 908 Northstar Drive. Appendix B2 provides a memorandum prepared by the trail engineers describing each trail segment. Segments 3E and 4 would be constructed in the future as funding allows and are evaluated in this Draft EIR at a programmatic level. The total length of the Highway Alignment, including Segments 3E and 4, is approximately 10.4 miles (54,889 linear feet).

Segment 1: Same as Valley Alignment from Town of Truckee/Placer County boundary to the existing Martis Creek Lake Project Wildlife Viewing Area (±1.8 miles, ±9,300 linear feet)

Segment 1 is the same for both the Valley Alignment and the Highway Alignment, and is described above under the description of the Valley Alignment trail segments. As described for the Valley Alignment, Segment 1 would extend from the Town of Truckee/Placer County boundary to a junction with Segment 2A near the existing Martis Creek Lake Project Wildlife Viewing Area and would include a rest area, off trail picnic area, small wildlife viewing area, and a Native American Interpretive Exhibit and Wildlife Viewing Area. A new parking lot would also be constructed.

Segment 3A: Existing Martis Creek Lake Project Wildlife Viewing Area west to junction with Segment 3B (±1.16 miles, ±6,143 linear feet)

This segment would junction with Segment 1 at the existing Martis Creek Lake Project Wildlife Viewing Area parking lot. This segment would then follow a portion of the existing Tompkins Memorial Trail in the area between SR 267 and Martis Creek. The trail would cross over Martis Creek, replacing the existing Frank's Fish Bridge with a stronger structure 12 feet in width. One junction with existing trails would be included in this segment. The trail would continue roughly parallel to SR 267, just outside the highway easement. Construction along this segment would also include improvements to the existing drainage ditch adjacent to SR 267. In the area of the Northstar golf course, the trail would be located along the edge of the golf course property and would be bound by a split rail fence. The trail would turn south at the location of an existing unpaved and unnamed driveway just east of the Northstar golf course, known locally as Sawmill Flat Road.

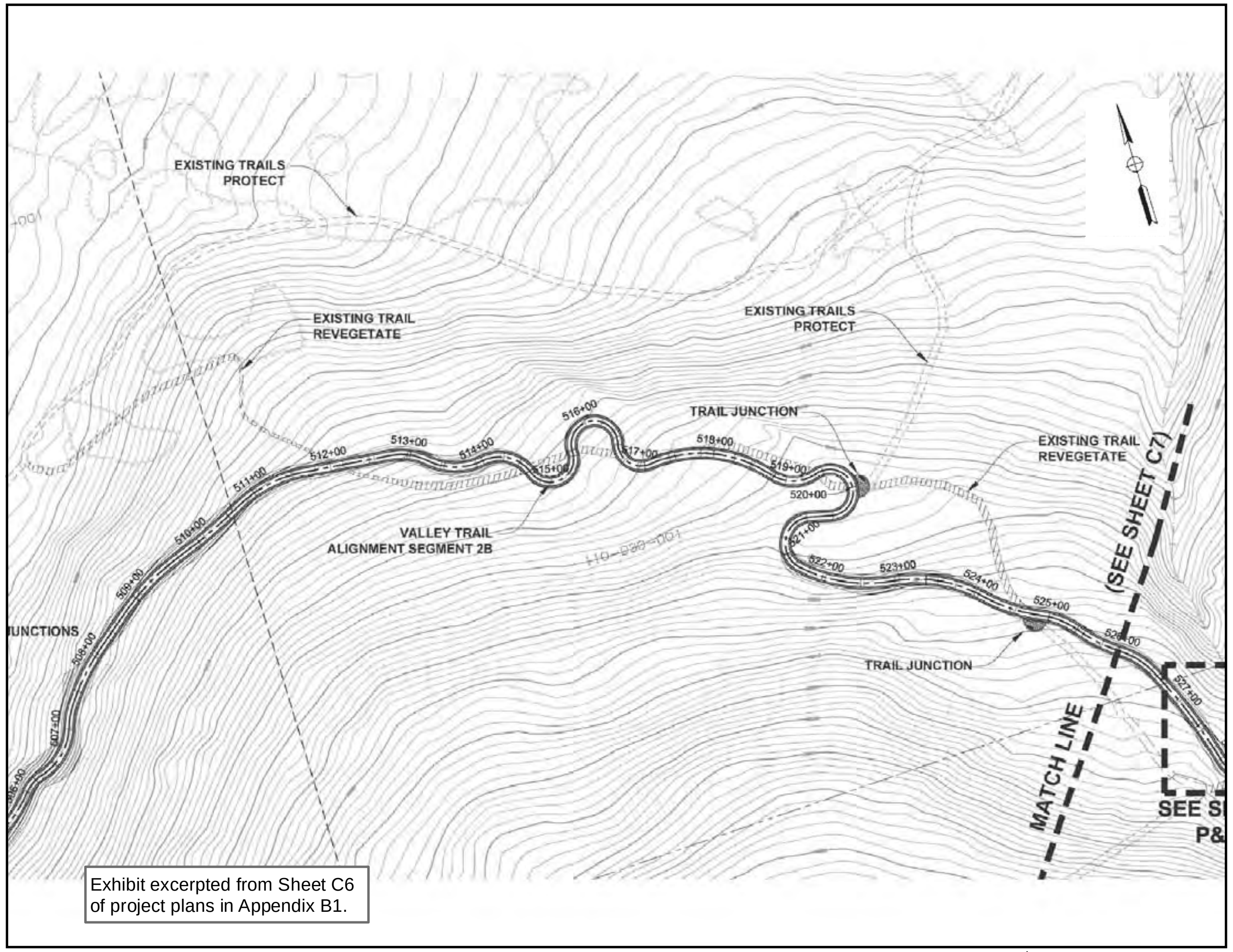


Exhibit excerpted from Sheet C6 of project plans in Appendix B1.

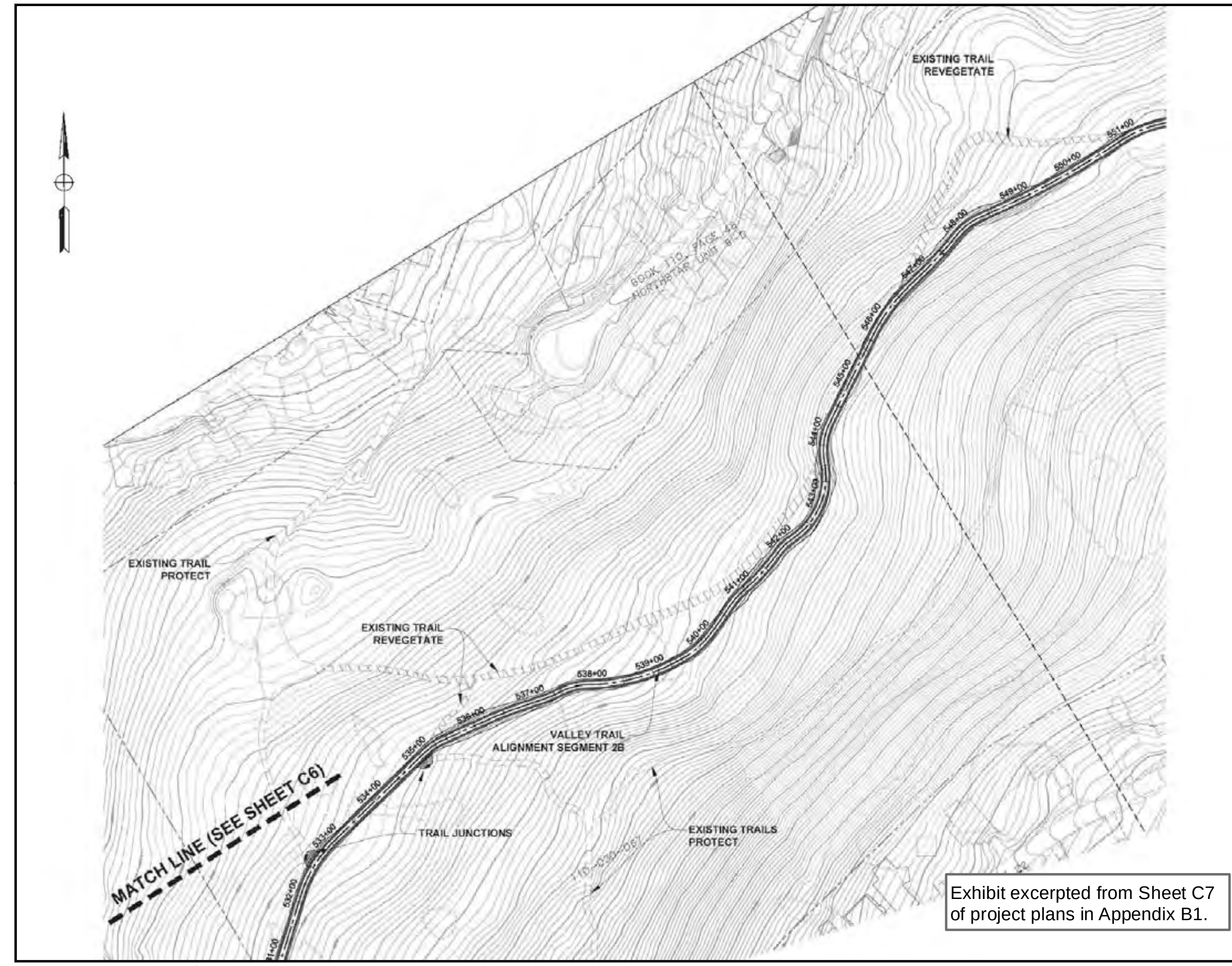
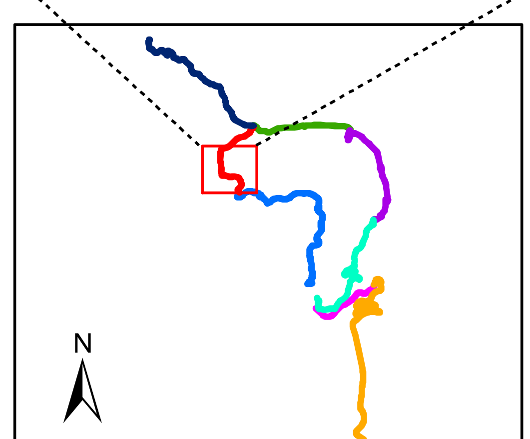


Exhibit excerpted from Sheet C7 of project plans in Appendix B1.



Exhibits above provide examples of existing unpaved trails that would be decommissioned and revegetated as part of the proposed project. Areas shown above are along Segment 2A of the proposed trail alignment. Existing unpaved trails would be revegetated in several other areas that are not shown.

north fork associates

Source: Auerbach Engineering Corp.

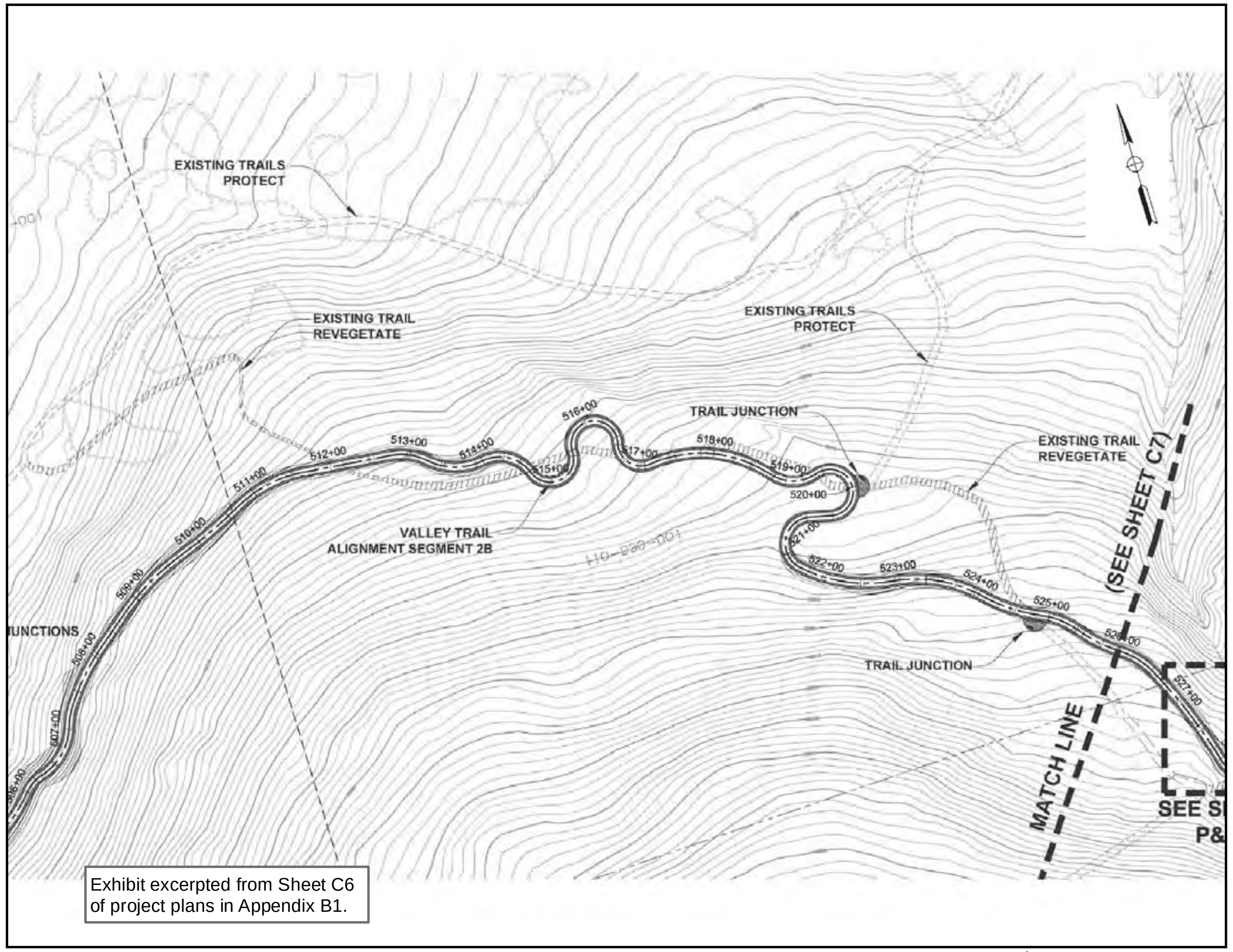
NOT TO SCALE

Figure 3-8

EXAMPLE TRAIL REVEGETATION AREAS

Martis Valley Trail

Placer County, California



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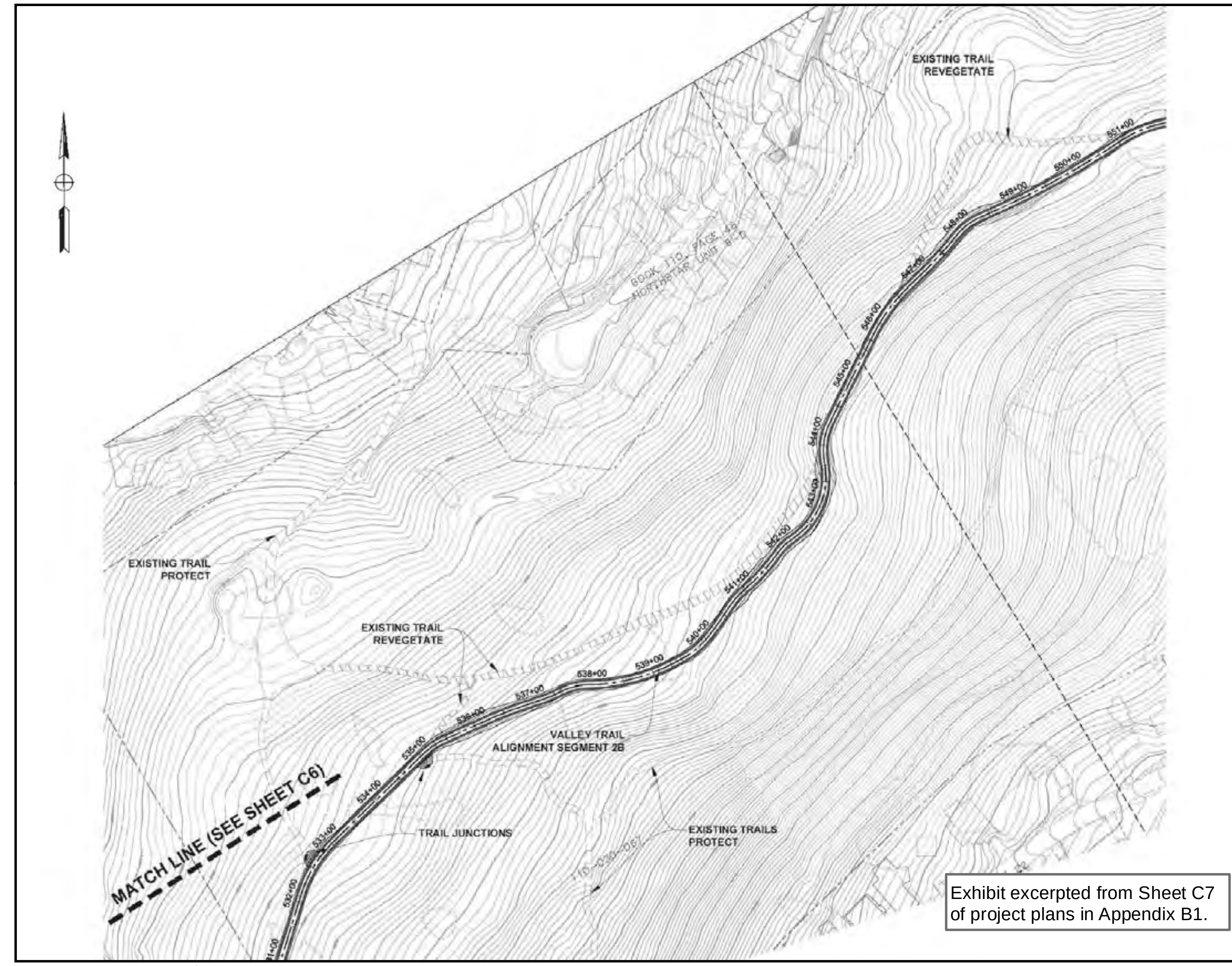

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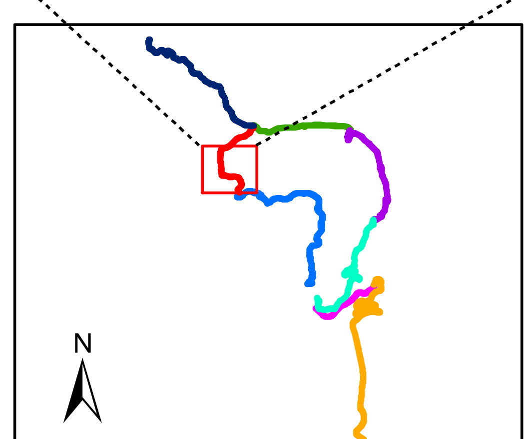

Exhibits above provide examples of existing unpaved trails that would be decommissioned and revegetated as part of the proposed project. Areas shown above are along Segment 2A of the proposed trail alignment. Existing unpaved trails would be revegetated in several other areas that are not shown.

north fork associates

Source: Auerbach Engineering Corp.

NOT TO SCALE

Figure 3-8

EXAMPLE TRAIL REVEGETATION AREAS

Martis Valley Trail

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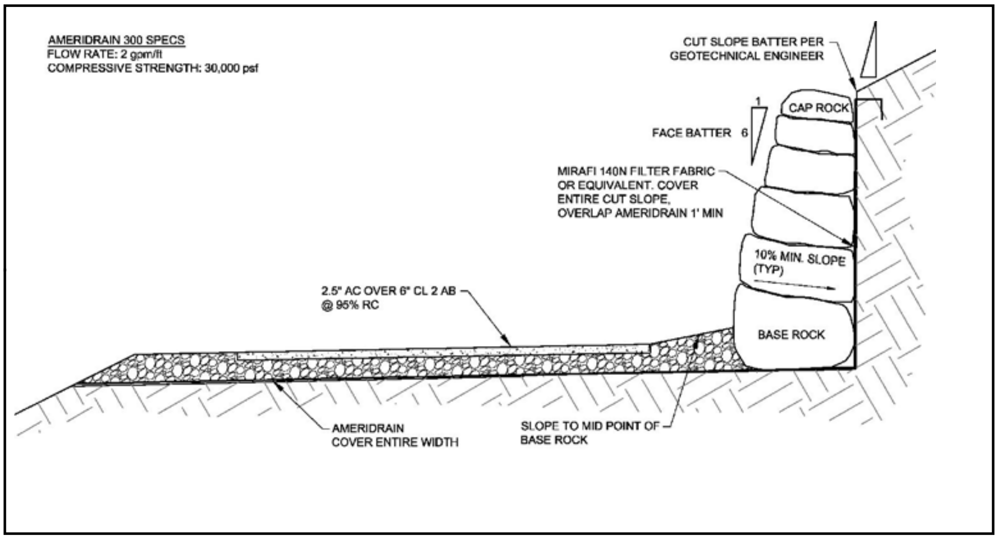
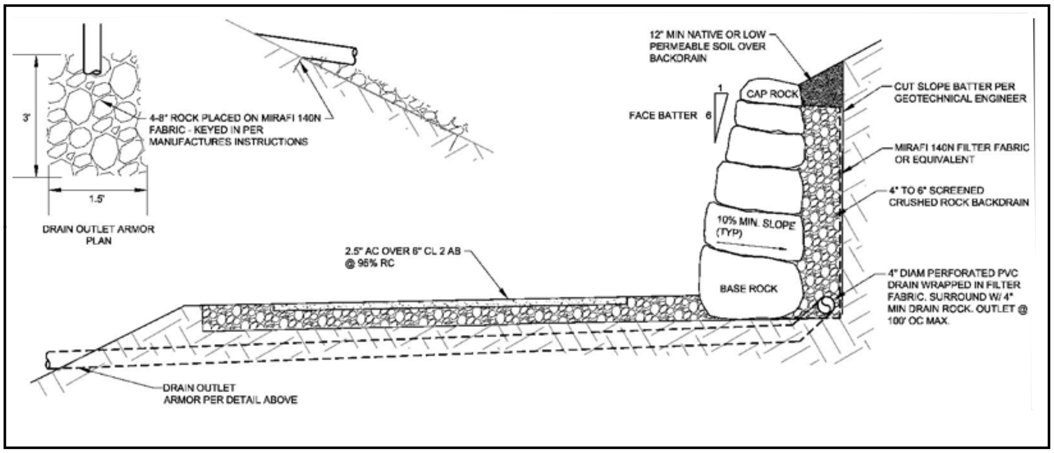
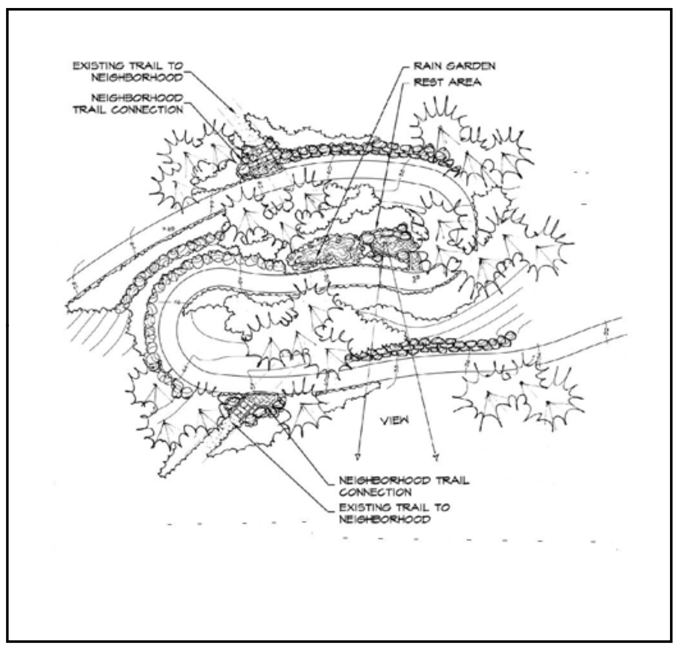


Cross-section of rockery walls proposed along trail.



Cross-section alternative for rockery walls proposed along trail.



Proposed design for trail switchbacks. Switchbacks would be used along Segments 2B, 3F, and 4.

Exhibits excerpted from Page C8 of project plans. Please refer to Appendix B1.

Source: Auerbach Engineering Corp.

Figure 3-9

TRAIL DESIGN ELEMENTS

Martis Valley Trail

Placer County, California

Segment 3B: Northstar California Golf Course to Northstar Drive, traversing Porcupine Hill (±1.65 miles, ±8,699 linear feet)

Segment 3B would begin by heading south on the existing unpaved and unnamed roadway east of the Northstar golf course for approximately 700 feet, and would then make a hairpin turn and begin traversing Porcupine Hill. As it ascends a steep slope, this segment would require grading and rockery retaining walls to achieve the target trail design grade. Portions of this segment generally follow an existing dirt trail in the area, but would deviate from the existing trail alignment in many places to remain within design grade limitations. Most of the existing trail would be protected, but two short sections would be revegetated. This segment would tie into an existing parking lot and sidewalk on the north side of Northstar Drive; a trail map would be provided in this location. The trail would continue along Northstar Drive to the roundabout at Castle Peak Way/Ridgeline Road. Trail users would cross Castle Peak Way in the existing crosswalk on the north leg of this intersection, follow a 10-foot wide landscape strip around the northwest quadrant of the roundabout, then cross Northstar Drive on the western leg of this intersection to access Segment 3F.

Segment 3F: Between Northstar Drive and the Village at Northstar (±1.9 miles, ±9,885 linear feet)

Segment 3F would begin in the southwest quadrant of the roundabout at Northstar Drive and Castle Peak Way/Ridgeline Road. A trail map is anticipated to be provided in this location. The trail would head westerly, roughly parallel to Northstar Drive for approximately 550 feet and then trend southerly roughly to parallel Ridgeline Road. Retaining walls would be constructed in several locations and two scenic view and rest areas would be constructed within this segment. This trail segment crosses several unnamed drainages as well as West Martis Creek. Crossings would be accomplished with bridges and culverts. The end of this segment would trend westerly and then turn north, passing west of the Northstar Property Owners Association tennis courts. This segment would end near an existing walkway that provides access to the Village at Northstar.

Segment 3E: Same as Valley Alignment from the Village at Northstar to Segment 4 (±0.8 miles, ±4,398 linear feet)

In its conceptual design, Segment 3E would include one at-grade crossing of Highlands View Road and a crossing of West Martis Creek. The trail would extend southeasterly from the Village at Northstar and reach an elevation of approximately 6,500 feet on a forested ridgeline where it would junction with Segment 4.

Segment 4: Same as Valley Alignment from Segment 3E to junction with Forest Route 73 (±3.12 miles, ±16,464 linear feet)

In its conceptual design, Segment 4 would head generally south from its junction with Segment 3F and ascend the forested slope with a series of switchbacks following existing dirt roads to the extent possible. The southern terminus of Segment 4 would be its junction with Forest Route 73 just south of Sawmill Flat Reservoir.

Trail Parking

Under either alignment, the trail would include a new parking lot located along Segment 1. The parking lot would include approximately 22 parking stalls and a trailhead with information kiosk. Parking lot drainage would be managed with the use of a pervious surface for the parking stalls, a rain garden, and detention basin. The parking lot would be located in one of four potential one-half-acre sites. Two of those sites are accessed directly from SR 267 while the other two are located on the north side of Schaffer Mill Road near SR 267.

A detailed analysis of the impacts of each of the Parking Lot Alternative locations is provided in **CHAPTER 11 CEQA DISCUSSIONS**. The analysis is consolidated in that chapter to facilitate comparison of the relative impacts of each Parking Lot Alternative and to allow each resource chapter impact analysis to focus on each of the alternative trail alignments. The overall impacts of the complete project are represented by the impacts of the trail alignment selected for construction in addition to the impacts of the parking lot alternative selected for construction.

Trail Alignment Location

The trail would cross through the parcels identified in *Table 3.1*, which also identifies the zoning and land use designation applied to each parcel. Definitions of each designation are provided at the end of the table.

Table 3.1
Parcels Crossed by Trail Alignment

APN	Size (Ac.)	Zoning	Land Use Designation	Crossed By	
				Valley Alignment	Highway Alignment
019-620-059	0.02	RM-6	High Density Residential, Tahoe Donner PC	Yes	Yes
019-620-017	0.01	RM-6	High Density Residential, Tahoe Donner PC	Yes	Yes
080-270-006-000	0.2479	RM-B-43-Ds	MDR 5-10 DU/AC	Yes	Yes
080-270-062-000	87.0423	RS-B-X 20 AC. MIN. PD = 1.2, RM-DL10 PD = 10	LDR 1 - 5 DU./Ac	Yes	Yes
080-270-057-000	1.4927	O	OS	Yes	Yes
080-270-063-000	91.6740	O	LDR 1 - 5 DU./Ac.	Yes	Yes
110-010-030-000	102.2126	O	OS	Yes	Yes

APN	Size (Ac.)	Zoning	Land Use Designation	Crossed By	
				Valley Alignment	Highway Alignment
110-010-009-000	114.3029	W, O	OS, WATER	Yes	Yes
110-010-013-000	18.5447	O, W	WATER	No	Yes
110-010-014-000	14.1922	O, W	WATER, OS	No	Yes
110-010-016-000	3.8288	O	OS	No	Yes
110-010-019-510	0.7947	O	OS	No	Yes
110-010-020-000	6.2119	O	OS	No	Yes
110-030-069-000	229.7506	RES-UP-Ds, FOR-B-X 160 AC MIN, RS-B-43, O	OS, FOREST 40-640 AC MIN, LDR 1-5 DU/AC, TOURIST/RESORT COMMERCIAL	No	Yes
110-081-049-000	3.0444	RES-Ds	TOURIST/RESORT COMMERCIAL	No	Yes
110-081-006-000	4.2706	FOR-B-X 160 AC MIN	FOREST 40-640 AC MIN	No	Yes
110-081-013-000	1.3720	FOR-B-X 160 AC MIN	FOREST 40-640 AC MIN	No	Yes
110-081-012-000	2.7425	FOR-B-X 160 AC MIN	FOREST 40-640 AC MIN	No	Yes
110-081-014-000	45.7632	FOR-B-X 160 AC MIN, TPZ, O	FOREST 40-640 AC MIN, OS, HDR 10-15 DU/AC	No	Yes
110-081-015-000	176.9873	O, TPZ	OS	No	Yes
110-081-022-000	27.2049	FOR-B-X 160 AC MIN	FOREST 40-640 AC MIN	No	Yes
110-081-016-000	8.8138	TPZ	FOREST 40-640 AC MIN	No	Yes
110-400-005-000	28.3528	FOR-B-X 160 AC MIN, RES-UP-Ds, RM-B-X-Ds 20 AC MIN PD=5.8	FOREST 40-640 AC MIN, TOURIST/RESORT COMMERCIAL, MDR 5-10 DU/AC	No	Yes
110-081-018-000	1.4895	FOR-B-X 160 AC MIN	FOREST 40-640 AC MIN	No	Yes
110-081-021-000	41.0396	FOR-B-X 160 AC MIN, RES-Ds PD=15	FOREST 40-640 AC MIN, TOURIST/RESORT COMMERCIAL	Yes	Yes

APN	Size (Ac.)	Zoning	Land Use Designation	Crossed By	
				Valley Alignment	Highway Alignment
110-081-020-000	0.5494	FOR-B-X 160 AC MIN, RES-Ds PD=15	FOREST 40-640 AC MIN, TOURIST/RESORT COMMERCIAL	No	Yes
110-030-001-000	472.6349	W, O	OS, WATER	Yes	No
110-030-067-000	156.5722	FOR-B-X 160 AC MIN, RS	LDR 1-5 DU/AC, FOREST 40-640 AC MIN	Yes	No
110-030-012-000	12.8711	FOR-B-X 160 AC MIN	OS	Yes	No
110-081-026-000	1.7638	FOR-B-X 160 AC MIN	OS	Yes	No
110-081-027-000	29.6133	FOR-B-X 160 AC MIN	OS	Yes	No
110-081-047-000	21.8255	FOR-B-X 160 AC MIN	FOREST 40-640 AC MIN	Yes	No
110-100-001-000	2.4880	RS PD=3	MDR 5-10 DU/AC	Yes	No
110-250-003-000	0.2666	RES-Ds PD=15	TOURIST/RESORT COMMERCIAL	Yes	No
110-250-010-000	1.9252	RES-Ds PD=15	TOURIST/RESORT COMMERCIAL	Yes	No
110-250-009-000	1.3170	RES-Ds PD=15	TOURIST/RESORT COMMERCIAL	Yes	No
110-081-017-000	1.8409	FOR-B-X 160 AC MIN	FOREST 40-640 AC MIN	Yes	Yes
110-050-071-000	116.8583	FOR, RM-B-X-Ds 20 AC MIN PD=5.8, FOR-B-X 160 AC MIN	MDR 5-10 DU/AC, FOREST 40-640 AC MIN	Yes	Yes
110-050-069-000	437.9576	TPZ	FOREST 40-640 AC MIN, Public Facility	Yes	Yes
110-050-007-000	11.2419	TPZ	FOREST 40-640 AC MIN	Yes	Yes
110-050-054-000	226.5826	TPZ	FOREST 40-640 AC MIN	Yes	Yes
110-050-026-000	34.4523	TPZ	AGRICULTURE/TIMBERLAND - 80 AC MIN	Yes	Yes

<table>
<tr><th rowspan="2">APN</th><th rowspan="2">Size (Ac.)</th><th rowspan="2">Zoning</th><th rowspan="2">Land Use Designation</th><th colspan="2">Crossed By</th></tr>
<tr><th>Valley Alignment</th><th>Highway Alignment</th></tr>
<tr><td colspan="3">Zoning Designation Acronym Definitions:
FOR = Forestry
B-X = Building Site Minimum
O = Open Space
W = Water
TPZ = Timber Production Zone
RS = Residential Single-Family
RM = Residential Multi-Family
RES = Residential
PD = Planned Development
Ds = Design Review
UP = Use Permit Required
OP = Office Professional</td><td colspan="3">Land Use Designation Acronym Definitions:
OS = Open Space
FOREST 40-640 AC MIN = Forestry, minimum parcel sizes between 40 and 640 acres
LDR = Low Density Residential
MDR = Medium Density Residential
HDR = High Density Residential
DU/AC = Dwelling Units per Acre</td></tr>
</table>

Trail Construction Techniques

Both hand and mechanical construction techniques would be used to build the proposed trail and to build ancillary features such as retaining walls, rest areas, interpretive exhibits, and bridges.

The trail corridor would be cleared of vegetation to a minimum width of 15 feet. Vegetation removal adjacent to the paved trail section and shoulders would be minimized to the extent possible, but some vegetation removal adjacent to the trail would be needed to provide safe lines of sight. To the extent possible, native trees greater than 6 inches diameter at breast height adjacent to the trail alignment would be retained. Trees that overhang the trail would be trimmed generally up to between 12 and 15 feet. During trail clearing, limbs would be cut flush with the tree trunk. All cut vegetation would be chipped and broadcast, or lopped and scattered, within the project area. Areas adjacent to the trail disturbed by grading would be revegetated. Rockery walls would be used in places to stabilize steep cut slopes and would have pockets of vegetation to provide a more natural appearance to these slope stabilization features.

It is estimated that construction of the trail segments between the Segment 1 trailhead (Placer County/Town of Truckee boundary) and the Village at Northstar would start in 2012 or 2013 and, dependent on funding available for construction, would be completed in phases over a period of two to three years. Except for the specific areas under construction, public areas around the site would remain open during construction, where possible, subject to public health and safety considerations. Restricted areas would be secured or fenced to deter unauthorized entry. Construction periods and activities may be limited in biologically and culturally sensitive areas as dictated by the results of surveys and mitigation measures identified in **CHAPTER 4 BIOLOGICAL RESOURCES** and **CHAPTER 5 CULTURAL RESOURCES**.

Equipment used in trail construction, road removal, revegetation, and boardwalk installation will include the following: small bulldozers, motorized wheelbarrows, hand operated compactors, hand-held power augers, small front-end loader, small tracker, hand-held power tools and hand tools (e.g., Pulaskis, McLeods, shovels, hammers, saws). As established in the Initial Study and Notice of Preparation, construction activities would occur between the hours of 7:00 a.m. and 6:00 p.m. Monday through Friday and between 8:00 a.m. and 6:00 p.m. on Saturdays.

Staging areas for this project have not yet been identified, but would be located outside of resource areas and, as much as is feasible, within existing disturbed areas. Staging areas are likely to be placed outside of the study corridor. Requirements for selection and management of staging areas are identified in **CHAPTER 4 BIOLOGICAL RESOURCES**, **CHAPTER 5 CULTURAL RESOURCES, CHAPTER 6 HYDROLOGY AND WATER QUALITY**, and **CHAPTER 8 VISUAL RESOURCES**. Areas potentially available to be used for equipment and materials storage and staging include the proposed new parking lot, the existing Martis Creek Lake Project Wildlife Viewing Area parking lot, the quarry site within Segment 2A, log landing sites near Segment 2B, gravel and dirt areas near the golf course maintenance access gate south of 267, existing parking lots within the Northstar Community (such as the lower fire station area near Aspen Grove Drive, the parking lot off Castle Peak Way, and the parking at the Village at Northstar), and existing disturbed areas within Segments 3B and 3F. All staging areas would be protected with construction Best Management Practices (BMPs) to avoid erosion and tracking of materials away from these areas. BMPs could include construction fencing, silt fences, fiber rolls, and placing tarps over material stockpiles, in addition to other measures, as discussed in **CHAPTER 6 HYDROLOGY AND WATER QUALITY**.

The paved portion of the trail would generally be ten feet wide, but the width may vary slightly based on geologic and safety considerations. Unpaved shoulders on each side of the trail would generally be two-feet wide but may be reduced in steeper areas to reduce grading. The trail surface would be excavated using a small bulldozer, mini excavator, hand construction, and/or other machinery capable of conforming to the dimensional requirements of the trail. Dips and undulations in the design would follow the natural drainage patterns to facilitate effective surface flow of water off the trail surface.

Creek Crossing and Drainage Features

Under either the Valley Alignment or the Highway Alignment, several crossings of creeks, drainages, and wetlands would be required. Bridges and boardwalks would be used for each crossing. *Figure 3-7* provides a schematic drawing of the bridge and boardwalk proposed for crossing Martis Creek in Segment 2A. This bridge and boardwalk section would be typical of bridges and boardwalks used throughout the trail. **CHAPTER 4 BIOLOGICAL RESOURCES** identifies each crossing and both the proposed and existing crossing method/structure for each.

Best Management Practices for Prevention of Erosion and Siltation

Northstar CSD would implement a Storm Water Pollution Prevention Plan (SWPPP) to minimize potential impacts from soil transportation, erosion, and siltation during trail construction. The SWPPP would be prepared in accordance with Lahontan Regional Water Quality Control Board (RWQCB) procedures and requirements and in compliance with the California Construction General Permit. The SWPPP would provide the plans and specifications for BMPs intended to prevent and control erosion and siltation to the extent feasible. The SWPPP for this project is discussed in more detail in **CHAPTER 6 HYDROLOGY AND**

WATER QUALITY. Trail design features to provide long-term management of stormwater would include rain garden retention basins and pervious surfaces at rest and viewing areas.

Interpretive Program

The trail would include interpretive panels and displays to inform area visitors of biological, hydrological, cultural, and physical features. These displays would be combined with seating at overlooks and rest areas. Final signage design has not been determined. The interpretive features would be developed through a design process that includes property owners, the USACE, the Washoe Tribe, and local historians and residents. *Figure 3-5* provides an example of potential interpretive exhibit design.

Public Access

Primary access to the northern section of the trail (between the Segment 1 trailhead and the Village at Northstar) would come from existing trails within the Town of Truckee and the existing Tompkins Memorial Trail, the proposed new parking lot, the existing Martis Creek Lake Project Wildlife Viewing Area parking lot, and existing developed areas such as residential areas and the commercial centers of Truckee and Northstar. Access to the southern sections of the trail (between the Village at Northstar and the junction with Forest Route 73) would come from existing trails and roadways in the Village at Northstar as well as from Forest Route 73. The four potential locations for the proposed new parking lot are identified above and shown in *Figure 3-6*. No changes are proposed to the existing Martis Creek Lake Project Wildlife Viewing Area parking lot.

Fences and Gates; Control of Access to Private Property

The trail is proposed to accommodate pedestrians, bicyclists, and other non-motorized transportation. The trail would intersect Schaffer Mill Road at SR 267 and would intersect Northstar Drive. Walk-throughs or stiles would be used at these locations to prohibit motorized use of the trail. Emergency vehicle access to the trail system would be accommodated by removable bollards.

Portions of the trail would cross through private property in several places, including along Segment 1 and on portions of the trail within the Northstar Community. Access easements will be required from the owners of these private parcels. Northstar CSD is currently working to obtain the necessary access easements for trail construction use such as for assessor's parcel number 110-010-030-000. The easements for public use of the land would be granted to Placer County. Access from the trail to this private property, which is located along Segment 1 between Schaffer Mill Road and the existing Martis Creek Lake Project Wildlife Viewing Area, would be prohibited by fencing that would be constructed along both sides of the trail through this property. Fencing would be of an open design (such as split-rail) to allow for wildlife movement.

Construction Schedule

As noted above, Northstar CSD currently proposes to construct the segments between the Segment 1 trailhead and the Village at Northstar. Under the Valley Alignment, this includes Segments 1, 2A, and 2B. Under the Highway Alignment, this includes Segments 1, 3A, 3B, and 3F. Construction is anticipated to begin in 2012 or 2013 and construction activities would occur throughout the construction season of early May through the beginning of November for a period of two to three years. Construction hours would be limited by Mitigation Measure NOI.1 identified in the Initial Study, which states that construction activities would occur between the hours of 7:00 a.m. and 6:00 p.m. Monday through Friday and between 8:00 a.m. and 6:00 p.m. on Saturdays. Construction may be limited in biologically sensitive areas as dictated by the results of pre-construction surveys and mitigation measures identified in **CHAPTER 4 BIOLOGICAL RESOURCES**.

Under either alignment Segments 3E and 4 would be constructed at a future date, when funding for these segments becomes available. Future construction periods would also be expected to occur between May and November and construction hours must comply with Mitigation Measure NOI.1 as well as the results of pre-construction surveys and mitigation measures identified in **CHAPTER 4 BIOLOGICAL RESOURCES**. Cultural resource surveys and evaluation would also be completed prior to construction of these segments.

Long-Term Maintenance and Management

The trail would be constructed and maintained by Northstar CSD but owned by Placer County. Maintenance activities including sweeping, crack sealing, surface restoration, vegetation control, and removal of slough would be performed by Northstar CSD staff and/or volunteers, and maintenance would occur annually or as needed. It is expected that minimal trail surface maintenance would be needed for the first three years of use.

Additional maintenance may be required as a result of weather-related events (e.g., removal of downed trees and slide removal) and unauthorized activities such as vandalism. Depending on the bridge materials used (i.e., wood, steel, or fiberglass) the bridges would require routine maintenance about every eight to ten years.

3.7 ENTITLEMENTS AND REQUIRED APPROVALS

Table 3.2 lists the entitlements, permits, and approvals required from Northstar CSD and from other Responsible Agencies for the proposed project. This same table appears in **CHAPTER 2 EXECUTIVE SUMMARY** along with a description of each required approval.

Table 3.2
Required Approvals/Permits for Martis Valley Trail

Required Permit	Responsible Agency
Trail Authorization	Northstar CSD
Agreement authorizing trail alignment through USACE property	U.S. Army Corps of Engineers
Clean Water Act Section 404 Permit	U.S. Army Corps of Engineers
Water Quality Certification	Lahontan Regional Water Quality Control Board
Federal Endangered Species Act Section 7 Consultation	U.S. Fish and Wildlife Service
National Historic Preservation Act Section 106 Consultation	State Historic Preservation Officer
Streambed Alteration Agreement	California Department of Fish and Game

Required Permit	Responsible Agency
Minor Use Permit	Placer County
Grading Plan / Improvement Plan Approval	Placer County
Encroachment Permit (may be required)	California Department of Transportation
Timber Harvest Plan or Timberland Conversion Permit (may be required)	California Department of Forestry and Fire Protection

CHAPTER 4

BIOLOGICAL RESOURCES

CHAPTER 4 BIOLOGICAL RESOURCES

This chapter identifies the habitats, vegetation, and wildlife that may be supported within the study area. Field work and resource mapping conducted to evaluate conditions within the project area focused on a 50-foot wide corridor around the preliminary trail centerline. In one area, a portion of Segment 3F, the field work was conducted on a wider area. The land included in the corridor where field work and resource mapping occurred is referred to as the study area and/or the study corridors.

Based on the results of the field work and resource mapping, a proposed alignment was identified for each of the project alternatives. The Preliminary Trail Plans developed for each alignment, provided in Appendix B of this Draft EIR, identify the area that would be disturbed by trail construction. Impacts identified in this chapter are based on the area of disturbance shown in the Preliminary Trail Plans. The area of disturbance is referred to as the project site.

The analysis in this chapter is based on the information in the Biological Resources Assessment and Wetland Delineation prepared by North Fork Associates, as well as additional field review conducted to evaluate areas that have been added to the study area to reflect minor changes in trail alignments made after the reports and their addendums were completed. The original reports were prepared in 2009 and addendums to each were prepared in 2011. These reports and addendums are provided in Appendix C to this EIR. The 2009 studies included assessment of Segments 3C and 3D, which were part of the Highway Alignment proposed at the time. These segments were subsequently omitted from further consideration and replaced with Segment 3F, which was evaluated by the 2011 addendums. The 2009 Wetland Delineation and 2011 addendum have been submitted to the U.S. Army Corps of Engineers (USACE) for verification.4.1Environmental Setting

Both study corridors are mapped on the 7.5 minute Truckee and Martis Peak, California, United States Geological Survey (USGS) quadrangles. The study corridor for the Valley Alignment is within Sections 13 and 24 of Township 17 North, Range 16 East; Sections 19, 29, 30, and 32 of Township 17 North, Range 17 East; and Sections 5 and 8 of Township 16 North, Range 17 East. The study corridor for the Highway Alignment is within Sections 13 and 24 of Township 17 North, Range 16 East; Sections 19, 20, 28, 29, and 32 of Township 17 North, Range 17 East; and Sections 5 and 8 of Township 16 North, Range 17 East (refer to *Figure 3-1* in **CHAPTER 3 PROJECT DESCRIPTION**).

4.1 ENVIRONMENTAL SETTING

Regional Setting

The study area is within Martis Valley, which is located on the eastern side of the Sierra Nevada Mountains, north of Lake Tahoe and southeast of the Town of Truckee. Martis Valley is generally bounded by the Truckee River to the north and west, the Lake Tahoe Basin to the south, and the eastern reaches of Waddle Ranch on the east. Geographically, Martis Valley encompasses an area of approximately 70 square miles (44,800 acres). Elevations in the Martis Valley area range from approximately 5,800 feet above mean sea level (msl) along the valley floor to approximately 8,600 feet msl along the southern mountain ridges. The climate in the area is characterized by mild, dry summers and cold, wet winters, with most precipitation falling as snow. Annual temperatures range from -28 degrees F to 101 degrees F.

The valley floor is characterized by scrub and chaparral vegetation while the steep terrain surrounding the valley is dominated by coniferous forest. Natural waterbodies and waterways in the area include the Truckee River, Martis Creek, Dry Lake, and Gooseneck Lake. According to the *Martis Valley Community Plan* (Placer County 2003), habitats in the region include mixed coniferous forest, Great Basin sage scrub, Red fir forest, montane chaparrel, montane meadow, and riparian scrub. Mixed coniferous forest is the dominant habitat type in the region. These vegetation communities provide cover, foraging, and breeding habitat for a variety of fish and wildlife species, including several special-status species. Ongoing development within Martis Valley has incrementally reduced wildlife movement corridors in the area. Several organizations are involved in efforts to preserve natural areas within Martis Valley.

The proposed trail would pass through the Martis Creek Lake Project area, which includes ±1,800 acres owned and managed by the USACE. This area is managed by the USACE in accordance with the *Martis Creek Lake Master Plan*, which was adopted in 1977. The trail would cross the portion of the Martis Creek Lake Project south of State Route (SR) 267. The Master Plan designates this area as a wildlife management area and includes it within the *Operations: Wildlife Management* zone. The Master Plan anticipates development of nature-interpretative trails in this area. Uses allowed by the Master Plan are discussed further in **CHAPTER 9 RECREATION** of this EIR.

Northstar Community Services District (CSD) maintains the Tompkins Memorial Trail, which consists of ±14.6 miles of unpaved trail within Martis Valley. The Tompkins Memorial Trail passes through the portion of the Martis Creek Lake project south of SR 267 and the Northstar California property.

The existing trail along Martis Creek through the Martis Creek Lake Project Wildlife Management Area is one of the most popular trails in the Truckee/North Tahoe area. The heavy use of trails adjacent to Martis Creek has led to water quality impacts from sediment generated by erosion of the trail and streambanks, and impacts to wildlife resulting from the presence of humans and dogs in the area (Truckee River Watershed Council 2009). Restoration activities undertaken by the Watershed Council and USACE include "rerouting some portions of the existing trails away from stream banks, meadows and wetlands, restructuring and rebuilding portions of trails, and stabilizing stream banks through extensive revegetation" to reduce sedimentation and enhance natural habitat (Truckee River Watershed Council 2009). In 2010, the Truckee River Watershed Council began an assessment of the Martis Creek watershed. The assessment includes describing watershed attributes, an existing conditions inventory, and identification of additional restoration opportunities. The field assessment has been completed and the final report is anticipated in April 2012 (D. Shaw, pers. comm.).

Study Area Setting

Topography within the study area ranges from generally flat to gently rolling on the floor of Martis Valley to steeply sloped south of the valley. Elevations range from approximately 5,840 feet on the valley floor to 7,100 feet at Forest Route 73. Land uses in the vicinity of the trail alignment include residential and commercial uses at the eastern end of the Town of Truckee, the Truckee-Tahoe Airport, the Lahontan and Northstar golf courses, existing trails and wildlife viewing in the Martis Creek Lake Project, Martis Creek Lake (a flood-control reservoir north of the project site within the Martis Creek Project), residential uses throughout the Northstar California property, commercial uses in the Village at Northstar, and Northstar California recreation uses. Uses in the higher elevations, above the Village at Northstar, primarily consist of resource management (timber management and harvesting) and recreation.

Habitats

The Biological Resources Assessment documents five habitat types that occur along the proposed alignments for the Martis Valley Trail: coniferous forest, sagebrush scrub, wet meadow, dry meadow, and riparian. Each habitat type is described below. While the trail has been designed to follow the alignment of existing unpaved trails in the valley to the extent possible, the proposed alignment departs substantially from existing disturbed areas in several locations. *Figure 4-1* identifies the location of each habitat type within the study corridor for both the Highway Alignment and the Valley Alignment. *Table 4.1* summarizes the approximate area of each habitat type within the study corridor for each alignment. For the Valley Alignment, the habitat areas identified in *Table 4.1* include habitats within the study corridors for segments 1, 2A and 2B. For the Highway Alignment, *Table 4.1* identifies the amount of each habitat type within the study corridors for segments 1, 3A, 3B, and 3F.

Table 4.1
Study Corridor Habitat Types and Area

Alignment	Habitat Type and Area (acres)				
	Riparian	Wet Meadow	Dry Meadow	Coniferous Forest	Sagebrush Scrub
Valley Alignment	0.14	0.11	0.24	20.63	11.74
Highway Alignment	0.38	0.0	0.02	23.22	14.82

Riparian

Riparian habitat within the study area is associated with Martis Creek and its tributaries. The riparian habitat is generally a patchy band approximately 10 to 20 feet wide along each bank of the creek which is dominated by compacted, rounded willow shrub species 10 to 15 feet high. Small lodgepole pine trees also occur throughout the riparian habitat. Other associated plant species are similar to the species found in the wet meadow, along with mountain alder, wild rose, mountain timothy, willow dock, common monkeyflower, and stemless thistle. Riparian habitat is associated with Martis Creek and its tributaries along Segments 2A, 3A, 3B, and 3F.

Wet Meadow

The wet meadow habitat occurs in a large area in Martis Valley that supports wetland vegetation due to hydrological influences from Martis Creek (and its tributaries) and/or a seasonally high water table. The wet meadow habitat type occurs along Segment 2A just south of the existing Wildlife Viewing Area parking lot and at the crossing of Martis Creek. The wet meadow habitat is dominated by herbaceous wetland species such as Ryberg's beardtongue, long-stalk clover, dense-flower spike-primrose, western mountain aster, dwarf woolly-heads, water speedwell, Great Basin navarretia, long-stalk starwort, glandular cinquefoil, western buttercup, sedges, rushes, meadow barley, and tufted hairgrass. Some marginal wetland species, such as Parry's arnica, Kentucky blue grass, and common timothy also occur in the wet meadow areas.

Dry Meadow

The dry meadow habitat type is typically found in the transition zone between wet meadow or riparian and upland sage scrub and coniferous forest habitat types. A small area of dry meadow habitat occurs within Segment 2A, south of the proposed crossing of Martis Creek, and another small area of dry meadow habitat occurs within Segment 3A, east of the existing Wildlife Viewing Area. The dry meadow habitat type is dominated by many of the same plant species as found in the wet meadow habitat but with a species composition trending toward plants that are more tolerant of dryer conditions. Perennial species of sedges, rushes, and grasses comprise most of the vegetation in these areas.

Coniferous Forest

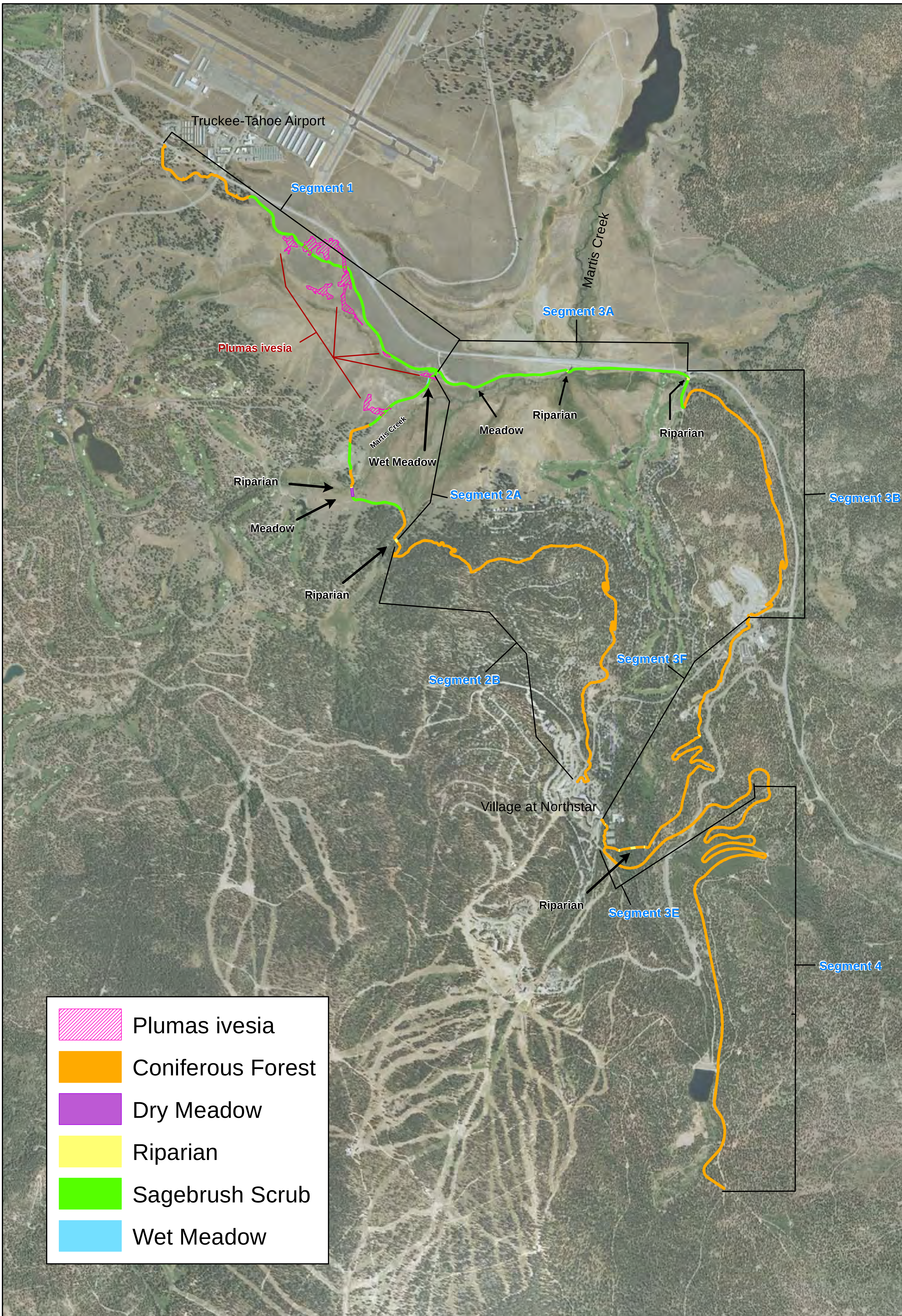
The coniferous forest vegetation community occurs in areas above the valley floor, primarily south of Martis Valley, around the Village at Northstar and along sections of the trail leading toward Forest Route 73. Coniferous forest habitat is the dominant habitat along Segments 2B, 3B, 3F, and 4. This habitat type also occurs in the northern portion of Segment 1 near the crossing of Schaffer Mill Road and along portions of Segment 2A. The upper slopes above Northstar support dense forests with red and white fir, western white pine, Jeffrey pine and lodgepole pine. At lower elevations near Martis Valley, the coniferous forest habitat is dominated by Jeffrey pine and white fir. In areas with more moisture, particularly in the lower landscape positions of Martis Valley, lodgepole pine is the dominant overstory species. Understory shrubs include greenleaf manzanita, mahala mat, tobacco brush, big sagebrush, and antelope brush. The herbaceous cover is relatively light and includes bitter dogbane, mountain mule's-ears, phacelia, campion, blue wildrye, quackgrass, and orchard grass.

Along Segment 2B, the trail alignment meanders through existing residential development within the Northstar community. This area of conifer forest habitat has been thinned, presumably for fire fuels management. Evidence of recent thinning operations along the trail alignment includes slash piles and tree stumps. Evidence of thinning operations was also noted along Segments 3B and 3F.

Sagebrush Scrub

This habitat occurs below the coniferous forest in elevation and is dominated by big sagebrush; secondary shrub dominants include antelope brush and rubber rabbitbrush. Sagebrush scrub is the dominant habitat type along Segments 1, 2A, and 3A. It also occurs in the northern portion of Segment 2B.

The sagebrush scrub varies from dense intertwining branches of big sagebrush and antelope brush to more open areas that also support herbaceous vegetation, such as



Note:
Alignment shown represents 50-foot study corridor.

Imagery: Microsoft Corp 2010

N

0 1,000 2,000 Feet
Scale in Feet

Figure 4-1

HABITAT MAP

Martis Valley Trail

Placer County, California

Parish's yampah, thickstem aster, mountain tarweed, cryptantha, locoweed, dwarf lupine, clustered broom-rape, blue-eyed Mary, sulfur flower, navarretia, onion, cheat grass, bulbous bluegrass, and squirreltail. Embedded within the sagebrush scrub are areas dominated by low sagebrush.

Special-Status Plant Species

Research through the California Natural Diversity Database, U.S. Fish and Wildlife Service (USFWS), and California Native Plant Society (CNPS) indicates that there are a total of 22 special-status plant species that may occur in the project region. Of these, one plant is known to occur within the study corridor for Segments 1 and 2A and five other plants are rated likely or possible to occur because the study corridor has some areas of suitable habitat or there are known occurrences in the project region. The special-status plant species that could be supported by habitats present in the study area are identified in *Table 4.2* below. Each species listed in the table is discussed in more detail in the Biological Resources Assessment and addendum included in Appendix C to this Draft EIR. The special-status plant species determined to have potential to occur in the study area are all included on CNPS lists but have no state or federal status (i.e., are not listed as threatened or endangered under the California Endangered Species Act or the Federal Endangered Species Act).

Plumas ivesia was the only special-status plant species observed in the study area for both trail alignments. This species was observed at several locations within the sagebrush scrub habitat along the proposed trail alignment north of Martis Creek. In the study corridors this species is found growing in areas dominated by low sagebrush where antelope brush and big sagebrush are absent. While a small area of Plumas ivesia was mapped along Segment 2A, these areas primarily occur along Segment 1 where several populations of this species were noted. Plumas ivesia is a CNPS Rank 1B.2 species. Rank 1 species are those considered by the CNPS to be rare, threatened, or endangered in California and elsewhere. The CNPS considers this species to be "Fairly endangered in California." Plumas ivesia is not listed under either the federal or state endangered species acts.

Table 4.2
Special-Status Plants with Potential to Occur in the Project Study Area

Species	Status*	Habitat	Potential for Occurrence**
Davy's sedge *Carex davyi*	Rank 1B.3	Subalpine coniferous forest (sandy, mesic)	Possible. Suitable habitat occurs in onsite streams and wetlands.
woolly-fruited sedge *Carex lasiocarpa*	Rank 2	Montane bogs and fens, marshes, swamps, and other areas with standing water	Possible. Suitable habitat occurs in onsite streams and wetlands.
mud sedge *Carex limosa*	Rank 2.2	Bogs and fens in upper montane coniferous forest	Possible. Suitable habitat occurs in onsite streams and wetlands.
American mannagrass *Glyceria grandis*	Rank 2.3	Bogs, fens, meadows, streambanks and lake margins	Possible. Suitable habitat occurs in onsite streams and wetlands.

Species	Status*	Habitat	Potential for Occurrence**
slender-leaved pondweed *Stuckenia filiformis*	Rank 2.2	Marshes and swamps, moving water (assorted shallow freshwater).	Possible. Suitable habitat in onsite perennial creeks.
alder buckthorn *Rhamnus alnifolia*	Rank 2.2	Wet meadow edges, stream sides, seeps; riparian scrub.	Possible. Suitable habitat onsite in riparian scrub.
Plumas ivesia *Ivesia sericoleuca*	Rank 1B.2	Great Basin scrub; lower montane coniferous forest; meadows and seeps; vernal pools (vernally mesic, usually volcanic).	Occurs. Observed in sagebrush scrub habitat onsite.

*Status Codes:
CNPS
Rank 1B Rare, Threatened, or Endangered in California
Rank 2 R, T, or E in California, more common elsewhere
1- Seriously threatened in California
2- Fairly threatened in California
3- Not very threatened in California

**Definitions for Potential for Occurrence:
Possible. Marginal to suitable habitat occurs, and the study area occurs within the range of the species.
Occurs: Species was observed during surveys.

Wildlife

The Martis Valley Trail study area provides habitat suitable for a wide diversity of wildlife. Habitat features available in the area include nesting sites for a variety of birds, escape and thermal cover, and abundant food sources.

Aquatic habitats in the area, including Martis Creek and its tributaries, provide year-round and seasonal sources of water for wildlife and habitat for various aquatic and semi-aquatic species. Historic occurrences of Lahontan cutthroat trout, listed as a threatened species under the federal Endangered Species Act, are documented from Martis Creek. The California Department of Fish and Game (CDFG) has been stocking this species in Martis Creek Lake for several years (K. Thomas 2011, pers. comm.). Since no barrier exists that would restrict trout released in the lake from moving upstream, this species could be found in portions of Martis Creek and tributaries upstream of the lake and within the project area. During the field survey, numerous small trout were observed in pools along Martis Creek just upstream of the Highway 267 crossing and in the unnamed drainage crossed at the south end of Segment 2A near its junction with Segment 2B. While the species of trout observed was not determined, the presence of these fish indicates the potential for Lahontan cutthroat trout to occur upstream of Martis Creek Lake.

Forest communities, such as those located throughout much of the study corridor, are important for animal cover and provide high quality roosting and nesting opportunities for songbirds and shelter for numerous mammals. Snags located within and adjacent to forested areas of the study corridor provide nesting cavities for birds such as owls and woodpeckers. Taller trees located on hillsides overlooking foraging areas provide good nesting habitat for raptors such as great horned owl and red-tailed hawk.

Because of the elevation of the project area, many species are expected to occur onsite seasonally either for nesting purposes or during migration but are not expected to be year-round residents. The conifer forest community provides suitable nesting habitat for many bird species. The following birds are a representative sample of those observed throughout forested habitats of the study corridor: mountain chickadee, brown creeper, dusky flycatcher, western wood-pewee, northern flicker, dark-eyed junco, western tanager, yellow-rumped warbler and red-breasted nuthatch. Species observed in sagebrush scrub habitat included Brewer's sparrow, cliff swallow, and chipping sparrow. Riparian communities associated with the various drainages crossing the study corridors are expected to provide important seasonal nesting habitat for numerous migratory songbirds, including a variety of special-status species, as discussed further below.

In addition to the variety of birds observed in these habitat areas, three raptors – two American kestrels and a solitary osprey – were observed within the study area. The kestrels were observed emerging from a cavity in a snag located just up-slope of Martis Creek and foraging in adjacent sagebrush scrub. It is expected that the pair of kestrels had been recently, or were currently, using the snag for nesting.

Various mammals either observed or detected throughout the study area included: mountain pocket gopher, Douglas' squirrel, and golden-mantled ground squirrel. Tracks, scat, or other sign of mule deer, coyote, and raccoon were found in various locations throughout both forest and sagebrush communities of the study area. Deer occurring within Martis Valley are part of the Loyalton-Truckee Deer Herd. The study area is within the summer range for the Loyalton-Truckee Deer Herd (Kahre and Fowler 1982).

Special-Status Wildlife Species

Research through the California Natural Diversity Database and USFWS indicates that there are a total of 16 special-status animal species that could occur in the project region. Of these, eight animals either occur within the study area or are rated likely or possible to occur because the study corridors have some areas of suitable habitat or occurrences are documented from the project region. The special-status animal species with potential to occur within the study corridors are identified in *Table 4.3* below. Each species listed in the table is discussed in more detail in the Biological Resources Assessment in Appendix C to this Draft EIR.

Table 4.3

Special-Status Wildlife with Potential to Occur in the Study Area

Species	Status*		Habitat	Potential for Occurrence**
	Federal	State		
Lahontan cutthroat trout *Oncorhynchus clarki henshawi*	FT	-	Endemic to cold-water lakes, rivers, and streams of Lahontan Basin in northern Nevada, eastern California, and southern Oregon.	Possible. Stocked in Martis Creek Lake. No barrier to movement upstream into Martis Creek.
Northern leopard frog *Rana pipiens*	-	CSC	Known from a variety of aquatic habitats. Endemic populations potentially occur in Truckee River drainage.	Possible. Potential habitat in Martis Creek and perennial tributaries. Rare in project region.

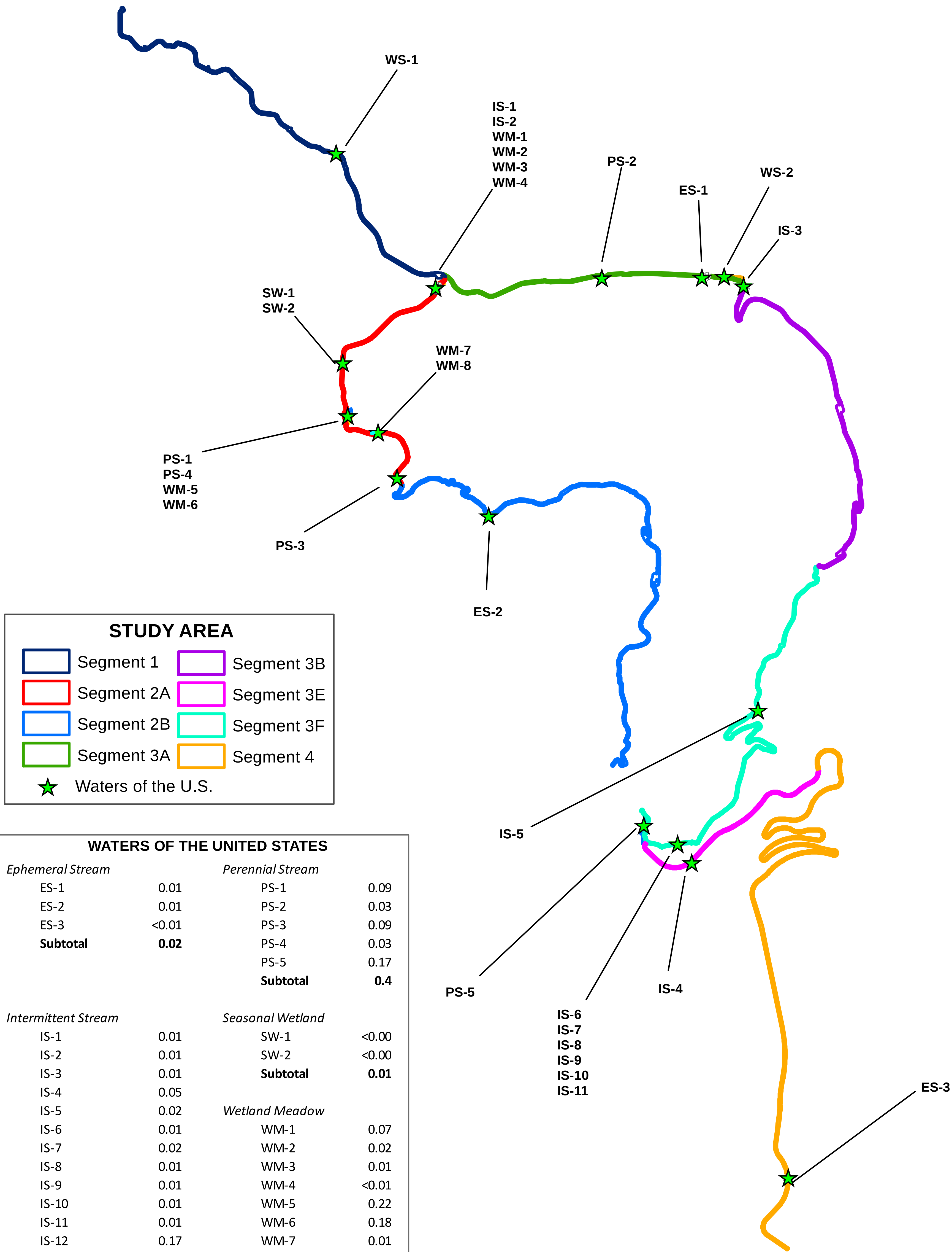
Species	Status*		Habitat	Potential for Occurrence**
	Federal	State		
Sierra Nevada yellow-legged frog *Rana sierrae*	FP	CSC***	Streams, lakes, and ponds in montane habitats.	Possible. Marginal-quality habitat in Martis Creek and perennial tributaries.
Northern goshawk *Accipiter gentilis*	-	CSC	Mature and old-growth stands of conifer and deciduous forests.	Possible. Potential nesting habitat onsite. Known nesting in project vicinity.
Yellow warbler *Dendroica petechia brewsteri*	-	CSC	Breeds in riparian deciduous habitats or open conifer forest with shrub cover.	Possible. Suitable nesting habitat available throughout corridor.
Willow flycatcher *Empidonax traillii*	-	CE	Breeds in extensive willow thickets on edge of wet meadows, ponds, or streams.	Likely. Suitable nesting habitat in onsite riparian scrub. Known previous nesting along Martis Creek.
Sierra Nevada snowshoe hare *Lepus americanus tahoensis*	-	CSC	Montane riparian habitats, with dense thickets of young trees and shrubs.	Possible. Suitable habitat occurs in association with onsite dense riparian scrub communities. Rare in project region.
Sierra Nevada mountain beaver *Aplodontia rufa californica*	-	CSC	Aquatic habitats with adjacent shrubs and deciduous trees.	Possible. Suitable habitat in scattered locations along drainages of study corridor with dense riparian cover.

*Status Codes:
Federal
FE Federal Endangered
FT Federal Threatened
FP Federal Proposed Species
State
CE California Endangered
CT California Threatened
CR California Rare (plants only)
CSC California Species of Concern
CFP California Fully Protected

**Definitions for the Potential to Occur:
Possible. Marginal to suitable habitat occurs, and the study area occurs within the range of the species.
Likely. Good habitat occurs, but the species was not observed during surveys.
*****Proposed for listing as threatened by California Fish and Game Commission.**

Waters of the U.S.

The Wetland Delineation identifies five categories of waters of the U.S. in the study corridors. As described below, these include wetland swale, wetland meadow, perennial stream, intermittent stream, and ephemeral stream. *Figure 4-3* identifies the location of each delineated wetland area in relation to both trail alignments; *Table 4.4* identifies the type and area of waters of the U.S. mapped within the study corridors for each trail segment. As described in **CHAPTER**



WATERS OF THE UNITED STATES

Ephemeral Stream		*Perennial Stream*	
ES-1	0.01	PS-1	0.09
ES-2	0.01	PS-2	0.03
ES-3	<0.01	PS-3	0.09
Subtotal	**0.02**	PS-4	0.03
		PS-5	0.17
		Subtotal	**0.4**
Intermittent Stream		*Seasonal Wetland*	
IS-1	0.01	SW-1	<0.00
IS-2	0.01	SW-2	<0.00
IS-3	0.01	**Subtotal**	**0.01**
IS-4	0.05		
IS-5	0.02	*Wetland Meadow*	
IS-6	0.01	WM-1	0.07
IS-7	0.02	WM-2	0.02
IS-8	0.01	WM-3	0.01
IS-9	0.01	WM-4	<0.01
IS-10	0.01	WM-5	0.22
IS-11	0.01	WM-6	0.18
IS-12	0.17	WM-7	0.01
Subtotal	**0.34**	WM-8	0.02
		Subtotal	**0.53**
		Wetland Swale	
		WS-1	0.06
		WS-2	0.11
		Subtotal	**0.17**
TOTAL WATERS OF THE U.S. (Acres)			**1.47**

Figure 4-2

WETLANDS MAP

Martis Valley Trail

Placer County, California

3 PROJECT DESCRIPTION, the study corridor is generally 50 feet wide while the area of disturbance would be smaller. The area of wetlands given in *Table 4.4* is substantially larger than the area of jurisdictional waters that would be impacted by the trail project. Actual wetland impacts are discussed in Section 4.3 Impacts.

- ***Wetland Swales*** are water conveyance features that do not develop the bed-and-bank morphology typical of streams but exhibit wetland soils characteristics and are vegetated with wetland species. Two wetland swales were mapped in the study area, WS-1 in Segment 1, and WS-2 in Segment 3A. Both of these are on the valley floor within sagebrush scrub communities. The wetland swale is similar to wetland meadow in that it is the product of a high groundwater table and/or a hydrologic connection to adjacent streams; however, as a result of being on a steeper slope, it is a linear water conveyance feature.
- ***Wetland Meadow*** in the study area supports wetland vegetation due to hydrological influences from Martis Creek (and its tributaries) and/or a seasonally high water table. Wetland meadow is abundant in the areas adjacent to Martis Creek and along the tributaries to Martis Creek. The wetland meadow is dominated by herbaceous wetland species and also supports some marginal wetland species. The study area contains wetland meadow in eight locations along Segment 2A (WM-1 through WM-8).
- ***Perennial Streams*** flow year-round and exhibit well defined bed-and-bank morphology. Martis Creek and one of the tributaries to Martis Creek meet the definition of a perennial stream. The study corridors cross perennial streams in four locations along Segments 1, 2A, and 3F (PS-1, 2, 3, and 5). A fifth crossing, identified by the Wetland Delineation as PS-4, was mapped for an alternate crossing of Martis Creek on Segment 2A that was subsequently eliminated from further consideration.
- ***Intermittent Streams*** begin flowing sometime during the rain/snowmelt season and usually continue to the end of the rain/snowmelt season. Intermittent streams have a groundwater component that allows them to flow during dry weather. Four intermittent streams are within the study area; all are tributary to Martis Creek. The Wetland Delineation mapped 12 intermittent stream features along Segments 2A, 3B, 3F, and 3E (IS-1 through IS-12). While only four intermittent streams occur in the study area, these multiple features indicate that some of the intermittent streams in the study area split into multiple channels.
- ***Ephemeral Streams*** flow only during periods of rainfall/snowmelt or for a short time thereafter. Ephemeral streams do not have a groundwater component. Three ephemeral stream features were mapped within the study corridors for Segments 2A, 3A, and 4.

Table 4.4
Waters of the U.S. Mapped in Study Area

Alignment	Segment	Wetland Feature[1]	Size (acres)	Total Wetlands in Segment (acres)[2]
Valley Alignment	1	WS-1	0.06	0.06
	2A	WM-1	0.07	<0.86
		WM-2	0.02	
		WM-3	0.01	
		WM-4	<0.01	
		WM-5	0.22	
		WM-6	0.18	
		WM-7	0.1	
		WM-8	0.02	
		PS-1	0.09	
		PS-3	0.09	
		PS-4	0.03	
		IS-1	0.01	
		IS-2	0.01	
	2B	ES-2	0.01	0.01
	3E	IS-4	0.05	0.05
	4	ES-3	<0.01	<0.01
Totals within Valley Alignment by Type		*Wetland Swale*	*0.06*	
		Wetland Meadow	*0.63*	
		Perennial Stream	*0.21*	
		Intermittent Stream	*<0.07*	
		Ephemeral Stream	*<0.02*	
Total of all Wetland Features - Valley Alignment				***<0.99***

Alignment	Segment	Wetland Feature[1]	Size (acres)	Total Wetlands in Segment (acres)[2]
Highway Alignment	1	WS-1	0.06	0.06
	3A	PS-2 ES-1 WS-2	0.03 0.01 0.11	0.15
	3B	IS-3	0.01	0.01
	3F	IS-5 IS-6 IS-7 IS-8 IS-9 IS-10 IS-11 PS-5	0.02 0.01 0.02 0.01 0.01 0.01 0.01 0.17	0.26
	4	ES-3	<0.01	<0.01
Totals within Highway Alignment by Type		*Wetland Swale* *Wetland Meadow* *Perennial Stream* *Intermittent Stream* *Ephemeral Stream*	*0.17* *0* *0.20* *0.10* *<0.02*	
Total of all Wetland Features - Highway Alignment				***<0.49***

WS = Wetland Swale, WM = Wetland Meadow, PS = Perennial Stream,
IS = Intermittent Stream, ES = Ephemeral Stream
Note that area surveyed for wetlands is larger than the impact area. Survey corridor is generally 50 feet wide while impact area is generally 20 feet wide.

4.2 REGULATORY FRAMEWORK

Federal Regulations

Federal Endangered Species Act

Projects that would result in impacts to species listed under the federal Endangered Species Act (FESA) are required to comply with the FESA, which is administered by the USFWS. Section 9 of the FESA prohibits unauthorized 'take' of listed species. *Take* is defined by the FESA as "...to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." The USFWS has further defined the terms harass and harm. *Harass* is defined as an act that:

> …creates the likelihood of injury to a listed species by annoying it to such an extent as to significantly disrupt normal behavior patterns that include, but are not limited to, breeding, feeding, or sheltering.

Harm is defined to include:

> ...significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering.

The ESA defines 'incidental take' as take that is incidental to, and not the purpose of, an otherwise lawful activity. Incidental take of listed species can be authorized by USFWS as long as the incidental take will not result in extinction of the species.

FESA compliance for projects that may affect federally listed species can be accomplished by federal agencies under Section 7 of the FESA or by private parties or non-federal agencies under Section 10 of the FESA. The objective under Section 7 of the FESA is to determine whether a federally funded or federally authorized project would adversely affect a listed species or designated critical habitat, and to identify measures necessary to reduce impacts to the species to an acceptable level. This is typically accomplished through a formal or informal consultation process involving the federal agency taking action and the federal agency with stewardship responsibilities for the species with potential to be affected. Section 10 of the FESA applies when there is no 'federal nexus', or when no action by a federal agency is required for a project. Different standards apply in the two different contexts. For example, under Section 7, the participating federal agencies must consider whether a proposed action could destroy or adversely modify critical habitat. This inquiry is not specifically required under Section 10.

Section 404 of the Clean Water Act

The USACE and the U.S. Environmental Protection Agency (EPA) regulate the discharge of dredge and fill material into waters of the U.S. under Section 404 of the Clean Water Act (CWA). Waters of the U.S. are defined as "all waters which are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce, including all waters which are subject to the ebb and flow of the tide." These include:

1. All interstate waters including interstate wetlands;
2. All other waters such as intrastate lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, wet meadows, or natural ponds;
3. All impoundments of waters otherwise defined as waters of the U.S. under the definition;
4. Tributaries of waters;
5. Territorial seas; and
6. Wetlands adjacent to waters (other than waters that are themselves wetlands).

The USACE will typically exert jurisdiction over that portion of the project site that contains waters of the U.S. This jurisdiction includes approximately the bank-to-bank portion of a creek up to the ordinary high water mark along its entire length, and adjacent wetland areas.

Section 401 of the Clean Water Act

The State Water Resources Control Board (SWRCB) has authority over discharges of dredged or fill material into waters of the U.S. through Section 401 of the CWA. Section 401 of the CWA requires that an applicant for a Section 404 permit also obtain certification from the appropriate state agency stating that the fill is consistent with the State's water quality standards and criteria. In California, the authority to either grant certification or waive the requirement for permits is delegated by the SWRCB to the nine regional water quality control boards. The Lahontan Regional Water Quality Control Board (RWQCB) is the appointed authority for

Section 401 compliance in the project area. A request for certification or waiver must be submitted to the RWQCB, which has 60 days to review the application and act on it. Because no USACE permit is valid under the CWA unless "certified" by the state, the RWQCB may effectively veto or add conditions to permits issued by the USACE.

Migratory Bird Treaty Act

The federal Migratory Bird Treaty Act (16 USC, Sec. 703, Supp. I, 1989)(MBTA) regulates and prohibits taking, killing, possession of, or harm to migratory bird species listed in Title 50 CFR §10.13, including migratory birds of prey (raptors). This international treaty for the conservation and management of bird species that migrate through more than one country is enforced in the United States by the USFWS. Additionally, as discussed below, §3513 of the California Fish and Game Code states that it is unlawful to take or possess any migratory non-game bird as designated in the MBTA. This provides the CDFG with enforcement authority for project-related impacts that would result in the take of bird species protected under the MBTA.

Martis Creek Lake Master Plan

The USACE manages the Martis Creek Lake Project under the provisions of the *Martis Creek Lake Master Plan*, which was adopted in 1977. This document identifies the types of habitats in the 1,891-acre master plan area as well as general wildlife and plant populations supported in this area. It also identifies the recreational uses anticipated to be developed within the master plan area, including "opportunities for wildlife observation and nature and hiking trails" (pages 13 and 15). The portion of the Martis Creek Lake Project that the Valley and Highway alignments cross is designated in the Master Plan as *Operations: Wildlife Management* and is also referred to as the "wildlife management area." At the time the Master Plan was prepared, facilities within the wildlife area included a graveled access road and graveled parking lot with parking for 10 vehicles. The Master Plan also called for future development in the wildlife area to include construction of 4.9 miles of "nature-interpretive hiking trail." Paragraph 37 of the Master Plan notes that "trails will be located to reduce the need for grading and to maximize scenic diversity and interest." Paragraph 58 of the Master Plan identifies the resource use objectives for the wildlife management area, stating that "the best use of the southern portion of project land is for management of wildlife; the diverse habitat, from marsh to forest, provides food cover for many species of wildlife; intensive recreation development would cause habitat loss; an interpretive trail system would minimally disturb habitat." Further, paragraph 63.d. states that the wildlife management lands "were acquired for project operations and allocated as habitat for wildlife. These lands are continuously available for low density recreation activities." Uses allowed by the Master Plan and consistency of the proposed project with the Master Plan are discussed in greater detail in **CHAPTER 9 RECREATION** of this EIR.

State Regulations

California Endangered Species Act

The California Endangered Species Act (CESA), established under California Fish and Game Code §2050 et. seq., identifies measures to ensure that endangered species and their habitats are conserved, protected, restored, and enhanced. The CESA restricts the "take" of plant and wildlife species listed by the state as endangered or threatened, as well as candidates for listing. Section 86 of the Fish and Game Code defines "take" as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." Under §2081(b) of the Fish and Game Code, CDFG has the authority to issue permits for incidental take for otherwise lawful activities. Under this section, CDFG may authorize incidental take, but the take must be minimal and permittees must fully mitigate project impacts. CDFG cannot issue permits for projects that would jeopardize the continued existence of state listed species.

CDFG maintains lists for Candidate-Endangered Species and Candidate-Threatened Species. Candidate species and listed species are given equal protection under the law. CDFG also lists California Species of Special Concern (CSC) based on limited distribution, declining populations, diminishing habitat, or unusual scientific, recreational, or educational value. Designation of a species as a CSC is intended by the CDFG to be used as a management tool for consideration in future land use decisions; these species do not receive protection under the CESA or any section of the California Fish and Game Code, and do not necessarily meet CEQA Guidelines §15380 criteria as rare, threatened, endangered, or of other public concern. The determination of significance for California species of special concern must be made on a case-by-case basis. CDFG typically requests that CEQA lead agencies give consideration to minimization of impacts to CSC species when approving projects.

Nesting Birds, Raptors, and Migratory Birds

California Fish and Game Code §3503 states that it is unlawful to take, possess, or needlessly destroy the nests or eggs of any bird, except as otherwise provided by this code or other regulation. Fish and Game Code §3503.5 protects all birds-of-prey (raptors) and their eggs and nests, while §3513 states that it is unlawful to take or possess any migratory non-game bird as designated in the MBTA. These regulations could require that vegetation removal or construction near nest trees be reduced or eliminated during critical periods of the nesting cycle unless surveys by a qualified biologist demonstrate that nests, eggs, or nesting birds will not be disturbed, subject to approval by the CDFG and/or the USFWS.

Streambed Alteration Agreements

Fish and Game Code §§1600 through 1616 regulate activities by which a public or private entity proposes to "substantially divert or obstruct the natural flow of, or substantially change or use any material from the bed, channel, or bank of, any river, stream or lake, or deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it may pass into any river, stream, or lake." Section 1600 et. seq. of the code defines the responsibilities of CDFG and the requirements for public and private applicants to obtain an agreement for the activities referenced above. In general, a Streambed Alteration Agreement is necessary where any such proposed activity would "substantially adversely affect an existing fish or wildlife resource." The local CDFG warden or unit biologist typically has responsibility for issuing Streambed Alteration Agreements. These agreements usually include specific requirements related to construction techniques and remedial and compensatory measures to mitigate for adverse impacts. CDFG may also require long-term monitoring as part of an agreement to assess the effectiveness of the proposed mitigation.

Sensitive Vegetation Communities

The California Riparian Habitat Conservation Program (CRHCP) was created within the Wildlife Conservation Board (WCB) under California Fish and Game Code §§1385-1391, the California Riparian Habitat Conservation Act. This Act identifies riparian habitat as a sensitive resource that provides important wildlife habitat and has scenic, recreational, and economic value. The CRHCP is a cooperative effort involving state and federal agencies, local government, nonprofit conservation groups, private landowners, and concerned citizens in protecting, preserving, and restoring riparian habitats throughout the state by the acquisition of interests and rights in real property and waters to the extent deemed necessary to carry out the purposes of the program.

Local Regulations

Placer County General Plan

The *Placer County General Plan* Natural Resources element establishes goals, objectives and policies regarding water resources (including wetlands and riparian areas), fish and wildlife habitat, and vegetation. The goals listed below are applicable to the biological resources found at the project site. *Placer County General Plan* policies require the County to identify and protect significant ecological resources and habitat, including wetland areas, stream environment zones, habitat for special-status plants and animals, and large areas of natural habitat.

Goal 6.A To protect and enhance the natural qualities of Placer County's streams, creeks and groundwater.

Goal 6.B To protect wetland communities and related riparian areas throughout Placer County as valuable resources.

Goal 6.C To protect, restore, and enhance habitats that support fish and wildlife species so as to maintain populations at viable levels.

Goal 6.D To preserve and protect the valuable vegetation resources of Placer County.

Goal 6.E To preserve and enhance open space lands to maintain the natural resources of the County.

Martis Valley Community Plan

The *Martis Valley Community Plan* Natural Resources section establishes goals and policies pertaining to geology, soils, water resources, vegetation, wetland and riparian areas, fish and wildlife habitat, and air quality. The following goals relate to biological resources that are found at the project site, and are applicable to this chapter's analysis of the potential impacts to those resources:

Goal 9.E To preserve and protect the valuable vegetation resources of Martis Valley.

Goal 9.F To protect wetland communities and related riparian areas throughout Martis Valley as valuable resources.

Goal 9.G To protect, restore, and enhance habitats that support fish and wildlife species so as to maintain populations at viable levels.

4.3 IMPACTS

Significance Criteria

As evaluated in the Initial Study, no habitat conservation plan applies within the project area and project would have no impact with respect to the following significance criterion:

- Conflict with the provisions of an adopted Habitat Conservation Plan, natural Conservation Community Plan, or other approved local, regional, or state habitat conservation plan.

The analysis below evaluates potentially significant project impacts related to biological resources based on the following significance criteria:

- Have a substantial adverse effect, either directly through habitat modifications or indirectly, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFG or USFWS;
- Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the CDFG or USFWS;
- Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the CWA (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means;
- Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites; and
- Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance.

Project Impacts

IMPACT 4.1:	Adversely Affect Special-Status Species	
APPLICABLE POLICIES AND REGULATIONS:	Federal Endangered Species Act California Endangered Species Act Martis Valley Community Plan Placer County General Plan	
	Valley Alignment	**Highway Alignment**
SIGNIFICANCE WITH POLICIES AND REGULATIONS:	Potentially Significant	Potentially Significant
MITIGATION MEASURES:	Mitigation Measures 4.1a through 4.1i	Mitigation Measures 4.1a through 4.1i
SIGNIFICANCE AFTER MITIGATION:	Less than Significant	Less than Significant

The discussions below evaluate potential impacts to each of the special-status plant and animal species that have potential to occur in the project site. As described below, implementation of

Mitigation Measures 4.1a through *4.1i* would ensure that potential impacts from the trail project to special-status plant and wildlife species would remain less than significant.

Special-Status Plants

As shown in *Table 4.2,* one special-status plant species is known to occur within the study corridor for each of the proposed trail alignments and six other special-status plant species have a possibility of occurring due to the presence of suitable habitat or documented occurrences of these species from nearby locations.

Since the initial field survey identified Plumas ivesia within the study corridor, focused surveys for this special-status species were carried out by North Fork Associates as part of the Biological Resources Assessment. Focused surveys were conducted in potential areas of occurrence within the sagebrush scrub habitat within and outside Segments 1 and 2A. While the CNPS considers this species to be "Fairly endangered in California," it is not listed under either the federal or state endangered species acts. This species was observed at several locations within the sagebrush scrub habitat within and adjacent to Segment 1 of the trail alignment, as well as in two locations along and adjacent to Segment 2A. These populations were mapped and an estimate of the number of plants within and outside the corridor was made. The focused surveys estimated that 196,000 Plumas ivesia plants occur in the vicinity of the trail corridor and approximately 1,100, or about 0.56 percent of the estimated population in the vicinity, occur within the study corridor (NFA 2009).

The estimate of plants within the study corridor is based on a 50-foot wide corridor, while trail construction would affect an approximately 20-foot wide area within that corridor. Thus the total number of plants affected by trail construction in the Valley Alignment would be less than the estimated 1,100 plants. An estimate based on the proportional area of disturbance within the overall corridor indicates that fewer than 500 individual plants would be affected by construction disturbance. The Highway Alignment would avoid two populations of Plumas ivesia mapped within Segment 2A of the Valley Alignment. These populations account for approximately 20 percent of the total area of Plumas ivesia mapped within both alignments, therefore the Highway Alignment would likely affect fewer than 400 individual plants.

Typical threats to Plumas ivesia associated with multi-use trails include changes in hydrology and disturbance from off-trail activity (U.S. Forest Service 2009, Urie, S., pers. comm.). It is noted that Plumas ivesia have deep taproots and demonstrate some resilience to sporadic disturbance (USFS 2009). To ensure that the proposed project's direct impacts to individual Plumas ivesia plants do not adversely affect the long-term survival of this species within Martis Valley, *Mitigation Measure 4.1a* requires Northstar CSD implement construction period protection measures and monitor the survival of Plumas ivesia populations adjacent to the trail. Due to the narrow width of the proposed trail and the project design to avoid changing local hydrology (as discussed in **CHAPTER 6 HYDROLOGY AND WATER QUALITY**), the proposed project is not expected to result in significant indirect impacts to survival of Plumas ivesia in the project area.

The onsite sagebrush scrub habitat was thoroughly surveyed during the 2009 focused field surveys for Plumas ivesia. However, while no other special-status plant species were identified during reconnaissance-level field surveys, other habitats onsite, such as the riparian and wet meadow habitats, were less intensively surveyed and provide habitat suitable for several special-status plant species. Therefore, *Mitigation Measure 4.1b* requires that, prior to construction, floristic rare plant surveys be conducted within the wetland, riparian, and stream habitats that would be disturbed by construction activities. If any special-status plant species are identified by the surveys, *Mitigation Measure 4.1b* requires that a management plan be developed to provide measures that Northstar CSD would be required to implement to avoid or reduce adverse affects to special-status plant species to a less than significant level. With implementation of *Mitigation Measures 4.1a* and *4.1b*, impacts to special-status plant species would be less than significant. These measures would be required for either the Valley Alignment or the Highway Alignment.

Special-Status Wildlife

As shown in *Table 4.3*, the Biological Resources Assessment found that there are eight special-status wildlife species that are considered likely to occur or have a possibility of occurring within the study corridors due to the presence of suitable habitat or recorded occurrences from nearby locations. As described in *Table 4.3*, several of these species rely wholly or partially on riparian and aquatic habitats; thus impacts within and adjacent to riparian habitat associated with drainages in the study area could adversely affect these species.

Table 4.5 identifies drainages that would be crossed in each segment of the two alignments under consideration for the Martis Valley Trail. Riparian habitat is associated with each of these drainages.

Table 4.5
Drainage Crossings

Alignment	Segment	Drainageway Name/Classification	Proposed Crossing Method/Structure	Existing Conditions at Crossing Location
Valley Alignment	Segment 2A	Unnamed intermittent stream, northwest tributary to Martis Creek	Bridge/boardwalk	Unpaved trail surface over small eroded culverts.
	Segment 2A	Martis Creek	Bridge/boardwalk	No formal crossing structure. Eroded foot path at streambank.
	Segment 2A	Unnamed perennial stream, tributary to Martis Creek	Boardwalk	No formal crossing structure at proposed crossing. Proposed crossing area undisturbed.
	Segment 2B	Unnamed ephemeral stream	Bridge	No crossing structure. Trail crosses through ephemeral stream.
	Segment 3E	West Martis Creek	Undetermined	No formal crossing structure.
	Segment 4	Unnamed ephemeral stream	Undetermined	Culvert

Alignment	Segment	Drainageway Name/Classification	Proposed Crossing Method/Structure	Existing Conditions at Crossing Location
Highway Alignment	Segment 3A	Martis Creek	Bridge	Pedestrian Bridge
	Segment 3F	Unnamed intermittent streams	Bridges	Undisturbed. No existing crossings.
	Segment 3F	West Martis Creek	Bridge	Existing foot bridge
	Segment 3E	Unnamed intermittent stream	Undetermined	No formal crossing structure.
	Segment 4	Unnamed ephemeral stream	Undetermined	Culvert

For each alignment, where crossings would occur at the location of an existing trail crossing, the existing structure would be removed and a new structure would be constructed. Construction of each crossing could result in disturbance to the bed, bank, and associated riparian vegetation in the vicinity of the drainage crossing. Disturbance could result in erosion, sedimentation, and water quality impairment within the immediate construction area, and could result in direct and indirect impacts to special-status species within riparian and aquatic habitats.

At least two of the special-status species with potential to occur, Northern goshawk and yellow warbler, are found within the coniferous forest habitat type. Disturbance within these areas, particularly vegetation and tree removal, could disturb nesting sites for these special-status bird species.

The following paragraphs evaluate potential project impacts to each special-status wildlife species with potential to occur within the project corridors.

Lahontan Cutthroat Trout

The Lahontan cutthroat trout is listed as a threatened species under FESA. According to the *Recovery Plan for the Lahontan Cutthroat Trout,* this species inhabits lakes and streams and requires spawning and nursery habitat with cool water, pools close to cover and velocity breaks, stable and well-vegetated stream banks, and relatively silt free rocky substrates in riffle-run areas. Spawning typically occurs between April and July. Primary threats to this species include habitat degradation resulting from grazing and development, water quality degradation, and competition and hybridization with nonnative trout (USFWS 1994). The proposed project could potentially contribute to water quality degradation as a result of ground disturbing activities and changes in stormwater runoff (as evaluated in **CHAPTER 6 HYDROLOGY AND WATER QUALITY**). Conservation measures for this species cited by the USFWS' Life History Account focus on habitat improvement activities, including bank stabilization, revegetation, and addition of in-stream cover features (USFWS 2012).

Project effects to water quality are expected to be less than significant with implementation of measures required through Clean Water Act permitting, including the National Pollutant Discharge Elimination System construction stormwater and Section 404 wetland impacts permitting. However, project activities such as grading and proposed bridges and boardwalks could result in adverse effects to Lahontan cutthroat trout habitat by removing riparian vegetation and temporarily disturbing streambanks.

Mitigation Measure 4.1c would ensure that impacts to Lahontan Cutthroat trout remain less than significant. *Mitigation Measure 4.1c* requires that the USFWS Nevada Field Office be consulted prior to any ground disturbance to determine appropriate measures for avoiding impacts to Lahontan cutthroat trout habitat within and downstream of the study corridor and identify any potential permitting responsibilities. Since the project would require approvals from the USACE, the USACE would initiate a Section 7 consultation with the USFWS to determine potential impacts to LCT and appropriate measures to mitigate impacts, which would include water quality best management practices and compensatory mitigation in the form of habitat improvements or restoration at a ratio to habitat impacts deemed appropriate by the USFWS and no less than 1:1.

Sierra Nevada Yellow-Legged Frog and Northern Leopard Frog

Portions of Martis Creek and its tributaries provide potential habitat for Sierra Nevada yellow-legged frog (SNYLF) and northern leopard frog (NLF). Both species are California species of special concern and the SNYLF is a candidate for federal listing as threatened. On February 2, 2012, the California Fish and Game Commission (Commission) made a finding that SNYLF warrants listing as a threatened species. In light of this finding the Commission has proposed to add SNYLF to the list of species listed as threatened under CESA. *Mitigation Measures 4.1d* and *4.1e* are required for project activities that would result in disturbance within and adjacent to perennial waterways within the study corridor. Perennial streams within the study corridor include main stem Martis Creek, the unnamed tributary to Martis Creek at the southern terminus of Segment 2A, and West Martis Creek. Implementation of M*itigation Measure 4.1d* would require a biological monitor to be retained throughout the duration of construction activities in the vicinity of affected aquatic habitat, to ensure that disturbance of SNYLF and its habitat is minimized or avoided. *Mitigation Measure 4.1e* requires that all aquatic habitat and wetland areas that are temporarily disturbed as a result of construction activities be restored to pre-project conditions or as required by the terms and conditions of permits required from the USACE, CDFG, and Lahontan Water Quality Control Board. Implementation of *Mitigation Measures 4.1d* and *4.1e* would ensure impacts to SNYLF and NLF remain less than significant.

Northern Goshawk and Other Raptors

Portions of the study corridors provide suitable nesting habitat for northern goshawk which is designated a California species of special concern, as well as for a variety of other raptors which have no formal state or federal listing status, but are protected under other statutes. At a minimum, forested habitats within the study corridor have potential to support nesting of the following raptors known from the region: northern goshawk, Cooper's hawk, and red-tailed hawk. Snags located throughout the study area also provide suitable nesting habitat for American kestrel and a variety of owls. As the project would disturb a narrow area of forested habitats in an area that already supports recreational trails, it is not expected to result in habitat loss or fragmentation that would significantly affect northern goshawk and other raptors. Project implementation could result in disturbance of breeding and nesting of some of the identified species if construction occurs at any time during the typical breeding season (approximately March 1 through August 31) (North Fork Associates 2009 and Shuford and Gardali 2008). Take of any active raptor nest is prohibited under California Fish and Game Code Section 3503.5. It is anticipated that construction would begin in May, which would be during the typical nesting season. To avoid disturbance of active nests, *Mitigation Measure 4.1f* requires a pre-construction survey to be conducted by a qualified biologist no more than 30 days prior to initiation of proposed construction activities. If active raptor nests are found on or immediately adjacent to proposed construction areas, consultation must be initiated with the CDFG to determine appropriate avoidance measures, which may include avoidance of construction activities within a designated buffer area (typically a minimum of 300 feet) surrounding the nest until any young have fledged. Implementation of *Mitigation Measure 4.1f* would ensure that impacts to Northern goshawk and other protected raptors remain less than significant.

Willow Flycatcher and Yellow Warbler

The willow flycatcher is designated as a threatened species under the CESA. Any disturbance of breeding or nesting willow flycatcher or its habitat would require a "take" permit under the CESA. The yellow warbler is designated as a California species of special concern and disturbance of its habitat would not require a "take" permit. As described in *Table 4.3*, potential nesting and/or breeding habitat for willow flycatcher and yellow warbler occurs in scattered locations along various drainages throughout the study area. Narrow riparian strips along well defined watercourses immediately adjacent to upland forest are typically not considered potential breeding habitat for willow flycatcher (CDFG 2004). Willow thickets that represent good potential breeding habitat for willow flycatcher occur at the crossing of Martis Creek on Segment 2A (Valley Alignment), more marginal riparian scrub habitat occurs at the south end of Segment 2A at a crossing of an unnamed tributary to Martis Creek on the Valley Alignment and where Segment 3A crosses Martis Creek just south of 267 on the Highway Alignment. Areas within the Valley Alignment that could support yellow warbler breeding include coniferous forest and riparian habitats along Segment 2A. In the Highway Alignment, areas with suitable yellow warbler breeding habitat include the small riparian area where Segment 3A crosses Martis Creek, areas of conifer forest with dense shrubs in the understory, and the portion of the coniferous forest crossed by several intermittent streams along Segment 3F.

While each trail alignment has been routed to avoid disturbance to the areas that may support willow flycatcher and yellow warbler nesting habitat, some disturbance to these areas is unavoidable. *Mitigation Measure 4.1g* requires that any work in the general vicinity of potential nesting habitat be conducted following the typical breeding season for both species (nesting season is spring and early summer; construction during fall would avoid impacts). *Mitigation Measure 4.1g* also specifies requirements for consultation with CDFG, protocol surveys, and take permits should construction occur in willow flycatcher habitat during the breeding season.

Sierra Nevada Snowshoe Hare and Sierra Nevada Mountain Beaver

Portions of the study corridors provide potential habitat for Sierra Nevada snowshoe hare (SNSH) and Sierra Nevada mountain beaver (SNMB), which are both designated as California species of special concern. The potential for occurrence of SNSH is considered low due to the species' rarity in the region. According to the California Natural Diversity Database, the last recorded occurrence of SNSH in the Truckee area was in 1915; the last recorded occurrence of this species in the Tahoe area is from 1959 in the vicinity of Rubicon Bay in the Lake Tahoe Basin. Suitable habitat for this species includes riparian thickets. Conversion of dense riparian scrub habitat to recreational use would be a significant impact to this species.

Suitable habitat for SNSH in the Valley Alignment study corridor occurs along Segment 2A in association with dense riparian vegetation at the crossing of Martis Creek and the unnamed tributary to Martis Creek near the Segment 2A/2B junction. Potentially suitable riparian vegetation also occurs on the Highway Alignment near the crossing of Martis Creek and Middle Martis Creek along Segment 3A and in dense riparian vegetation associated with several stream crossings along Segment 3F. Potential habitat for SNMB includes montane riparian habitats, consisting of dense riparian-deciduous vegetation, but this species is also found in forested areas with a dense understory near water. Potential habitat for this species is found at the Segment 2A (Valley Alignment) crossings of Martis Creek and the unnamed tributary to the east, as well as the crossing of Martis Creek on Segment 3A in the Highway Alignment. Marginal habitat for this species is found associated with riparian habitat along Segment 3F (Highway Alignment).

While the proposed trail alignments have been designed to minimize impacts to potential SNSH and SNMB habitat to the extent possible, trail construction would result in ground disturbance and vegetation removal within and adjacent to areas of potential habitat. *Mitigation Measure 4.1h* requires Northstar CSD to retain a qualified biologist to survey appropriate riparian habitat areas prior to project disturbance and requires that CDFG be contacted to determine appropriate measures to avoid impacts to these species if evidence of the presence of either of these species is found within proposed disturbance areas.

Construction Staging Areas

As discussed in **CHAPTER 3 PROJECT DESCRIPTION**, staging areas for construction activities have not been defined and may be located outside the study corridor for the selected trail alignment. As required in *Mitigation Measure 4.1i,* staging areas would be located in areas that have been previously disturbed, do not include any riparian habitat, do not support Plumas ivesia plants, and do not require any tree removal. This would ensure that use of construction staging areas would not result in any impacts to special-status species.

Programmatic Analysis of Segments 3E and 4

Habitat within the study corridors for Segments 3E and 4 consists primarily of mixed conifer forest crossed in several places by riparian habitat associated with intermittent and ephemeral streams draining to the north. Construction of Segments 3E and 4 could potentially result in impacts to each special-status species of plant identified in *Table 4.2*, except for Plumas ivesia, which would not be expected to occur in habitat within these segments. While Lahontan cutthroat trout would not be expected to occur in streams within these segments, there is at least marginally suitable habitat within Segment 3E and 4 for all other special-status wildlife species listed in *Table 4.3*. *Mitigation Measures 4.1b* and *4.1d* through *4.1i* would apply to work conducted within these segments and would ensure that impacts to these species remain less than significant.

IMPACT 4.2:	**Adversely Affect Riparian Habitat or Other Sensitive Natural Community**	
APPLICABLE POLICIES AND REGULATIONS:	Martis Creek Lake Master Plan Migratory Bird Treaty Act California Fish and Game Code Martis Valley Community Plan Placer County General Plan	
	Valley Alignment	**Highway Alignment**
SIGNIFICANCE WITH POLICIES AND REGULATIONS:	Potentially Significant	Potentially Significant
MITIGATION MEASURES:	Mitigation Measures 4.2a through 4.2c	Mitigation Measures 4.2a through 4.2c
SIGNIFICANCE AFTER MITIGATION:	Less than Significant	Less than Significant

The approximate area of each habitat type within the study corridor for each trail alignment is identified in *Table 4.1*. The study area generally is defined as a 50-foot corridor surrounding the trail alignment. While a 50-foot corridor was surveyed, disturbance related to trail construction would generally be limited to within a 20-foot corridor, and therefore a conservative estimate of impacts to each habitat type would be approximately half the area identified in *Table 4.1*. The area of disturbance for each trail alignment is shown in the Preliminary Trail Plans provided in Appendix B to this Draft EIR. *Table 4.6* identifies the approximate amount of each habitat type that would be affected by each trail alignment, based on the assumption that half of the study corridor would be subject to disturbance. As in *Table 4.1*, the values in *Table 4.6* for the Valley Alignment include segments 1, 2A and 2B and the values in *Table 4.6* for the Highway Alignment include segments 1, 3A, 3B and 3F.

Table 4.6

Estimated Area of Impact within Each Habitat Type

Alignment	**Habitat Type and Amount Impacted (acres)**				
	Riparian	**Wet Meadow**	**Dry Meadow**	**Coniferous Forest**	**Sagebrush Scrub**
Valley Alignment	0.07	0.06	0.12	10.32	5.87
Highway Alignment	0.19	0.0	0.01	11.61	7.41

As discussed in Section 4.1, the Highway Alignment passes through four different habitat types: riparian, dry meadow, coniferous forest, and sagebrush scrub; while the Valley Alignment passes through these four habitat types and an additional type: wet meadow. These habitats support a wide diversity of wildlife due to the availability of important habitat features including nesting sites, escape and thermal cover, abundant food sources and year-round and seasonal sources of water.

Riparian Impacts

Under the Valley Alignment, the project would impact approximately 0.06 acre of riparian habitat located within Segment 2A. Under the Highway Alignment, the project would impact approximately 0.19 acre of riparian habitat within Segments 3A and Segment 3F. Segment 2A is within the Wildlife Management Area of the Martis Creek Project. The riparian habitat area at the crossing of Martis Creek on Segment 3A is also within the Martis Creek Project, while riparian areas associated with Middle Martis Creek at the junction of Segments 3A and 3B and riparian areas along Segment 3F are located within Northstar California property, outside the Martis Creek Project. Construction of the trail would require some removal of riparian vegetation at each of these crossings. This would result in a small loss of cover and potential nesting habitat for a variety of wildlife species and would result in impacts to the bed and bank of a stream regulated under the California Fish and Game Code. This would represent a significant project impact under either the Valley Alignment or the Highway Alignment. *Mitigation Measure 4.2a* requires Northstar CSD to enter into a Streambed Alteration Agreement with CDFG. The terms and conditions of the Streambed Alteration Agreement will include measures to ensure that impacts to the riparian habitat are minimized and mitigated. Measures would likely include construction Best Management Practices (BMPs) for erosion and sediment control, limited operating periods, revegetation, restoration, and monitoring. With implementation of *Mitigation Measure 4.2a*, the project's impacts to riparian habitat and associated plant and wildlife populations would be less than significant.

Wet Meadow Impacts

Under the Valley Alignment, the project would impact an estimated 0.06 acre of wet meadow habitat located within Segment 2A. The wet meadow habitat occurs on both sides of the existing trail in this location and is associated with an intermittent stream that flows from west to east. The proposed trail alignment would impact a portion of the wet meadow on the west side of the existing trail. Construction of the proposed Martis Valley Trail would widen and pave the existing trail through this area. In addition, a covered wildlife observation platform is proposed in this location. Based on the small area of impact, it is not expected that construction and use of the trail through Segment 2A would affect substantial wildlife or plant populations or otherwise create a significant adverse impact on wet meadow habitat in the region. This is a less than significant impact of the proposed project. The wet meadow habitat is located within the Wildlife Management Area of the Martis Creek project, which identifies nature trails and wildlife observation uses as compatible with the management goals for this area.

Under the Highway Alignment, the project would not impact any wet meadow habitat.

Dry Meadow Impacts

Under the Valley Alignment, the project would impact approximately 0.12 acre of dry meadow habitat located within Segment 2A. Under the Highway Alignment, the project would impact an estimated 0.09 acre of dry meadow habitat along Segment 3A. Both of these segments are located within the Wildlife Management Area of the Martis Creek project.

The dry meadow habitat on Segment 2A occurs immediately south of the Martis Creek crossing. This habitat is present along much of Martis Creek. Construction of the trail through this habitat would require removal of some vegetation within the dry meadow, including willows

(Appendix B). While the trail would bisect the wet meadow habitat in this location, it would not create a barrier that would result in substantial discontinuity of this habitat.

The dry meadow habitat on Segment 3A occurs south of the trail adjacent to Martis Creek, in the area of an existing segment of the Tomkins Memorial Trail. As shown on Sheet C11 of the Preliminary Trail Plans, the proposed trail alignment and grading in this area generally would not extend into the dry meadow habitat in this area. It is expected that any disturbance of vegetation within the dry meadow habitat along Segment 3A would be very limited.

Vegetation removal in dry meadow habitats would result in small and temporary reduction in the dry meadow habitat available for a variety of wildlife species. The impacts to specific special-status wildlife species associated with this vegetation removal are evaluated in *Impact 4.1* above. Outside of those impacts, the small area of impact to dry meadow habitat from the proposed project would have a less than significant effect on wildlife or plant populations in the area. Operational impacts associated with recreational use of Segments 2A or 3A would not be expected to reduce the value of this portion of the Martis Creek project as a Wildlife Management Area as envisioned by the Master Plan.

Coniferous Forest Impacts

Under the Valley Alignment, the project would impact approximately 22.87 acres of coniferous forest habitat. Under the Highway Alignment, the project would impact approximately 24.17 acres of coniferous forest habitat. Conifer forest along the proposed trail could provide habitat for special-status species. Potential impacts to special-status species for which conifer forest provides suitable habitat are discussed in *Impact* 4.1 above.

The coniferous forest impacted in Segment 1 is near the SR 267/Schaffer Mill Road/ Truckee Tahoe Airport Road intersection and existing residential and commercial development at the southern limit of the Town of Truckee. Because of existing development and the isolated situation of this stand of trees, the coniferous forest habitat in this location is of marginal habitat value. The proposed trail would not represent a significant barrier resulting in further fragmentation of this small area of forest.

Segment 2A would affect two small areas of coniferous forest - one located at the transition between a larger forest area, sagebrush scrub areas, and meadows associated with Martis Creek, and one located on a knoll just north of the crossing of Martis Creek and surrounded by sagebrush scrub habitat. The proximity of these different habitat areas to each other increases the habitat value of each by providing a more diverse mosaic of habitat features. The proposed trail along Segment 2A would follow or replace portions of existing trail through these areas, and while the proposed trail would have a larger footprint than the existing trails and would be paved, it would not create a substantial barrier that would restrict wildlife movement or result in habitat fragmentation.

Nearly the entire length of Segments 2B, 3B, and 3F are mapped as coniferous forest by the Biological Resources Assessment. Coniferous forest habitat in these areas is managed to reduce fuels load and has historically been subject to disturbance related to timber harvesting and logging activity, which continue along portions of the proposed trail alignment in some areas. Existing trails are present in many areas of the proposed alignment in the vicinity of Segments

2B and 3B. Coniferous forest habitat in Segment 2B traverses forest areas between developed residential areas in the Northstar community. Forested areas along Segment 3B parallel SR 267 and Northstar Drive as it contours around Porcupine Hill.

Segment 3F does not follow existing formal trails, but is located in close proximity to Ridgeline Road, Highlands View Road, and Northstar Drive, as well as existing resort and residential development associated with the Village at Northstar, Northstar Stables, a number of informal use trails, and homes south of Northstar Drive. Based on the local abundance of this habitat type, and existing uses and disturbance associated with timber operations and existing residential and resort development in the area, the proposed trail would not represent a significant change in the habitat values provided by the coniferous forest habitat type in areas traversed by the alignment. The proposed trail and recreational use thereof would not represent a new barrier that would substantially affect the continuity of this habitat type or result in substantial additional fragmentation of this habitat type. Construction and use of the trail would have a less than significant impact on the value of coniferous forest habitat within the trail alignment.

Tree Removal - Removal of trees would be in association with grading plan or improvement plan approval from Placer County and would be subject to approval by CalFire. Placer County does not require a separate tree permit to remove trees when grading plan or improvement plan approval is required. Portions of the proposed trail are within "Forest" zoned lands. In general, tree removal within "Forest" zoned lands is subject to the California Forest Practice Rules and is under the jurisdiction of the California Department of Forestry and Fire Protection (CalFire) and could require preparation of a Timber Harvest Plan. Northstar CSD would be required to remove trees in compliance with the terms and conditions of the THP approved by CalFire.

Sagebrush Scrub Impacts

Under the Valley Alignment, the project would impact approximately 5.87 acres of sagebrush scrub habitat. Under the Highway Alignment, the project would impact approximately 7.31 acres of sagebrush scrub habitat. As shown in *Table 4.6*, Segments 1, 2A, and 3A support sagebrush scrub habitat. This habitat occurs throughout dry areas in Martis Valley on the valley floor at a slightly elevated position in relation to meadow areas.

The portion of Segment 1 that passes through sagebrush scrub habitat is proximate to SR 267 and is considered to provide marginal habitat values. Disturbance associated with construction and operation of the proposed trail would not be expected to substantially diminish existing habitat values along Segment 1. This area is known to support the special-status plant species Plumas ivesia. Impacts of the project to Plumas ivesia are evaluated in *Impact 4.1* above.

The portions of Segments 2A and 3A that pass through sagebrush scrub habitat contain existing unpaved trails that range from two to ten feet in width. Construction of the trail would result in disturbance within an approximately 20-foot wide corridor, but would not substantially change uses in areas traversed by the trail. Therefore, trail construction and recreational use of the proposed trail would not be expected to substantially decrease the value of the sagebrush scrub habitat along Segments 2A and 3A. Both of these segments are located within the Wildlife Management Area of the Martis Creek Project, which identifies nature trails and wildlife observation uses as compatible with the management goals for this area. Widening and paving the trail and the ongoing use of the trail would have a less than significant impact on the sagebrush scrub habitat in this area.

Construction Staging Areas

As discussed in **CHAPTER 3 PROJECT DESCRIPTION**, staging areas for construction activities have not been defined and may be located outside the study corridor for the selected trail alignment. As required in *Mitigation Measure 4.2b,* staging areas would be located in areas that have been previously disturbed and do not include any riparian habitat or other sensitive natural community. This would ensure that use of construction staging areas would not result in any impacts to sensitive habitats.

Programmatic Analysis of Segments 3E and 4

The Segment 3E and 4 study corridors pass through coniferous forest habitat crossed by drainages with associated riparian vegetation in some locations. Impacts to the conifer forest habitat and riparian community along these segments would be the same as those identified above for other trail segments within conifer forest and riparian areas. Removal of trees would be in association with grading plan or improvement plan approval from Placer County and would be subject to approval by CalFire. The Segment 3E study corridor includes a total of 4.94 acres of coniferous forest habitat, and construction of this segment would impact approximately 2.47 acres of this habitat. The Segment 4 study corridor includes a total of 19.00 acres of coniferous forest habitat, and construction of this segment would impact approximately 9.5 acres. *Mitigation Measures 4.2a* and *4.2b* would ensure that impacts to sensitive riparian communities would be less than significant. In addition, a qualified biologist would be retained to confirm and/or update the Biological Resources Assessment for the study corridors for these segments at the time that construction is proposed, as required by *Mitigation Measure 4.2c*.

IMPACT 4.3:	Adversely Affect Federally Protected Wetlands	
APPLICABLE POLICIES AND REGULATIONS:	Clean Water Act Martis Valley Community Plan Placer County General Plan	
	Valley Alignment	**Highway Alignment**
SIGNIFICANCE WITH POLICIES AND REGULATIONS:	Significant	Significant
MITIGATION MEASURES:	Mitigation Measures 4.3a through 4.3d	Mitigation Measures 4.3a through 4.3d
SIGNIFICANCE AFTER MITIGATION:	Less than Significant	Less than Significant

As shown in *Table 4.4*, the study corridor for the Valley Alignment supports a total of approximately 0.99 acres of wetlands while the study corridor for the Highway Alignment supports a total of approximately 0.49 acres of wetlands. The wetland types present in the Valley Alignment include wetland swale, wetland meadow, perennial stream, intermittent stream, and ephemeral stream. The Highway Alignment includes all of these wetland types except wetland meadow. The study corridor for each alignment is generally 50 feet in width, while disturbance associated with trail construction would generally be limited to a width of 20 feet. At crossings of Martis Creek along Segments 2A and 3A the proposed trail has been designed to follow the alignment of existing unpaved trails to the extent possible to reduce new disturbance in wetlands and other sensitive areas. *Table 4.7* identifies the extent of wetland impacts anticipated in each trail segment.

Table 4.7
Wetland Impacts by Alignment

Alignment	Estimated Total Wetland Impact Area	
	Temporary (Construction) sq. ft./acres	**Permanent** sq. ft./acres
Valley Alignment	7,252 / 0.17	200 / 0.005
Highway Alignment	2,590 / 0.06	0 / 0

As shown in *Table 4.7*, the total permanent wetland impacts under the Valley Alignment would be approximately 200 square feet (0.005 acre) to allow for footings for boardwalks to be constructed across wetland areas. All crossings of wetlands along the Highway Alignment would be achieved using structures to span the wetland features; no footings or other physical structure would be constructed within wetland areas along the Highway Alignment and no impacts to wetlands would occur. Temporary impacts would occur to approximately 7,215 square feet (0.17 acre) under the Valley Alignment, while the Highway Alignment would result in temporary impacts to approximately 2,590 square feet (0.06 acre) of wetlands. Temporary impacts include site preparation and construction disturbance outside of the footprint of the proposed trail improvements in areas that would be restored to pre-project conditions upon completion of the project.

Mitigation Measures 4.3a and *4.3b* require the project to obtain appropriate permits to authorize activities that affect these areas from the USACE and RWQCB in accordance with Sections 404 and 401 of the CWA to provide for replacement of the impacted habitat at a minimum of a 1:1 ratio to ensure no net loss of wetlands. Each agency may require the project applicant to implement other measures to mitigate for impacts to the wetlands, and each agency may place terms and conditions of approval on any permits issued. Compliance with the permit requirements will lessen and provide compensation for the proposed project's impacts to these resources. To address the potential for indirect effects to wetlands and waters of the U.S. adjacent to the site, *Mitigation Measure 4.3c* identifies BMPs that must be implemented to control erosion and maintain water quality. Additional discussion of impacts to water quality is included in **CHAPTER 6 HYDROLOGY AND WATER QUALITY**. With implementation of *Mitigation Measures 4.3a* through *4.3c* Northstar CSD would compensate for the onsite impacts to waters of the U.S. and minimize indirect effects to offsite waters of the U.S, ensuring that the project's impacts to federally-protected wetlands would be less than significant.

Construction Staging Areas

As discussed in **CHAPTER 3 PROJECT DESCRIPTION**, staging areas for construction activities have not been defined and may be located outside the study corridor for the selected trail alignment. As required in *Mitigation Measure 4.3d*, staging areas would be located in areas that have been previously disturbed and do not include any federally protected wetlands. This would ensure that use of construction staging areas would not result in any impacts to wetlands.

Programmatic Analysis of Segments 3E and 4

As shown in *Table 4.4*, the wetland delineation mapped one intermittent stream within Segment 3E and a single ephemeral stream within Segment 4. Impacts to federally protected wetlands as a result of constructing Segments 3E and 4 would be mitigated to a less than significant level by implementation of *Mitigation Measures 4.3a* through *4.3c*.

IMPACT 4.4:	**Interfere Substantially with Wildlife Movement or Native Wildlife Nursery Sites**	
APPLICABLE POLICIES AND REGULATIONS:	California Fish and Game Code Martis Valley Community Plan Placer County General Plan	
	Valley Alignment	**Highway Alignment**
SIGNIFICANCE WITH POLICIES AND REGULATIONS:	Potentially Significant	Potentially Significant
MITIGATION MEASURES:	Mitigation Measures 4.4a	Mitigation Measure 4.4a
SIGNIFICANCE AFTER MITIGATION:	Less than Significant	Less than Significant

There are no known active and defined important wildlife nursery sites within the project area, although riparian and meadow habitat areas may support nesting by special-status bird species, SNMB burrows, and aquatic habitat suitable for LCT as discussed in *Impact 4.1*. The Truckee-Loyalton Deer Herd seasonally migrates from winter range in the Loyalton area to summer range in the Martis Valley area, although SR 267 is considered a significant barrier to their historical movements.

Wildlife movement activities generally fall into one of three movement categories: (1) dispersal (e.g., of juvenile animals from natal areas or individuals extending range distributions), (2) seasonal migration, and (3) movement related to home range activities (foraging for food or water, defending territories, or searching for mates, breeding areas, or cover). While the Truckee-Loyalton Deer Herd and migratory birds move in and out of Martis Valley seasonally, the most common type of wildlife movement in the project area is expected to be movement related to home range activities of resident species.

In a developed environment, wildlife movement is facilitated by corridors linking areas of suitable wildlife habitat. In the absence of these corridors, wildlife populations may become isolated and may be affected by reduced availability of food, water and other resources as well as reduced ability to escape from fire, predators, and human disturbances. Riparian zones often serve as wildlife movement corridors because they offer vegetative cover and a variety of water and food sources.

Development of the proposed Martis Valley Trail under either the Valley Alignment or the Highway Alignment would have a potentially significant impact on wildlife movement and wildlife nursery sites by constructing bridges and culverts through riparian areas that could create physical barriers to typical movement patterns and impair the ability of smaller mammals to move along the affected riparian corridor. *Mitigation Measure 4.4a* requires the use of bridges or culverts large enough for smaller mammals to pass through to avoid the need for wildlife to travel over the trail surface to travel within the riparian corridor.

The proposed project could adversely affect aquatic and riparian habitat as a result of erosion and sedimentation during construction. This potential effect would be controlled by BMPs as required by terms and conditions of the Streambed Alteration Agreement obtained from the CDFG (*Mitigation Measure 4.2a, 4.3a)*, in addition to terms and conditions of Section 404 CWA permitting (*Mitigation Measure 4.3a)*, and as required by the Stormwater Pollution Prevention Plan required to be implemented as required to obtain coverage under the National Pollutant Discharge Elimination System (discussed in **CHAPTER 6 HYDROLOGY AND WATER QUALITY**). The Stormwater Pollution Prevention Plan is required to include BMPs to avoid erosion and sedimentation impacts associated with use of staging areas as well as all other construction activities. Terms and conditions of the 404 permit issued by the USACE would include mitigation measures resulting from Section 7 consultation with the USFWS regarding LCT. With implementation of mitigation measures required as terms and conditions of these permits and agreements, the proposed project would result in less than significant impacts to aquatic habitat and associated riparian areas that are important as wildlife movement corridors.

Outside of riparian areas, the proposed trail project would result in a flat paved surface that would create no substantial barriers to wildlife movement or substantial discontinuity or fragmentation of important wildlife habitat. The project would not result in habitat fragmentation as discussed under *Impact 4.2* and would not urbanize a non-urban area. The proposed recreational use represents little threat to mortality of species crossing the trail during either daylight or nighttime hours. The project area is subject to existing recreational use and the proposed bicycle and pedestrian uses would be similar to these existing uses. Wildlife in the area is generally adapted to low-intensity human activity. While the proposed project would increase the amount of recreational use in the area, it is unlikely to represent a significant deterrence to wildlife movement. The trail system would receive little to no use during nighttime hours and no lighting is proposed along the trail that would interfere with nocturnal movement or cause disorientation that would make individuals more vulnerable to predation or affect hunting success.

Programmatic Analysis of Segments 3E and 4

The Segment 3E and 4 corridors consist primarily of conifer forest but are crossed by intermittent and ephemeral drainages, some supporting riparian vegetation. While a trail within the conifer forest would not be expected to significantly affect wildlife movement, these segments could result in interference with wildlife movement along riparian corridors. *Mitigation Measures 4.2a, 4.3a,* and *4.4a* would apply to constructing Segments 3E and 4 and would ensure that impacts to wildlife movement and nursery sites would remain less than significant.

IMPACT 4.5:	Conflict with Local Policies or Ordinances Protecting Biological Resources	
APPLICABLE POLICIES AND REGULATIONS:	Martis Creek Lake Master Plan Martis Valley Community Plan Placer County General Plan	
	Valley Alignment	**Highway Alignment**
SIGNIFICANCE WITH POLICIES AND REGULATIONS:	Significant	Significant
MITIGATION MEASURES:	Mitigation Measure 4.5a	Mitigation Measure 4.5a
SIGNIFICANCE AFTER MITIGATION:	Less than Significant	Less than Significant

Construction of the Martis Valley Trail under either the Valley Alignment or the Highway Alignment would result in impacts to wetlands and creeks. Paragraph 58 of the *1977 Martis Creek Lake Master Plan* states a resource use objective of managing the portion of the Martis Creek Lake recreation area south of SR 267 for "the protection and improvement of wildlife habitat." Appendix D to the Master Plan includes additional policies and concepts for the management of fish and wildlife resources to ensure sustainability of these resources. Policies in the *Placer County General Plan* and the County's *Martis Valley Community Plan* require protection of biological resources to the extent feasible to meet the goals included in these plans, which are provided under Section 4.2 in this chapter. The County and the USACE maintain policies requiring that there be no net loss of wetlands as a result of project activities. To ensure compliance with these policies and regulations, *Mitigation Measure 4.5a* requires implementation of *Mitigation Measures 4.1a* through *4.1i, 4.2a and 4.2b, 4.3a* through *4.3d,* and *4.4a* which include measures to minimize impacts to special-status species of plants and wildlife, and to avoid, minimize, or compensate for impacts to sensitive habitats such as riparian zones and wetlands. Specific requirements include pre-construction surveys and construction monitoring, consultation with responsible agencies, and compliance with terms and conditions of permits required for impacts to sensitive habitats such as riparian areas and waters of the U.S. These measures would ensure that direct impacts to wetlands are compensated for at a minimum 1:1 ratio, and that appropriate BMPs are implemented to avoid indirect impacts to offsite waterways. Implementation of these measures would ensure that the project complies with Placer County policies regarding protection of biological resources by reducing the project's impacts to habitat and vegetation to less than significant levels.

Programmatic Analysis of Segments 3E and 4

The policies contained in both the *Martis Valley Community Plan* and *Placer County General Plan* would apply to impacts to biological resources resulting from construction and operation of Segments 3E and 4. *Mitigation Measure 4.5a* would also apply to impacts associated with Segments 3E and 4 and would ensure that impacts associated with conflicts with Placer County policies for protection of biological resources would be less than significant.

4.4 MITIGATION MEASURES

Adversely Affect Special-Status Species

Mitigation Measure 4.1a: Northstar CSD shall implement the following:

A. Avoid substantially modifying the existing hydrology in the vicinity of identified populations of Plumas ivesia to ensure that areas that support Plumas ivesia are not drained or dried or subject to concentrated flows.

B. Flag the limits of disturbance before construction begins to ensure that construction equipment and crews do not enter areas where Plumas ivesia will be protected.

C. Periodically monitor areas adjacent to the trail where Plumas ivesia occurs for disturbance associated with trail operations. Monitoring efforts shall include consideration of vegetation health and vigor, changes in hydrology and erosion, and evidence of off-trail activities. If disturbance in these areas is observed, Northstar CSD shall consult with a qualified botanist to determine appropriate measures to implement for the protection of non-impacted Plumas ivesia populations adjacent to the trail. Measures could include fencing along the trail shoulder, signage to identify areas of sensitive species and advise trial users to stay on the trail, drainage modifications, and temporary or permanent fencing of areas where disturbance is observed.

Mitigation Measure 4.1b: Prior to commencement of any construction activities, including site clearing and/or grading, Northstar CSD shall retain a qualified botanist to conduct floristic rare plant surveys within wetland, riparian, and stream habitats that would be affected by project construction. These surveys shall be carried out during appropriate blooming periods of special-status species with potential to occur onsite. Should any individual special-status plant species be located, the applicant shall retain a qualified botanist to develop and implement a management plan. Appropriate measures could include transplanting, soil/seed salvage and avoidance.

Mitigation Measure 4.1c: To minimize impacts to Lahontan cutthroat trout and its habitat or potential habitat, Northstar CSD shall implement BMPs to avoid adversely affecting water quality during and following construction, as identified below and to be consistent with NPDES and Section 404 permitting requirements. Northstar CSD shall also implement Lahontan cutthroat trout habitat restoration at a ratio no less than 1:1. The actual restoration ratio shall be determined by USFWS through consultation with USACE as part of the Clean Water Act Section 404 permitting process. Restoration of Lahontan cutthroat trout habitat could include bed and bank stabilization measures, revegetation, and in-stream habitat improvement, among other measures. Northstar CSD shall also implement any additional measures required by USFWS as identified through USACE consultation with USFWS as part of the Clean Water Act Section 404 permitting process.

BMPs implemented to avoid adversely affecting water quality shall be identified on Improvement Plans and subject to approval by the Placer County Planning Department and Engineering and Surveying Department and USACE. BMPs to minimize impacts to Lahontan cutthroat trout and its habitat or potential habitat shall include the following:

A. Implement ***Mitigation Measure 6.1a*** which identifies requirements for design of BMPs.

B. Implement ***Mitigation Measure 6.1b*** which requires Northstar CSD to prepare a Stormwater Pollution Prevention Plan (SWPPP) and project Grading or Improvement Plans that include detailed provisions for all construction BMPs.

C. Implement ***Mitigation Measure 6.1c*** which requires permanent BMPs to be included in the SWPPP and project Grading or Improvement Plans and identifies minimum requirements for permanent BMPs**.**

D. Implement ***Mitigation Measure 6.1d*** which identifies design standards for trail amenities to manage stormwater.

Mitigation Measure 4.1d: A biological monitor shall be retained throughout the duration of construction activities in the vicinity of affected aquatic habitat, to ensure that disturbance of Sierra Nevada yellow-legged frog and its habitat is minimized or avoided. If any Sierra Nevada yellow-legged frog are detected within a construction area, work must be halted and the CDFG shall be contacted immediately to determine appropriate avoidance measures including, but not limited to, moving individuals to appropriate offsite locations or limiting construction operating periods.

Mitigation Measure 4.1e: All aquatic habitat and wetland areas disturbed by construction activities shall be restored/revegetated to pre-project conditions or as required by the terms and conditions of permits obtained from the USACE, CDFG, or Lahontan RWQCB.

Mitigation Measure 4.1f: To avoid disturbance of active nests, trees should be removed outside the typical breeding season. A survey for active raptor nest sites shall be conducted by a qualified biologist prior to construction activities during the typical raptor nesting season (March 1 through August 31). The survey shall be conducted no more than 30 days prior to initiation of proposed construction activities and shall be coordinated with construction activities to ensure that any area that remains inactive for more than 30 days is resurveyed prior to initiating or re-initiating construction work. Survey results shall be submitted to the CDFG. If active raptor nests are found on or immediately adjacent to proposed construction areas, a minimum 300-foot buffer shall be established from active construction areas and consultation with CDFG shall be initiated to determine protective measures. Protective measures could include buffer zones around active nests and subsequent monitoring of the nest until it is determined to be inactive and CDFG concurrence is obtained. No trees with active nests shall be removed until the nest is determined to be inactive.

Mitigation Measure 4.1g: To avoid potential impacts to willow flycatcher, yellow warbler, and associated habitat, the following measures shall be implemented:

1) Prior to any work within 500 feet of any riparian habitat, a qualified biologist shall conduct a habitat assessment to identify areas of potential willow flycatcher nesting habitat. Work may proceed in areas determined to not provide willow flycatcher nesting habitat.

2) Except as provided under item 4, no heavy equipment shall be used and no vegetation shall be altered within 300 feet of potential willow flycatcher nesting habitat during the critical breeding season, which extends from May 1 to August 31.

3) Disturbance and removal of vegetation within riparian areas shall be minimized to the extent possible by clearly field marking the limits of vegetation removal requirements prior to any site disturbance. Vegetation removal from riparian areas shall be kept to the minimum required to allow for construction of the proposed improvements. CDFG shall be contacted prior to any vegetation removal within riparian areas to determine appropriate impact minimization strategies and compensation measures for impacts to vegetation that could occur. Compensation could include revegetation or habitat restoration at a ratio to impacts determined appropriate by CDFG, but no less than 1:1.

4) If work must occur during the breeding season for willow flycatcher, surveys to determine presence or absence of this species shall be carried out by a qualified biologist according to the protocol provided by *A Willow Flycatcher Survey Protocol for California* or the survey protocol guidance provided by CDFG at the time surveys are conducted. Results of the survey shall be provided to CDFG. With concurrence of CDFG, work may proceed in suitable habitat areas if surveys determine that no nesting birds occur within 500 feet of the proposed work area. Any work carried out during the breeding season shall be monitored by a biologist qualified to identify willow flycatcher individuals and nests and shall be subject to other measures resulting from consultation with CDFG. If surveys or monitoring indicate presence of nesting willow flycatcher within 500 feet of the project site, work within 300 feet of the nesting area shall cease until it is determined that nests are inactive or young have fledged.

Mitigation Measure 4.1h: New ground disturbance within areas of riparian vegetation that provide potential habitat for Sierra Nevada mountain beaver and Sierra Nevada snowshoe hare shall be avoided to the extent feasible. If disturbance to riparian vegetation cannot be avoided, a qualified biologist shall be retained to survey the proposed area of disturbance prior to construction. If evidence of occurrence of either of these species is found, a minimum 500 foot non-disturbance buffer shall be established around nest or burrow sites and CDFG shall be contacted to determine appropriate avoidance or impact minimization measures, which could include monitoring, buffer zones, seasonal work restrictions, or other measures.

Mitigation Measure 4.1i: *S*taging areas shall be located in areas that have been previously disturbed, do not include any riparian habitat, do not support Plumas ivesia plants, and do not require any tree removal.

Adversely Affect Riparian Habitat or Other Sensitive Natural Community

Mitigation Measure 4.2a: Northstar CSD shall obtain a Streambed Alteration Agreement from CDFG to authorize impacts within the bed and bank of drainages and associated riparian habitat within the trail alignment. Northstar CSD and their contractors shall adhere to all conditions and requirements of the Streambed Alteration Agreement. The Streambed Alteration Agreement shall be acquired prior to any clearing, grading, or excavation work on the project site.

Mitigation Measure 4.2b: *S*taging areas shall be located in areas that have been previously disturbed and do not include any riparian habitat or other sensitive natural community.

Mitigation Measure 4.2c: Northstar CSD shall retain a qualified biologist to update the Biological Resources Assessment for Segments 3E and 4 at the time construction of these segments is proposed.

Adversely Affect Federally Protected Wetlands

Mitigation Measure 4.3a: The project applicant shall obtain the appropriate permits from USACE, the Lahontan RWQCB, and CDFG to authorize impacts to waters of the U.S. delineated on the project site. These impacts would require a Section 404 permit from the USACE, a Section 401 Water Quality Certification from the Lahontan RWQCB, and a Streambed Alteration Agreement from CDFG. These permits shall be acquired prior to any clearing, grading, or excavation work on the project site.

Mitigation Measure 4.3b: To compensate for impacts to wetlands Northstar CSD shall carry out replacement, habitat restoration, or purchase of mitigation credits at an approved wetlands mitigation bank. Minimum replacement ratios shall be 1:1 for wetland habitat to ensure compliance USACE and Placer County policies requiring "no net loss" of wetlands. If purchase of credits at an approved wetlands mitigation bank is selected, sufficient credits shall be purchased to compensate for loss of wetland or habitat acreage and value, including temporal loss. Evidence of payment, which describes the amount and type of habitat purchased at the bank site, shall be provided to USACE prior to any ground disturbance associated with the project.

Mitigation Measure 4.3c: The project applicant shall incorporate BMPs to control erosion and sedimentation of waterways during and following construction. BMPs shall be identified on Improvement Plans and subject to approval by the Placer County Planning Department and Engineering and Surveying Department and USACE. BMPs to minimize indirect impacts to wetlands shall include the following mitigation measures:

A. Implement ***Mitigation Measure 6.1a*** which identifies requirements for design of BMPs.

B. Implement ***Mitigation Measure 6.1b*** which requires Northstar CSD to prepare a Stormwater Pollution Prevention Plan (SWPPP) and project Grading or Improvement Plans that include detailed provisions for all construction BMPs.

C. Implement ***Mitigation Measure 6.1c*** which requires permanent BMPs to be included in the SWPPP and project Grading or Improvement Plans and identifies minimum requirements for permanent BMPs.

D. Implement ***Mitigation Measure 6.1d*** which identifies design standards for trail amenities to manage stormwater.

Mitigation Measure 4.3d: Staging areas shall be located in areas that have been previously disturbed and do not include any federally protected wetlands.

Interfere Substantially with Wildlife Movement or Native Wildlife Nursery Sites

***Mitigation Measure 4.4a*:** Bridges and culverts constructed across riparian areas shall be designed and constructed to provide ample space for smaller mammals to move within the riparian corridor without having to travel over the trail surface. Design criteria shall be provided by a qualified wildlife biologist and could include spacing of boardwalk supports and free space between the bottom of the boardwalk and bridge decks and the bed and bank of drainages crossed to provide for continuous cover for smaller mammals using such corridors (raccoons, foxes, etc).

Conflict with Local Policies or Ordinances Protecting Biological Resources

Mitigation Measure 4.5a: Northstar CSD shall implement *Mitigation Measures 4.1a* through *4.1i, 4.2a* through *4.2c, 4.3a* through *4.3d,* and *4.4a*.

CHAPTER 5

CULTURAL RESOURCES

CHAPTER 5 CULTURAL RESOURCES

This chapter reports on the information provided in the cultural resource assessments that were completed for the Martis Valley Trail project. The assessments were completed by consulting archeologist Susan Lindström, Ph.D. in 2009, 2010, 2011, and 2012 and by EDAW│AECOM (EDAW) in 2007. Several reports were prepared by Dr. Lindström. Each is a Heritage Resource Inventory. Individual reports were prepared for the following segments: Segment 2 (2011), Segment 1 portion within the US Army Corps of Engineers (USACE) Martis Creek Lake Project (2012b), Segment 1 portion on private land and parking lot (2012d), Segment 2A (2012a), Segment 3A (2012f), Segment 3B (2012e), and Segment 3F (2012c). USACE is currently undertaking a comprehensive archeological resurvey of Martis Valley lands under their jurisdiction, which includes a portion of the study corridor for each of the potential trail alignments. The Lindström work included review of interim USACE survey findings and discussion with USACE archeology staff.

The work completed by EDAW, *Cultural Resources Inventory and Evaluation Report for the Martis Valley Trail Project,* covered Highway Alignment segments 1, 3A, and 3B. Segments 1 and 3A have shifted slightly since EDAW's work was completed, so these segments were resurveyed by Dr. Lindström. The work completed by Dr. Lindström covered Valley Alignment segments 1, 2A and 2B and Highway Alignment segments 1, 3A, and 3F. These segments are described in **CHAPTER 3 PROJECT DESCRIPTION**. Portions of the reports by Dr. Lindström and EDAW are available for review from Northstar CSD (portions of the reports that identify and map sensitive cultural resources are not available for public release). Unless otherwise noted, the information in this chapter comes from the reports prepared by Dr. Lindström.

5.1 ENVIRONMENTAL SETTING

The proposed Martis Valley Trail would be located on the eastern side of the Sierra Nevada Mountains, north of Lake Tahoe and southeast of the Town of Truckee. Two potential alignments for the proposed multi-use trail are described in **CHAPTER 3 PROJECT DESCRIPTION**. The first (northern) segment of either alignment would begin near the Town of Truckee/Placer County boundary and end at the existing parking area for the Martis Creek Lake Project Wildlife Viewing Area. From that point, the Valley Alignment would generally follow a portion of the existing Tomkins Memorial Trail through Martis Valley to the Village at Northstar. The Highway Alignment would follow a segment of the Tomkins Memorial Trail along the southern side of State Route (SR) 267 and up Porcupine Hill to Northstar Drive, then cross to the south side of Northstar Drive and head westerly to reach the Village at Northstar. Leaving the Village at Northstar, both trail alignments would continue uphill (southerly) towards Sawmill Flat Reservoir and Forest Route 73. A new trailhead and parking area is also proposed. Four potential locations for the new parking area and trailhead have been identified. The cultural resource impacts of each location are evaluated at an equal weight in **CHAPTER 11 CEQA DISCUSSIONS.**

The project area is known to support historic and archeological resources. The area is located within territory commonly attributed to the Washoe people. The area was also heavily affected by historic activities, including emigrant travel into California and logging.

Cultural Setting

A cultural chronology for the north-central Sierra Nevada region has been developed based on many different research efforts. This chronology identifies six distinct phases, as summarized below. In general terms, archeological resources and research in the Truckee basin demonstrate that populations in earlier times were hunting-based societies and that by the time of historic contact, populations were increasingly reliant on a diverse resource based (Lindström 2011 citing Elston 1982, Elston et al. 1977, 1994, 1995).

Tahoe Reach, *10,000 to 8,000 years Before Present (B.P.)* – This is an ill-defined period generally equated with small, highly mobile groups who relied on game hunting. Very little physical evidence for this phase has been found in the Sierra Nevada, although sites of this age have been identified at lower elevations.

Spooner (or Early Archaic), *8,000 to 5,000 B.P.* – This period is also poorly-defined because little physical evidence from this period has been identified in the region. General cultural patterns of this period include small game hunting, with increased milling of hard seeds (compared to the Tahoe Reach phase) and a forager-collector subsistence strategy.

Early Martis, *5,000 to 3,000 B.P.* and **Late Martis,** *3,000 to 1,300 B.P.* – The Martis Complex period, also referred to as the Middle Archaic, combines the Early Martis and Late Martis phases. The climate of this period was warmer and dryer than that of the preceding periods. During this period, there was a heavy reliance on flaked basalt implements as well as milling stones and slabs for grinding seed foods. The use of these types of tools reflects a focus on hunting and seed-gathering. The Martis Complex was first identified as a result of research done at the CA-Pla-5 (Placer 5) site, which both potential trail alignments cross.

Early Kings Beach, *1,300 to 700 B.P.* and **Late Kings Beach,** *700 to 150 B.P.* – Together these phases make up the Late Archaic period and represent a significant transition from the Middle Archaic period. During this period, the climate continued warming and drying and the population of the area began increasing. New tools used in this period include the bow and arrow. There was also an increased use of bedrock mortars and simple flake tools. The use of basalt materials for tool manufacture decreased in favor of an increased use of obsidian and chert.

Washoe Occupation

The project region is the ethnographic territory of the Washoe people. Their territory centered on Lake Tahoe and included the area around the upper reaches of the Truckee and Carson rivers. The Washoe were a hunting and gathering society that followed a seasonal subsistence cycle. In spring and summer, they moved to higher elevations to take advantage of cooler mountain temperatures and to exploit mountain resources. However, it is possible that some groups wintered in Martis Valley in some years.

The Washoe had a large range that allowed them to rely on a variety of resources, including seasonal fish runs in the Truckee River and tributaries such as Martis Creek, rabbits and antelope hunted in valleys, harvesting pinon nuts in the Pine Nut Mountains in Nevada, and harvesting acorns in the Honey Lake Valley in northern California. Basalt rock was commonly used to create stone tools, and the presence of basalt suitable for this purpose in the Truckee Basin influenced the prehistoric occupation of the region. There are multiple high-quality sources of basalt in Martis Valley. Further, the large variety of predictable resources throughout the region supported development of smaller ranges for many individual Washoe groups, and "relatively rich environment afforded the Washoe a degree of isolation and independence from neighboring peoples and may account for their long tenure in their known area of historic occupation" (Lindström 2011 citing d'Azevedo 1986:466, 471; Price 1962)..

The frequent movement throughout their range was facilitated by development of small and temporary camps. "Martis Valley is renowned for its large number of prehistoric archeological sites, some of which exhibit relatively unique characteristics as compared to other sites in the region. There is a high density of surface remains and some sites contain midden (i.e., subsurface cultural deposit) that is visible to the eye" (Lindström 2011). Archeological evidence of small camps, such as flakes of stone and broken tools, are found along mountain flanks. "In the high valleys (such as Martis Valley) more permanent base camps along water courses are represented by stone flakes, tools, grinding implements, and house depressions" (Lindström 2011).

Lindström also notes that "Washoe ethnography hints at a level of technological specialization and social complexity for Washoe groups, non-characteristic of their surrounding neighbors in the Great Basin. Semi-sedentism and higher population densities, concepts of private property, and communal labor and ownership are reported and may have developed in conjunction with their residential and subsistence resource stability" (Lindström 2011 citing Lindström 1992).

The earliest Euro-American influence on the Washoe may have occurred in the early 1800s as Spanish missionaries exploring interior valleys in California interacted with tribes that were in contact with the Washoe. More direct Euro-American influence occurred as early trappers and explorers traversed the project region. This influence expanded greatly after the discovery of gold in California's Mother Lode in 1848 led large numbers of miners and settlers into California, particularly through trails and passes in the Sierra Nevada. The Washoe likely encountered the Donner Party: "Washoe legends abound concerning ancestors who witnessed the [Donner Party] ordeal while trekking or hunting on snowshoes from nearby encampments. They were too frightened of the strange people to make themselves known. They did, however, leave food in sight of the party and took back tales of death and cannibalism to their people" (Lindström 2011 citing d'Azevedo 1984:147 and quoted in Nevers 1976:44-45).

"Washoes survived by trading goods and services to the Euro-American population (selling baskets, catching fish and game, and working as domestic laborers, wood cutters, ice harvesters, caretakers, game guides, etc.). In exchange, Washoes arranged for camping privileges on traditional lands with access to the limited remaining resources. Many established patronage relationships on ranches in the Carson Valley, Truckee Meadows and even Martis Valley" (Lindström 2011). While the Washoe lived relatively peacefully alongside Euro-American immigrants who settled in their territory, they were often blamed for depredations instigated by others (D'Azevedo as cited by EDAW). Gaps in the continuous chain of Washoe occupation in the region were likely a result of early mining events (ca. 1863) and intense logging activities (1860s-1920s), which may have been very disruptive to the maintenance of traditional camps.

Cattle ranching and dairying was practiced in Martis Valley from the late 1850s well into the 20th century. It is likely that at least some aspects of these ranching enterprises may have been more accommodating to continued land use by Washoe Indians, and oral history accounts suggest that a kind of symbiotic relationship prevailed in terms of mutual resource management and trade relations.

The contemporary Washoe have developed a Comprehensive Land Use Plan (Washoe Tribal Council 1994) that includes goals of reestablishing a presence within the Tahoe Sierra and re-vitalizing Washoe heritage and cultural knowledge, including the harvest and care of traditional plant resources and the protection of traditional properties within the cultural landscape (Lindström 2011 citing Rucks 1996:3).

Historic Context

The area was heavily affected by historic activities, including emigrant travel into California and logging, starting in the mid-19th century. Key historic activities in Martis Valley included transportation, mining, logging, ranching and early settlement, ice production, and recreation and residential development. Wood, water, and recreational resources became the essential economic bases of the Truckee basin.

Little is known about early settlement of the Truckee basin after the passage of emigrant wagons during the mid 1840s and 1850s. Mining, logging, and agricultural operations led to, the Truckee Basin becoming a major frontier "urban" center by the late 1860s. By the 1920s a recreation-based economy began to develop in place of the declining industrial economy.

Transportation

Several emigrant parties entered or traveled through the area. The route through the Sierra Nevada along the Truckee and Bear rivers became known as the California Trail or the Truckee Pass Emigrant Road. One of the earliest of these parties was the Steves-Murphy party, which crossed the California Trail in 1844. John Charles Fremont entered California along this trail the following year. The most famous use of this route was by the Donner Party. In November of 1846, approximately half of the original party of 89 people died while snowed-in along the pass.

The area near the Martis Creek confluence with the Truckee River, historically known as Martis Creek Station, was located on an historic transcontinental and trans-sierra transportation and communications corridor. The first emigrant trans-sierra crossings in the 1840s and 1850s, the first transcontinental railroad in the 1860s, and the first transcontinental auto road in the 1910s passed by Martis Creek Station. Extension of the transcontinental railroad to Truckee in 1868 and completion of it across the nation in 1869 led to increases in activity and innovations in the transportation, lumbering, ice, agriculture, and dairying industries.

State Route (SR) 267 provides a major transportation link between Lake Tahoe and Truckee. Since its establishment, this roadway and the improvements to it have been critical to development in the area. The road passes through Martis Valley and over Brockway Summit, ending at Kings Beach. This route follows the alignment of an historic route known as the Old Brockway Road, Truckee-Hot Springs Road, or Old Tahoe Road. The road was first shown on a GLO survey plat from 1861/1865. At Middle Martis Creek, the historic route junctioned with a road spur that later served the Richardson Brother's sawmill.

Mining

Discovery of several quartz ledges in the area brought hundreds of miners to Martis Valley during the summer of 1863 (Lindström 2011 citing Scott 1973:150). By July 1863, 700 miners had populated the district (Lindström 2011 citing Richards 2004:A4). Settlements were established along the Truckee River near the Squaw Creek confluence and near Brockway Summit on the trail that would become today's SR 267. A settlement located near the Middle Fork of Martis Creek and the entrance to today's Northstar California, had a population of 50 people, several saloons, an eating house, barber shop and butcher shop, and makeshift shelters of small logs and canvas-covered brush.

"Mining was carried out on an exploratory basis and no ore bodies of any economic importance were found" (Lindström 2011 citing U.S. Geological Survey: Geological Atlas, Truckee Folio 1897). By the end of 1863, the strike was over and mining towns were deserted (Lindström 2011 citing Scott 1973:147-150), and the settlement at the entrance to Northstar was described as deserted as early as 1874. The miners shifted their attentions to the other resources of the Truckee-Tahoe basins which led to settlement of Tahoe's north and west shores. Several mine exploration pits (representative of hard rock mining during this early era) have been recorded in the hills surrounding Martis Valley (Lindström citing Ludwig 2001), and two more have been inventoried within the Martis Valley Trail Valley Alignment.

Logging

Large-scale logging began in the area after the discovery of silver at the Comstock Lode in 1859 as lumber was used to support mining activities. As mining decreased, so did lumbering, until construction of the Transcontinental Railroad provided a new market for lumber. When the railroad reached Donner Summit in the late 1860s, several mills established operations in the area to provide cordwood for fuel, lumber for construction, and ties for the railroad bed. From this time through the beginning of the 20th century, logging activities primarily focused on pine species and the provision of large saw logs and cordwood for the mines and the railroad. With completion of the Transcontinental Railroad and continued declines in mining activities, production of other wood products was emphasized. This allowed for self-sufficient communities to establish around the larger mills, and logging remained a significant commercial activity in the region into the middle of the 20th century. In addition, due to the distance between logging sites and the point of consumption of the wood resource, the increase in logging activity prompted the innovation of a variety of transport techniques and a series of wood caps and mills that functioned as staging points along this transport system.

George Schaffer was one of the earliest lumbermen in the Truckee Basin. He built Truckee's first sawmill on the Truckee River in 1867 and established timber holdings in Martis Valley in 1871. The Richardson brothers also operated two mills in Martis Valley. The historic land ownership pattern shown on the 1897 Map of Placer County indicates that Schaffer may have logged the west-central portion of the proposed Valley Alignment project area and the Richardson brothers may have logged the east-central portion of the project area (Lindström citing Knowles 1942:9, 16).

Mill sites, including those established by George Schaffer and the Richardson brothers, were served by a series of wood camps, where wood processing and transport occurred. A large base camp would typically include an office/store, cookhouse, and bunkhouse with outbuildings consisting of stables, storehouses, and blacksmith shops. Residential furnishings were sparse: bedding consisted of straw or hay mattresses, with cedar incorporated to deter insects. Tools needed to be stored inside at night to prevent rodents from gnawing on the wooden handles, as the handles were salty with sweat. Smaller camps might include only a single domestic structure or temporary structures. Buildings were roughly constructed and provided few comforts.

By the turn of the century, timber tracks in Martis Valley were largely stripped of pine. Fir and other species remained in the area because they were considered unsuitable for the production of ties and timbers. With the introduction of paper mills, stands were re-entered to harvest fir for use as pulpwood for paper mills.

Harvesting also occurred within the project vicinity during 1950, 1954 and 1970. A marked increase in logging roads constructed sometime after 1952 and before 1966 is shown on aerial photographs, USGS quadrangles (1969) and U.S. Forest Service maps (1976).

Ranching and Dairying

The dairy business in the Truckee basin flourished on a large scale from the 1860s until about 1930 (Lindström citing McGlashan 1982:13-17). Martis Valley's rich meadowlands became a center for dairying operations. During the 1880s, up to 20 dairy farms had been established around Truckee (Lindström 2011 citing Edwards 1883:69-70; Truckee Republican 3/14/1883). Butter was the chief product, since milk would spoil without refrigeration.

Notable land owners in Martis Valley included the Cavitts, Joergers and Waddles. Joseph Joerger, Sr. built a modest ranch complex approximately one mile northeast of the Valley Alignment Segment 2A project area and the 1913 Map of Nevada County shows considerable Joerger land holdings due north of the Valley Alignment Segment 2A project area. The "Old Joerger Ranch" remains as a prominent landmark on modern maps of Martis Valley (Lindström 2011)

The Cavitt holdings encompassed the entire northern half of Segment 2A, including the meadowlands surrounding the present Martis Creek Lake project Wildlife Viewing Area parking lot. . A 1956 photo shows the Cavitt's "mountain ranch" in Martis Valley (Lindström citing McGlashan 1982:16-17), where buildings are located on either side of Segment 2A and the ranch access road comprises the centerline of a portion of this segment. The Cavitt dairy operations began in 1905 and ended in the 1960s when the Cavitts sold their ranch to the USACE in advance of Martis Dam construction.

Sheepherding

"During the height of the Sierran sheep industry, sheepherders grazed the lower quality grasslands on the margins of Martis Valley. George Mills ran some of the largest herds of sheep in northern California, in addition to dairy stock. He leased land west of Martis Creek for grazing (Truckee Republican 5/18/1907). Sheepherding continued in Martis Valley through the 1960s (Richards, personal communication 2005 in Lindström et al. 2007)" (Lindström 2011).

During the 1850s over 500,000 sheep crossed Nevada on their way to California markets. By the 1860s the trend had been reversed, as millions of California sheep were trailed from California to the mining camps of the Great Basin and railheads in the plains (Lindström citing Douglass and Bilbao 1975:214). Most of the herding was done by Basque shepherds. Carved aspens and domed rock ovens marking base camps provide physical evidence of the Basque activities in the area. Grazing was curtailed in the last half of the 20th century due to stricter government regulation and competition for grazing lands by recreational and residential/commercial development in the Sierra Nevada.

Ice Industry

From 1868 through the 1920s, ice harvesting rivaled the economic importance of the lumber industry (Lindström citing Earl 2004, Hansen 1987, Itogowa 1974, and Lord 1994:36). Eastern ice and Alaskan ice were costly and undependable so closer sources were sought. With the completion of the first transcontinental railroad across Donner Pass in 1869, ice could be harvested and transported cost-effectively and Truckee-Donner ice soon dominated the industry (Lindström citing Macaulay 2002:2). Sierra ice was noted for its superior quality and crystal purity and it was served in grand hotels throughout the nation. Yet, the Truckee ice industry targeted commercial demands for cooling rather than the market for domestic consumption. Truckee ice was used to provide ice-cooled chambers in mines in Virginia City (Lindström citing Earl 1996:12, Lord 1994:36, and Meschery 1978:48) and was used in iced box cars to ship produce to eastern markets. This enabled the growth of California's agricultural industry.

Recreation and Community Development

Construction of the first transcontinental railroad and the first transcontinental highway through the area allowed development of the region's summer and winter recreation and tourism opportunities. However, the new population base impacted traditional lifeways in Martis Valley, as expressed in the oral histories of some of its pioneer residents.

Martis Valley's first airfield was completed in 1929 on the former Joerger family ranch. The one-mile-airstrip was enlarged after the late 1950s (Lindström 2011 citing Scott 1973:155-156). "Joseph E. Joerger donated and sold land along SR 267 for the construction of the airport; he even tractor-cleared the land so planes could land (Gladys Joerger Gray n.d.:2; McMills 1994:11). However, airport development virtually divided the Joerger ranch in half and rendered the parts at the creek barely usable (Barte 1982:6; Carter 1983). Ranchers were already struggling with the high cost of cattle shipment and increasing property taxes and with the construction of the Truckee-Tahoe Airport, cattle-raising in Martis Valley was ultimately phased out (Barte 1982:6)" (Lindström 2011).

Martis Valley ranchers were further discouraged by the influx of visitors and the growing emphasis on recreation and subdivision development, which made the wanderings of stock particularly unwelcomed (Lindström 2011 citing Barte 1982:6).

Construction on the Martis Dam and Martis Lake by the USACE commenced ca. 1970, with completion in 1972. To facilitate dam construction, the USACE acquired approximately 1,800 acres in Martis Valley in the mid 1960s (Lindström 2011 citing Barte 1982). Ranchlands owned by the Joergers and Cavitts were procured in this transaction under the right of eminent domain. Buildings on the "Old Joerger Ranch" were torn down (Lindström 2011 citing Carter

1983; Gladys Joerger Gray oral history n.d.:2; McMills 1994:11); it is uncertain whether the USACE also demolished structures on the Cavitt Ranch.

Segment 2A of the Valley Alignment passes through a gravel borrow pit north of the proposed Martis Creek crossing. The quarry is accessed by a dirt road that branches southward from the historic road through the Cavitt Ranch. A batch plant inside this gravel pit operated for a few years and supplied materials for subdivision development at North Lake Tahoe. This gravel pit and access road do not appear on the 1966 aerial photographs but show on the 1972 aerials. The dirt access road appears to connect the borrow pit within Segment 2A to another large gravel pit on the north side of SR 267 (directly across from the Martis Creek Lake Project Wildlife Viewing Area parking lot). Development of both quarries is coincident with construction of Martis Dam.

Technical Studies

Native American Consultation

Both EDAW and Lindström conducted Native American consultation in association with preparation of the cultural resource assessments for the project. EDAW began this effort by sending a letter to the Native American Heritage Commission (NAHC) requesting a search of the Sacred Lands files and a list of appropriate Native American contacts for the project area. The NAHC did not identify the presence of any sacred lands or areas of cultural interest within or in the immediate vicinity of the EDAW study area. The NAHC identified the Washoe Tribe of Nevada and California as the main point of contact for the study area. EDAW sent letters to two individuals from the Washoe tribe, but did not receive any responses.

To follow up on Native American consultation initiated by archeologists involved with the EDAW study, Darrel Cruz, Director of the Washoe Tribe Historic Preservation Office (Washoe THPO), was contacted by Lindström in order to incorporate the Tribe's opinions, knowledge and sentiments regarding any potential concerns. Ms. Nevers, Washoe Trial Historian and trained archeological technician, participated as a Native American Consultant in some of the field reconnaissance conducted by Lindström.

Research

EDAW conducted a record search at the North Central Information Center (NCIC) of the California Historical Resources Information System at California State University, Sacramento. The search was conducted to determine whether previous cultural resource studies have been completed in the project vicinity and to identify whether any previously recorded resources could be impacted by construction and use of the proposed trail. EDAW also consulted with USACE archeologist Richard Perry to obtain additional information regarding cultural resources known to be present within the project vicinity. EDAW noted that the presence of known cultural resource sites noted on the USACE maps "indicates the general high level of sensitivity within the [project area] for historic-era and in particular, early Native American-related sites, features, and artifacts."

Through their research efforts and review of in-house files, EDAW identified 10 previous cultural resource investigations that have been completed in the project vicinity, which identified 14 cultural resources that could be affected by the proposed project.

Lindström also conducted research for the project study area which entailed a literature review of prehistoric and historic themes for the project area and review of historic maps (dating from 1865) and aerial photographs (dating from 1939). Lindström also conducted a records search at the NCIC. Records were reviewed to identify any properties listed on the National Register of Historic Places (NRHP), California Register of Historic Resources (CRHR) and other listings, including the files of the California State Historic Preservation Office among various other sources.

Oral History Interviews

Oral histories are referenced in the Lindström report and include the recollections of Cavitt, Joerger and Waddle family members. Lindström also gleaned personal recollections from various newspaper interviews.

Field Assessment

As noted above two separate cultural resource assessments were conducted for the proposed project. The EDAW assessment covered the Highway Alignment while the Lindström assessment covered the Valley Alignment and resurveyed portions of the Highway Alignment. For the field assessment of the Highway Alignment, EDAW conducted an intensive survey, which consisted of an EDAW archeologist walking the entire length of the study corridor in two transects. The Lindström field reconnaissance was accomplished by walking parallel transects at no greater than 15-foot intervals.

Identified Resources

The following discussion generally describes the type and extent of cultural resources identified in the study area. As noted above, specific details of cultural resource sites are withheld from this discussion for the protection of the resources.

The archeological surveys conducted for the proposed project identified 10 archeological sites, 18 linear features and 15 isolated finds within the area of potential effect. Based on Lindström's findings, all of these resources appear to be prehistoric or historic in origin (i.e., older than 50 years). However, based on preliminary analysis, only 8 of these resources appear to be eligible for listing on either the NRHP or the CRHR. As discussed above, Martis Valley contains a large number of prehistoric and historic resources. The prehistoric resource sites through which each potential trail alignment passes are part of an extensive prehistoric site complex. While the integrity of many of the prehistoric and historic sites has been reduced by later activities, many of the sites retain sufficient integrity and potential resource value to be potentially eligible for listing on the NRHP and/or CRHR.

The archeological sites include six sites associated with Native American occupation of the area and four sites associated with historic settlement and economic activity in the region (primarily logging and mining). Three of the Native American sites also include historic components. The largest of the Native American sites is known as Placer 5, which is centrally located relative to many individual prehistoric sites in the region. This site has been surveyed, evaluated, recorded, and inventoried multiple times in the past. This work has demonstrated that there is a subsurface component to this site, which is considered the type site of the Martis prehistoric complex. Through this prior work, the Placer 5 site has been characterized as a large prehistoric encampment consisting of an extensive scatter of flaked and ground stone artifacts and midden, with a historic component that includes refuse, fence posts and road traces. Despite disturbance from road and sewer line construction, quarrying, recreation, and construction of the Wildlife Viewing Parking Area, the Placer 5 site is considered eligible for listing on the NRHP (Lindström 2011 citing Ataman 1999).

The Native American sites include prehistoric lithic scatters, flaked and ground stone artifacts, midden, and milling slabs and milling handstones. Stone artifacts include basalt tools and flakes, and flakes of obsidian, cryptocrystalline (white and red chert) and quartz.

Historic artifacts (associated with both the primarily Native American sites and the solely historic sites) include fragments of a variety of historic glass and ceramics, beverage and tobacco cans, nails, barbed wire and baling wire, pieces of metal such as railroad spikes, milled board pieces, and high-cut stumps (which are considered remnants of historic logging). Historic features include wells, ditches, and roads. Lindström notes that the concentration of historic artifacts is greater outside the project's area of potential effect compared to the concentration within the potential trail alignments.

Linear features crossed by the potential trail alignments include historic roads, irrigation ditches, and fence lines. Some of the historic roads are currently used as segments of the Tompkins Memorial Trail. The irrigation ditches are in-filled.

The historic artifacts and linear features reflect the ranching/grazing, logging, and mining activities that were key to the region's settlement history. Specifically, artifacts found within the study corridors include resources associated with the Cavitt ranch (the Joerger ranch was located outside the study corridors), possible Basque sheep herding artifacts, and resources associated with logging by Schaffer and/or the Richardson brothers.

Isolated finds include items like basalt flakes and small debris scatters, a bottle, a Prince Albert tobacco can that could date ca. 1915 to 1930, mine prospect pits, and high cut stumps associated with historic logging. Lindström notes that "isolated finds, unless truly exceptional, isolated finds are not typically considered significant and therefore not eligible in terms of National Register or California Register criteria" (Lindström 2012f). These resources are not considered any further in this chapter's analysis.

Several of the identified sites are potentially eligible for listing in the California Register of Historical Resources (CRHR) and/or the National Register of Historic Places (NRHP). A listing of these sites is included in *Table 5.1 Cultural Resources Potentially Eligible for Listing in the CRHR and/or NRHP*. Most of the sites identified within the study corridors contain a large variety of artifacts representing various prehistoric and historic activities. *Table 5.1* highlights the most pronounced features that occur within the project site.

Most of the linear features identified in the study corridors are not included in *Table 5.1*. These features are not considered to contain information needed to answer important scientific questions or to have special or particular qualities (Lindström 2012d). Further the portion of each linear feature that occurs within the study corridors does "not appear to be contributing elements to the potential importance of the larger linear site," and few "retain good integrity to their period of significance" (Lindström 2011). Some of those resources may be directly associated with an important historic event or person (such as old roads associated with the Cavitt ranch) but have been subject to ongoing disturbance to the area and sometimes use of the feature. This ongoing disturbance has compromised the integrity of the linear features. Linear features not included on *Table 5.1* are not expected to be eligible for listing on the NRHP or CRHR and are not considered unique archeological resources under CEQA. Therefore, these features are not considered any further in this chapter's analysis.

Table 5.1
Potentially Significant Cultural Resources

Resource	Midden	Bedrock Mortar	Lithic Scatter (stone artifacts)	Milling Tools	Historic Artifacts	Linear Feature Component	Crossed by Linear Features	Notes
CA-PLA-5	X		X	X	X			Type site of Martis complex, large site, disturbed by prior construction activity
CA-PLA-6			X	X				Bedrock mortar included in the PLA-6 site but located outside the Martis Valley Trail project site. A cupule petroglyph, which is a rare prehistoric rock carving, is associated with the bedrock mortar.
CA-PLA-489			X	X		X	X	Sparse historic artifact scatter, not sufficient to constitute an historic component to this site
CA-PLA-490		X	X	X			X	Disturbed by former gravel quarry
CA-PLA-491/H			X	X	X	X	X	Density of stone flakes and tools indicate possible basalt tool workshop loci
P-31-2589					X	X		Log chute associated with Richardson

Resource	Midden	Bedrock Mortar	Lithic Scatter (stone artifacts)	Milling Tools	Historic Artifacts	Linear Feature Component	Crossed by Linear Features	Notes
								Brothers, likely used between 1874 and 1883
MVT1-1			X					Small prehistoric basalt lithic scatter
MVT3A-1					X			Mining related resource, possibly a contributing element to a larger site, likely dating to 1863, making it one of the earliest archeological finds associated with Euro-American occupation of the Truckee Basin

5.2 REGULATORY FRAMEWORK

Federal Regulations

Federal regulations governing cultural resources include: the Antiquities Act of 1906; Historic Sites Act of 1935; Reservoir Salvage Act of 1960; National Historic Preservation Act of 1966; National Environmental Policy Act of 1969; Executive Order 11593 (Projection and Enhancement of the Cultural Environment, 5/13/1971); 36 Code of Federal Regulations (CFR) 800 and CFR 60 (Advisory Council on Historic Preservation: Protection of Historic and Cultural Properties, Amendments to Existing Regulations, 1/30/1979, National Register of Historic Places, Nominations by States and Federal Agencies, Rules and Regulations, 1/9/1976); Revisions to 36 CFR 800 (Protection of Historic Properties, 1/10/1986); Archaeological and Historical Preservation Act of 1974; American Indian Religious Freedom Joint Resolution of 1978; Archaeological Resources Protection Act of 1979; and Native American Graves Protection and Repatriation Act of 1990. Collectively these regulations and guidelines establish a comprehensive program for the identification, evaluation, and treatment of cultural resources.

Under the National Historic Preservation Act (NHPA), an historic or archeological resource must be evaluated for eligibility to be listed in the National Register of Historic Places (NRHP). Resources considered eligible for listing are those that meet one or more of the following evaluation criteria:

- Resources that are associated with events that have made a significant contribution to the broad patterns of our history; or
- Resources that are associated with the lives of persons significant in our past; or
- Resources that embody the distinctive characteristics of a type, period, or method of construction, or that represent the work of a master, or that possess high artistic values, or that represent a significant and distinguishable entity whose components may lack individual distinction; or
- Resources that have yielded, or may be likely to yield, information important in prehistory or history (36 CFR 60.4).

Section (§) 106 of the National Historic Preservation Act and its implementing regulations require federal agencies to consider the effects of their actions, or those they fund or permit, on historic properties that may be eligible for listing or that are listed on the NRHP. To determine whether an undertaking could affect historic properties, cultural resources (including archeological, historical, and architectural properties) must be identified, inventoried, and evaluated for listing in the NRHP. The National Historic Preservation Act also requires federal agencies to afford the Advisory Council on Historic Preservation and the State Historic Preservation Office a reasonable opportunity to comment on any undertaking that would adversely affect properties eligible for listing on the NRHP.

State Regulations

Historic Resources

CEQA Guidelines §15064.5 defines an "historical resource" as a resource that is:

- listed in or eligible for listing in the California Register of Historical Resources (CRHR);
- listed in a local register of historical resources;
- identified in an historical resource survey and meeting requirements in Public Resources Code (PRC) §5024.1(g);
- any object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be historically significant, provided the determination is supported by substantial evidence in light of the whole record; or
- a resource so determined by a lead agency as defined in PRC §§5020.1(j) or 5024.1.

Generally, a resource is considered eligible for listing on the CRHR if it meets any of the following characteristics:

- Is associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;
- Is associated with lives of persons important in our past;
- Embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of an important creative individual, or possesses high artistic values; or
- Has yielded, or may be likely to yield, information important in prehistory or history.

CEQA Guidelines defines an adverse effect on cultural resources as including "physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings."

Unique Archeological Resources

Impacts to "unique archeological resources" are also considered under CEQA, as described under PRC §21083.2. If an archeological site does not meet the criteria for inclusion on the CRHR but does meet the definition of a unique archeological resource as outlined in PRC §21083.2, it is entitled to special protection or attention under CEQA. A unique archeological resource implies an archeological artifact, object, or site which has a clearly demonstrated high probability of meeting one of the following criteria:

- The archeological artifact, object, or site contains information needed to answer important scientific questions, and there is a demonstrable public interest in that information;
- The archeological artifact, object, or site has a special and particular quality, such as being the oldest of its type or the best available example of its type; or
- The archeological artifact, object, or site is directly associated with a scientifically recognized important prehistoric or historic event or person.

A resource that merely adds to the current body of knowledge without meeting one of the above criteria is considered a non-unique archeological or paleontological resource. Other than the simple recording of its existence, the lead agency is not required to give such resources further consideration.

Treatment of historical resources and unique archeological resources is governed by CEQA Guidelines §15126.4(b)(3), which states that "public agencies should, whenever feasible, seek to avoid damaging effects on any historical resource of an archaeological nature." The Guidelines further state that preservation in place is the preferred manner of mitigating impacts, and that preservation may occur through:

- Planning construction to avoid archeological sites;
- Incorporation of sites within parks, green space, or other open space;
- Covering the archeological sites with a layer of chemically stable soil before building tennis courts, parking lots, or similar facilities on the site; and/or
- Deeding the site into a permanent conservation easement.

CEQA Guidelines §15126.4(b)(3)(C) states that "when data recovery through excavation is the only feasible mitigation, a data recovery plan, which makes provision for adequately recovering the scientifically consequential information from and about the historical resource, shall be prepared and adopted prior to any excavation being undertaken." However, subsection (D) allows that "data recovery shall not be required for a historical resource if the lead agency determines that testing or studies already completed have adequately recovered the scientifically consequential information from and about the archaeological or historical resource."

Native American Human Remains

CEQA Guidelines §§15064.5(e)(1) and (2) provide the following guidance with regard to the accidental discovery of human remains:

In the event of the accidental discovery or recognition of any human remains in any location other than a dedicated cemetery, the following steps should be taken:

1) There shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent human remains until the following actions are taken:
   a. The coroner of the County must be contacted to determine that no investigation of the cause of death is required, and
   b. If the coroner determines the remains to be Native American:
      i. The coroner shall contact the Native American Heritage Commission within 24 hours.
      ii. The Native American Heritage Commission shall identify the person or persons it believes to be the most likely descended from the deceased Native American.
      iii. The most likely descendent may make recommendations to the landowner or the person responsible for the excavation work, for means of treating or disposing of, with appropriate dignity, the human remains and any associated grave goods as provided in PRC §5097.98, or
2) Where the following conditions occur, the landowner or his authorized representative shall rebury the Native American human remains and associated grave goods with appropriate dignity on the property in a location not subject to further subsurface disturbance.
   a. The Native American Heritage Commission is unable to identify a most likely descendent or the most likely descendent failed to make a recommendation within 24 hours after being notified by the commission; or
   b. The descendent identified fails to make a recommendation; or
   c. The landowner or his authorized representative rejects the recommendation of the descendent, and the mediation by the Native American Heritage Commission fails to provide measures acceptable to the landowner.

Unanticipated Discoveries

PRC §21082 requires that provisions be made for historical or unique resources that are accidentally discovered during project activities. These requirements are reiterated in CEQA Guidelines §15064.5(f). These provisions include:

- ❖ Immediate evaluation by a qualified archeologist;
- ❖ Implementation of avoidance measures or appropriate mitigation if the find is historical or unique; and
- ❖ Allowing work to continue in other parts of the construction area while mitigation is implemented.

Local Regulations

Placer County General Plan

The Placer County General Plan outlines the County's approach to treatment of cultural resources. Twelve individual policies are summarized with the main goal of the County as follows:

Goals 5.D To identify, protect, and enhance Placer County's important historical, archaeological, paleontological, and cultural sites and their contributing environment.

Martis Valley Community Plan

The Martis Valley Community Plan includes a section that outlines goals, policies, and implementation programs to address treatment of cultural resources. Ten individual policies are summarized in the Cultural Resources section with the following main goal of the Martis Valley Community Plan:

Goal 8.A: To identify, protect, and enhance Martis Valley's important historical, archaeological, paleontological, and cultural sites and their contributing environment.

5.3 IMPACTS

Significance Criteria

The analysis conducted for the Initial Study determined that the proposed project would have a less than significant impact with respect to the following significance criterion:

- Directly or indirectly destroy a unique paleontological resource (i.e., where the project would directly or indirectly destroy a site or resources).

The analysis below evaluates the potential for the project to result in significant cultural resources impacts related to the following criteria. A significant impact under CEQA would occur if the project physically demolishes, destroys, relocates, or alters an historical resource or unique archeological resource or its immediate surroundings such that the significance of the resource would be materially impaired. Specifically, a significant adverse change would occur if the project would:

- Cause substantial adverse change in the significance of a historically significant resource (i.e., a resource eligible for the CRHR);
- Cause a substantial adverse change in the significance of an archeological resource (defined as a unique archeological resource which does not meet CRHR criteria);
- Disturb any human remains, including those interred outside of formal cemeteries (i.e., where the project would disturb or destroy burials).

Project Impacts

IMPACT 5.1:	Adversely Affect Known Historically Significant and/or Unique Archeological Resources	
APPLICABLE POLICIES AND REGULATIONS:	National Historic Preservation Act Placer County General Plan Martis Valley Community Plan	
	Valley Alignment	**Highway Alignment**
SIGNIFICANCE WITH POLICIES AND REGULATIONS:	Significant	Significant
MITIGATION MEASURES:	Mitigation Measures 5.1a through 5.1e	Mitigation Measures 5.1a through 5.1e
SIGNIFICANCE AFTER MITIGATION:	Less than Significant	Less than Significant

The cultural resource assessments completed for the Martis Valley Trail project identified prehistoric and historic cultural resource sites within the study corridor for each potential trail alignment. Based on Lindström's findings, several of the identified sites are potentially eligible for listing in the CRHR and/or the NRHP.

Construction of either trail alignment could impair the significance of resources by adversely affecting physical or aesthetic qualities inherent in the sites and/or causing physical changes (such as destroying, relocating, or altering components of the sites) that would affect unique ethnic (including Native American) cultural values or traditional uses. Use and maintenance of the proposed trail could result in direct and indirect impacts to these sites by allowing continued resource disturbance and by increasing the amount of non-Native American use of the area. These would be significant impacts of the proposed project. The project includes construction of a Native American Interpretive Exhibit, which would provide trail users with information regarding the cultural context of the project area.

The Valley Alignment would pass through or along a total of 14 isolated features, 15 linear features, and 5 archeological sites (all 5 of which have prehistoric components; 3 also have historic components). The Highway Alignment would pass through or along a total of 11 isolated features, 8 linear features, and 6 archeological sites (2 of which have prehistoric components and 5 of which have historic components). Preliminary assessment of these resources indicates that none of the isolated features or linear features is considered potentially eligible for listing in the NRHP or CRHR. Additionally, as discussed above, none of isolated features or linear features is considered to meet the definition of a unique archeological resource. All of the archeological sites that would be affected by the Valley Alignment and 4 of the archeological sites that would be affected by the Highway Alignment are considered potentially eligible for listing in the NRHP or CRHR, and impacts to these resources would be significant. The extent of impacts would be similar under either alignment.

To ensure impacts to cultural resources sites remain less than significant, *Mitigation Measure 5.1a* requires avoidance of direct impacts to the extent feasible. Avoidance would be accomplished by prohibiting any grading within a resource area, capping the resource by placing a layer of chemically stable fill, and constructing the trail (including any drainage features) on top of the cap layer. Based on preliminary assessment of the trail construction plans and the cultural resource site mapping, it is expected that capping could be accomplished on MVT1-1, portions of CA-PLA-5, portions of CA-PLA-489, and all of CA-PLA-490 and -491. In addition, *Mitigation Measure 5.1b* requires that the limits of the area of disturbance be flagged in the field prior to commencement of construction. This would ensure that actual impacts to cultural resource sites during construction are consistent with the impacts identified in the trail construction plans.

Under the Valley Alignment., capping is not feasible for approximately 1,700 linear feet of CA-PLA-5 as well as 625 additional linear feet of significant resources. Under the Highway Alignment, capping is not feasible for 2,500 linear feet of CA-PLA-5 as well as 1,050 additional linear feet of significant resources.

Capping to avoid impacts is not feasible on all or a portion of the following sites, which are identified in *Table 5.1*: CA-PLA-5, CA-PLA-6, CA-PLA-489, and P-31-2589. Where capping is not feasible, *Mitigation Measure 5.1c* requires preparation and implementation of a Research Design and Testing Plan by a qualified archeologist prior to project construction. The prepared Research Design and Testing Plan would serve to identify the scientifically important information and recover it, in a timely manner and without risk of causing preventable project impacts. The testing, evaluation, and treatment measures included in the Research Design and Testing Plan would be required to be implemented prior to project construction.

Federal and State guidelines require that heritage resources subject to project impacts be evaluated to determine their significance according to criteria established by the National Historic Preservation Act and CEQA. While site evaluation is sometimes completed before project approvals are issued, new evaluations have not been conducted for resource sites along either of the alignments being considered in this Draft EIR. Evaluations have been previously completed for many sites in the project vicinity, which provides information applicable to this impact analysis. Further, because two potential alignments are being considered, but only one would be constructed, conducting evaluations for all resource sites within the study area would lead to physical disturbance of resources that would not subsequently be affected by the project. To avoid unnecessary disturbance to archeological resources evaluation of resource sites would occur as part of the Research Design and Testing Plan.

Where capping is determined to be infeasible, implementation of *Mitigation Measure 5.1c* would be required. The Research Design and Testing Plan prepared under *Mitigation Measure 5.1c* would address only the resources that cannot be capped within the area that would be affected by the trail alignment that is selected for construction. It is required to provide a summary of background information, field reconnaissance, and site recordation that has already occurred within the project area; discuss the archeological sensitivity of the region; identify the important questions that could be addressed by the kind of data that is likely to be contained at each affected site and could not be addressed using data from other sources alone; describe the cultural context of each affected site; present a testing program (which would identify specific areas for subsurface exploration and identify specific methods – such as extracting soil cores, surface scraping, trenching, or excavating test pits - for conducting that exploration); outline methods for evaluation of affected sites (including assessing the integrity and research potential of each affected site); and provide a treatment plan for affected resources that are eligible for listing or qualify as unique archeological resources. The testing program would also identify security measures to protect resources during implementation of the program (i.e., provide for fencing or other measures to prevent looting of the resource site) and describe handling and inventorying procedures for any resources and artifacts found during exploration.

The treatment plan would identify specific measures to minimize impacts to each site. These measures would likely include: (1) preservation and archeological monitoring; (2) interpretation (either as an individual site or feature or collectively as various elements of a site type or feature type that represent a particular prehistoric or historic theme such as Washoe culture or historic mining, logging and ranching); and/or (3) data recovery (including metal detection, archeological excavation, focused archival research, and enhanced documentation involving detailed mapping and photography). Data recovery measures for affected resources within the USACE Martis Creek Lake Project would likely be prepared and implemented as part of a Memorandum of Agreement between Northstar CSD, USACE, the State Historic Preservation Office (SHPO), and in consultation with the Washoe Tribe. Strategies likely to be included in the treatment plan include:

Preservation: Avoidance of cultural resources is preferred; however in many situations avoidance is not possible. Each of the potential Martis Valley Trail alignments have been designed and adjusted with avoidance of impacts to cultural resources as a primary goal; however avoidance of other physical impacts and development of an attractive and accessible trail are other primary goals that sometimes conflict with the goal of avoiding impacts to cultural resources. However, Northstar CSD would work with project engineers to reevaluate opportunities for resource avoidance by altering the trail alignment as the first approach in implementing the treatment plan. Where complete avoidance is not feasible, minimization of the impact would be attempted. This would involve partial avoidance, which could be accomplished by altering the trail alignment to the extent feasible, and additional mitigation would be necessary for those resources not avoided or preserved. In-place protection of resources that are avoided would be provided; however due to the public-use nature of the proposed trail, the potential for future vandalism of protected resources is high. This potential must be considered in implementing the treatment plan.

Interpretation: Public education regarding prehistoric occupation of the project area, such as explanatory written information and visual displays, is included as part of the proposed project. If warranted by the results of the testing program, additional interpretation efforts may be pursued. This may include signage, pamphlets, and displays that provide the public with information about archeological and historic values related to the study area. For historic sites, such as some of the roads and ditches, repair, rehabilitation or restoration, preservation, and/or relocation may be appropriate and effective.

Data Recovery: Strategies that provide for in-depth documentation of selected archeological resources would provide compensation for unavoidable adverse impacts that remain after all appropriate and practicable avoidance and protection has been achieved. This can include surface and subsurface collection, analysis, documentation, archival research, and oral interviews to allow all scientifically consequential information from and about the resource to be adequately recovered.

Implementation of *Mitigation Measure 5.1c* would ensure that impacts to historically significant archeological resources would be avoided where feasible and that public education and scientific knowledge would be gained from resources where avoidance is not feasible. This would ensure that the project's impacts to archeological resources under either alignment are reduced to a less than significant level.

Construction Staging Areas

Mitigation Measure 5.1d requires that cultural resource inventories be completed for any construction staging area located where previous surveys have not been conducted and prohibits location of staging areas where significant cultural resources are identified.

Programmatic Analysis of Segments 3E and 4

Mitigation Measure 5.1e requires that cultural resource inventories be completed for Segments 3E and 4. Based on the information provided through the resource inventories and research described above, Segments 3E and 4 are likely to contain some prehistoric and historic resources. At the time that Segments 3E and 4 are proposed for construction, inventories to identify resources must be completed, trail alignments selected, impacts assessed, and mitigation identified. It is expected that trail alignments will be selected to avoid resources where possible, resource capping will be used where feasible, and data recovery will be used where necessary. Because Segments 3E and 4 occur on relatively steep slopes, it is possible that opportunities for resource capping will be limited, as resource capping relies on placing fill over the resource and trail construction on slopes is better accomplished with grading cuts as it results in a more stable trail surface.

<table>
<tr><th>IMPACT 5.2:</th><th colspan="2">Adversely Affect Presently Unknown Historic or Archeological Resources</th></tr>
<tr><td>APPLICABLE POLICIES AND REGULATIONS:</td><td colspan="2">National Historic Preservation Act
Placer County General Plan
Martis Valley Community Plan</td></tr>
<tr><td></td><td>Valley Alignment</td><td>Highway Alignment</td></tr>
<tr><td>SIGNIFICANCE WITH POLICIES AND REGULATIONS:</td><td>Potentially Significant</td><td>Potentially Significant</td></tr>
<tr><td>MITIGATION MEASURES:</td><td>Mitigation Measure 5.2a</td><td>Mitigation Measure 5.2a</td></tr>
<tr><td>SIGNIFICANCE AFTER MITIGATION:</td><td>Less than Significant</td><td>Less than Significant</td></tr>
</table>

The project region is considered to have high sensitivity and potential for cultural resources. There is potential for currently unknown cultural resources to be present below the ground surface. Activities associated with construction of the proposed trail would include vegetation removal and grading, which could disturb unknown subsurface cultural resources. Destruction and/or disturbance of previously unknown cultural sites would constitute a significant impact of the proposed project. *Mitigation Measure 5.2a* specifies the procedures that must be implemented if unknown subsurface cultural resources are encountered during project construction. The procedures identified in *Mitigation Measure 5.2a* are consistent with state requirements for treatment of such resources. Implementation of this measure would ensure that potential impacts of the project to currently undiscovered cultural sites would remain less than significant.

Use and maintenance of the proposed trail would not include any activities, such as excavation, that would be likely to expose any currently undiscovered cultural sites.

Programmatic Analysis of Segments 3E and 4

Although cultural resource inventories would be completed prior to construction of Segments 3E and 4, there is a potential for unknown cultural resources to be present below the ground surface of those segments. *Mitigation Measure 5.2a* would also apply to construction of Segments 3E and 4 and would ensure that potential impacts to unknown cultural sites would remain less than significant.

IMPACT 5.3:	Adversely Affect Human Remains	
APPLICABLE POLICIES AND REGULATIONS:	Martis Valley Community Plan Placer County General Plan	
	Valley Alignment	Highway Alignment
SIGNIFICANCE WITH POLICIES AND REGULATIONS:	Less than Significant	Less than Significant
MITIGATION MEASURES:	None	None
SIGNIFICANCE AFTER MITIGATION:	Less than Significant	Less than Significant

The project area is not known to support any cemeteries or areas that supported human burial. If any human remains are encountered during project construction, Northstar CSD and their contractors would comply with state law requirements expressed in California Health and Safety Code Section 7050.5 and Public Resources Code Sections 5097.94, 5097.98 and 5097.99. As described in the Regulatory Framework section above, these code sections require that the NAHC be notified if Native American human burials are identified onsite, and require the NAHC to notify the person it believes to be the most likely descendant of the deceased Native American. Work would be halted in the area of any such find until compliance with state law is verified. With compliance with state law, it is expected that construction of the project would have less than significant impacts on human remains.

Use and maintenance of the proposed trail would not include any activities, such as excavation, that would be likely to expose any buried human remains.

Programmatic Analysis of Segments 3E and 4

The analysis above is applicable to Segments 3E and 4. Construction of those segments is not expected to disturb human remains, but should any be encountered, Northstar CSD and their contractors would comply with state law requirements to ensure no impacts to human remains occur.

5.4 MITIGATION MEASURES

Adversely Affect Known Historically Significant and/or Unique Archeological Resources

Mitigation Measure 5.1a: Capping of archeological resource site shall occur where feasible. Considerations of feasibility may include consideration of slope and trail surface stability, impacts to biological resources, visual resources, and hydrology and water quality, and construction economics.

Capping shall be accomplished by placing a layer of chemically stable fill over the identified cultural resource site and constructing the trail and all associated improvements over the top of this fill. Specific plans for capping resources within the Martis Creek Lake Project shall be approved by the USACE.

Mitigation Measure 5.1b: The limits of the area of disturbance in the vicinity of all known archeological resource sites shall be flagged or otherwise demarcated in the field prior to commencement of construction.

Mitigation Measure 5.1c: A Research Design and Testing Plan shall be prepared by a qualified archeologist in advance of project construction. The Research Design and Testing Plan must be approved by the U.S. Army Corps of Engineers if the excavation will occur within the Martis Creek Lake Project. The Research Design and Testing Plan shall include the following components:

A. Summarize background information, field reconnaissance, and site recordation that has already occurred within the project area;

B. Discuss the archeological sensitivity of the region;

C. Identify the important questions that could be addressed by the kind of data that is likely to be contained at each affected site and could not be addressed using data from other sources alone;

D. Describe the cultural context of each affected site;

E. Present a Testing Plan that identifies specific areas for subsurface exploration, identifies specific methods – such as extracting soil cores, surface scraping, trenching, or excavating test pits - for conducting that exploration, identifies security measures to protect resources during implementation of the program, and describes handling and inventorying procedures for any resources and artifacts found during exploration;

F. Outline methods for evaluation of affected sites (including assessing the integrity and research potential of each affected site); and

G. Provide a Treatment Plan for affected resources that are eligible for listing or qualify as unique archeological resources. The Treatment Plan shall identify specific measures for each site that ensure resources are avoided where feasible. Where avoidance is not feasible, the Treatment Plan may include interpretation and/or data recovery sufficient to provide meaningful public education and extraction of pertinent scientific knowledge. Any data recovery excavation shall include recovery of a statistically-significant sample of the archeological deposit. During the excavation, any features identified shall be drawn and photographed. Recovered cultural material (artifacts) shall be cleaned and catalogued, and a professional analytical report shall be prepared on the findings. The report shall be filed with appropriate agencies and the NCIC of the CHRIS. The recovered artifact collection and catalogue shall be placed in a permanent curation facility for use by future researchers.

Mitigation Measure 5.1d: Heritage Resource Inventories shall be completed for potential staging areas located outside boundaries of previous survey areas. Staging areas are prohibited where significant cultural resources are identified.

Mitigation Measure 5.1e: Heritage Resource Inventories shall be completed for Segments 3e and 4 prior to approval of Improvement or Grading Plans for those segments.

Adversely Affect Presently Unknown Historic or Archeological Resources

Mitigation Measure 5.2a: If artifacts, exotic rock, unusual amounts of shell or bone, or other buried archeological resources are encountered during earth-disturbance associated with the proposed project, all soil-disturbing work shall be halted within 100 feet of the discovery until a qualified archeologist completes a significance evaluation of the finds pursuant to Section 106 of the NHPA.

If the finds are determined to be culturally significant materials (i.e., unique archeological resources or historical resources), subsurface testing shall be conducted. Subsurface testing procedures shall involve shovel testing, augering, or other such techniques designed to identify and/or characterize subsurface cultural deposits. If a resource is determined to be important under CEQA (i.e., because it is a unique archeological or historical resource or it is eligible for inclusion in either the NRHP or CRHR), a qualified professional archeologist shall be retained to conduct data recovery excavation.

If data recovery excavation is required, a qualified archeologist shall prepare a data recovery plan that provides for recovering the scientifically consequential information from and about the resource. The data recovery plan must be prepared prior to commencing any excavation activities within 100 feet of the resource discovery. The data recovery plan must be approved by the U.S. Army Corps of Engineers if the excavation will occur within the Martis Creek Lake Project. The data recovery excavation shall include recovery of a statistically-significant sample of the archeological deposit. During the excavation, any features identified shall be drawn and photographed. Recovered cultural material (artifacts) shall be cleaned and catalogued, and a professional analytical report shall be prepared on the findings. The report shall be filed with appropriate agencies and the NCIC of the CHRIS.

The recovered artifact collection and catalogue shall be placed in a permanent curation facility for use by future researchers.

Adversely Affect Human Remains

This impact is determined to be less than significant. No mitigation measures are required.

CHAPTER 6

HYDROLOGY & WATER QUALITY

CHAPTER 6 HYDROLOGY AND WATER QUALITY

This chapter evaluates the project's effects on water quality and stormwater runoff in the project area. The analysis is based on the Martis Valley Regional Trail Project Hydrology Study (Civil Engineering Solutions 2012), the Stormwater Management & Water Quality Plan (Auerbach Engineering Corporation 2012), and the Preliminary Soil Evaluation and Stormwater BMP Design Report (Holdrege & Kull 2012). These documents are provided in Appendix D to this Draft EIR.

6.1 ENVIRONMENTAL SETTING

The proposed Martis Valley Trail would be located on the eastern side of the Sierra Nevada Mountains, north of Lake Tahoe and southeast of the Town of Truckee. The project site is located in the Middle Truckee River Basin. Two potential alignments for the proposed multi-use trail are described in **CHAPTER 3 PROJECT DESCRIPTION**. The first (northern) segment of either alignment would begin near the Town of Truckee/Placer County boundary and end at the existing parking area for the Martis Creek Lake Project Wildlife Viewing Area. From that point, the Valley Alignment would generally follow a portion of the existing Tomkins Memorial Trail through Martis Valley to the Village at Northstar. The Highway Alignment would follow a segment of the Tomkins Memorial Trail along the southern side of State Route (SR) 267 and up Porcupine Hill to Northstar Drive, then cross to the south side of Northstar Drive and head westerly to reach the Village at Northstar. Leaving the Village at Northstar, both trail alignments would continue uphill (southerly) towards Sawmill Flat Reservoir and Forest Route 73. A new trailhead and parking area is also proposed. Four potential locations for the new parking area and trailhead have been identified. The hydrology and water quality impacts of each location are evaluated at an equal weight in **CHAPTER 11 CEQA DISCUSSIONS**.

Regional Setting

Area within the Martis Valley Trail project site (both the Valley and Highway alignments) drains to Martis Creek and its tributaries. The Martis Creek drainage area covers 26,204 acres (Truckee River Watershed Council 2011). Martis Creek drains to Maris Creek Lake, which was constructed by the U.S. Army Corps of Engineers (USACE) to provide flood protection to downstream areas. Below the dam at Martis Creek Lake, Martis Creek flows to a confluence with the Truckee River south of Interstate 80. The Truckee River empties into Pyramid Lake in the Great Basin in Nevada.

Middle Truckee River Basin, which is the overall watershed that drains to the Truckee River downstream of Lake Tahoe, covers 1,190 square miles that include portions of Nevada, Placer and Sierra counties in California and portions of Washoe, Storey and Lyon counties and Carson City in Nevada. In California, the watershed includes the drainage areas surrounding the Truckee River between Lake Tahoe and the Town of Truckee, the Donner Lake drainage area west of Truckee, the Martis Creek drainage south and east of Truckee, the Prosser Creek and Little Truckee River drainage areas north and east of Truckee, and the upper Truckee Canyon below Hirschdale to the Nevada state line at Verdi.

Other hydrological features in the area include wetland swales, wetland meadows, and ephemeral and intermittent streams.

Regional Water Quality

Regional water quality is governed by the Water Quality Control Plan for the Lahontan Region. The Lahontan Region is expansive – it stretches from Modoc County in the north to Mono County in the south. It is 570 miles long and covers 33,131 square miles. The project area is within the Truckee River Hydrologic Area in the North Lahontan Basin. While there is little quantitative information available on most of the water bodies in the Region, the Basin Plan states that water quality is generally good in high elevation areas. The Basin Plan also states "water quality problems in the Lahontan Region are largely related to nonpoint sources (including erosion from construction, timber harvesting, and livestock grazing), stormwater, acid drainage from inactive mines, and individual wastewater disposal systems."

Beneficial uses of water for Martis Creek include:

- Agricultural supply
- Cold freshwater habitat
- Commercial and sportfishing
- Groundwater recharge
- Migration of aquatic organisms
- Municipal and domestic supply
- Water contact recreation
- Non-contact water recreation
- Spawning, reproduction and development
- Water quality enhancement

Regional Soils

With respect to hydrology, soils are classified in one of four hydrologic soil types. Type A soils have the highest expected infiltration rates and Type D soils have the lowest expected infiltration rates. The predominant soils in the Martis Creek water shed are Type B soils, although soils in each of the four classifications are present in the watershed.

Local Setting

As stated in the Martis Valley Trail Project Hydrology Study prepared by Civil Engineering Solutions (2011), "the project is located within the upper reaches of the Martis Creek watershed and consists of well-drained soils with high infiltration rates typical of the Lake Tahoe region." The trail would cross Martis Creek and three of its primary tributaries.

Precipitation

The climate of the project area is characterized by cold, wet winters and short mild summers. Approximately 75 percent of the annual precipitation in the area is received during the winter months. Much of the precipitation falls as snow or a mixture of rain and snow during storms occurring between November and April. Precipitation during summer is primarily associated with thunderstorms. Due to variations in elevation, precipitation ranges from approximately 40 inches a year in the western portion of the Martis Valley region to approximately 23 inches a year in the eastern portion of the region. Temperatures recorded at the Truckee Ranger Station range from an average minimum of 14.7 degrees Fahrenheit in January to an average of 81.8 degrees Fahrenheit in August (Placer County 2003a).

Floodplains

While most of the Martis Valley area is dominated by terrain not prone to flooding, there are low lying areas along Martis Creek that are subject to 100-year floods. Because of this condition, the Federal Emergency Management Agency (FEMA) has classified approximately 1,300 acres of land along Martis Creek into a Zone A floodplain category – "Special Flood Hazard area (100-year flood)." The Zone A area is located mostly in Sections 19, 20, 29, & 30, in Township 17 N, R 17 E, upstream from Martis Creek Lake in an area where drainage channels of the Martis, West Martis, Middle Martis and East Martis Creeks converge (Placer County 2003b).

Water Quality and Drainage

The proposed trail would cross Martis Creek and as many as three tributaries to Martis Creek (depending on the alignment selected). These tributaries join Martis Creek at the south side of SR 267 and flow through a culvert under the highway as a joined flow. On the north side of SR 267, Martis Creek passes along the east side of the Truckee-Tahoe Airport before entering Martis Creek Lake.

The Preliminary Soil Evaluation and Stormwater BMP Design Report (Holdrege & Kull 2012) identified a few localized drainage concerns that may adversely affect water quality. This includes the presence of borrow pits used to supply materials for prior construction projects, concentrated runoff from SR 267 that brings high sediment loads into meadow areas, and surface water flow that has been concentrated by drainage control structures, such as culverts for the existing dirt roads, leading to localized erosion.

Soils

Holdrege & Kull prepared an assessment of the soil types within each study corridor. In general, they found that the majority of each alignment would cross well-drained soils with moderate permeability although soils in low lying areas and on gentle slopes in Martis Valley have lower infiltration and permeability rates. More specifically, most soils in the Segment 1 study area, of the Aquolls and Borolls soil type, are poorly drained, subject to flooding, and have high erosion potential. This same soil type occurs in the northern and southern portions of Segment 2A and the western portion of Segment 3A. Soils in the central portion of Segment 2A and through most of Segment 2B are well-drained and have moderately slow permeability rates. Soils in the eastern portion of Segment 3B are also well-drained with moderately high to high permeability rates. Soils in Segment 3B also tend to be well-drained, although they do have medium to high erosion hazards and moderately slow permeability rates.

6.2 REGULATORY FRAMEWORK

Federal and State Regulations

Clean Water Act

The Clean Water Act is a 1977 amendment to the Federal Water Pollution Control Act of 1972, which establishes the basic structure for regulating discharges of pollutants to waters of the United States. Section 303 of the Clean Water Act requires states to adopt water quality standards, discussed below as part of the National Pollutant Discharge Elimination System (NPDES).

The USACE regulates the placement of fill or dredged materials that affect waters of the United States, which include stream courses and jurisdictional wetlands. USACE regulates these activities under the authority of Section 404 of the Clean Water Act. USACE would regulate any development within the project site that affects jurisdictional wetlands, as discussed in **CHAPTER 4 BIOLOGICAL RESOURCES**.

In the State of California, the State Water Resources Control Board (SWRCB) and Regional Water Quality Control Boards (RWQCB) also regulate activities in waters of the United States through Section 401 of the Clean Water Act. A Section 401 Water Quality Certification is required to obtain a 404 permit where waters of the United States are impacted. In issuing the Section 401 Certification, the RWQCB may impose conditions (such as Best Management Practices requirements) to protect water quality.

National Pollutant Discharge Elimination System

The NPDES program was developed by the U.S. EPA in accordance with Section 303 of the Clean Water Act. This program regulates all discharges to waters of the United States, including stormwater discharges associated with municipal drainage systems, construction activities, industrial operations, and "point sources" (such as wastewater treatment plant discharges and other direct discharges to water bodies). The intent of the NPDES program is to protect surface water quality. In California, the NPDES program is administered by the SWRCB and implemented and enforced by the RWQCBs.

In Martis Valley, the Lahontan RWQCB is responsible for protecting surface water and groundwater from both point and non-point sources of pollution. Martis Valley is designated within the NPDES Phase II General Permit, which the SWRCB adopted in April 2003. This General Permit applies to the discharge of stormwater from small municipal separate storm sewer systems (MS4s). Under this permit, stormwater discharges must not cause or contribute to an exceedance of water quality standards contained in a Statewide Water Quality Control Plan, the California Toxics Rule, or the applicable RWQCB Basin Plan. As discussed above, the applicable Basin Plan for Martis Valley is the *Water Quality Control Plan for the Lahontan Region* (Basin Plan). The Basin Plan establishes water quality objectives and implementation programs to meet stated objectives and to protect the beneficial uses of water in the basin, in compliance with the federal Clean Water Act and the state Porter-Cologne Water Quality Control Act (discussed below).

The SWRCB Water Quality Order 2009-0009-DWQ: "National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction Activity (General Permit)" authorizes a general permit for stormwater discharges associated with construction activities that disturb more than one acre. Construction activities subject to the permit include clearing, grubbing, grading, stockpiling, and excavation activities. The General Permit requires submittal of a Notice of Intent to comply with the permit and development of a Storm Water Pollution Prevention Plan (SWPPP) that must address the following:

- ❖ Plans for implementation of structural and operational Best Management Practices (BMPs) to prevent and control impacts to surface water during construction;
- ❖ Inspection and maintenance of BMPs throughout all phases of construction;

- Monitoring runoff quality during all phases of construction; and
- Preventing and controlling post-construction impacts to runoff quality.

Flood Protection

FEMA is responsible for determining flood elevations based on available studies pursuant to the National Flood Insurance Program (NFIP) Final Rule (CFR Parts 59 and 61). FEMA is also responsible for developing the Flood Insurance Rate Maps, which are used in the NFIP. FEMA classified 100-year floodplains are associated with Martis Creek, as discussed in Section 6.1.

State Regulations

Porter-Cologne Water Quality Control Act of 1969

The Porter-Cologne Water Quality Control Act (Porter-Cologne) is the principal law regulating water quality in California. This statute established enforcement and implementation measures for the SWRCB and the nine RWQCBs, which are charged with implementing this law. Porter-Cologne establishes a comprehensive program for protecting water quality and beneficial uses of water. It applies to surface waters, wetlands, and groundwater and to both point- and nonpoint-sources.

Porter-Cologne also incorporates many provisions of the federal Clean Water Act such as delegation of the NPDES permitting program to the SWRCB and RWQCBs.

Lahontan Region Basin Plan

The Lahontan Region Basin Plan sets forth water quality standards for surface and ground waters in the region. These standards identify both designated beneficial uses of water and the narrative and numerical objectives which must be maintained or attained to protect those uses. The Basin Plan was developed by the Lahontan RWQCB. It identifies types of water quality problems that can threaten beneficial uses within the Region, and required or recommended control measures for those problems. Table 3-11 of the Basin Plan identifies specific water quality objectives for Martis Creek.

Local Regulations

Placer County General Plan

The goals listed below summarize the priorities of the *Placer County General Plan* related to hydrology and water quality.

Goal 4.E To collect and dispose of stormwater in a manner that least inconveniences the public, reduces potential water-related damage, and enhances the environment.

Goal 4.F To protect the lives and property of the citizens of Placer County from hazards associated with development in floodplains and manage floodplains for their natural resource values.

Goal 6.A To protect and enhance the natural qualities of Placer County's streams, creeks and groundwater.

Martis Valley Community Plan

The following goals summarize the priorities of the *Martis Valley Community Plan* related to hydrology and water quality:

Goal 6.C To ensure the availability of an adequate and safe long-term water supply and the maintenance of high quality water in water bodies and aquifers used as sources of domestic supply.

Goal 6.E: To collect and dispose of stormwater in a manner that least inconveniences the public, reduces potential water-related damage, and enhances the environment.

Goal 6.F: To protect the lives and property of the citizens of Placer County from hazards associated with development in flood plains and manage flood plains for their natural resource values.

Stormwater Management Manual

The Placer County Flood Control and Water Conservation District (FCWCD) formulates regional strategies for flood control management. According to the FCWCD website (http://www.placer.ca.gov/Departments/Works/FloodControl.aspx), "the primary purpose of the District is to protect lives and property from the effects of flooding by comprehensive, coordinated flood prevention planning." This is frequently accomplished with the use of BMPs and engineered structures. The Placer County FCWCD Stormwater Management Manual (1990) presents policies, guidelines, and specific development criteria for stormwater management. The manual addresses the following elements that must be included in a construction project to mitigate impacts related to stormwater:

- Drainage structure planning and design to avoid damages to structures or improvements during the 100-year event and prevent inundation of developed or to-be-developed portions of private property during the 10-year event;
- Floodplain Management Plan;
- System Monitoring Program; and
- Operations and Maintenance Program.

The Stormwater Management Manual allows the use of both storage and infiltration of runoff as methods for stormwater management, and requires that drainage facilities be sized to accommodate runoff from the 10-year event.

Placer County requires projects in mountainous areas to provide two base analyses for the design of storm drainage facilities. The first analysis is the warm conditions model, which represents the expected runoff during warm/dry season conditions when snowmelt is also occurring. Thus the warm condition modeling includes a snowmelt rate of flow in addition to the modeled rainfall event. The second analysis is the snow cover or frozen conditions modeling, which represents the design event in which the ground is partially frozen by snow cover and runoff occurs. The Stormwater Management Manual also specifies several unique requirements for modeling stormwater flows in mountainous areas, as identified in the Martis Valley Trail Project Hydrology Study prepared by Civil Engineering Solutions.

Land Development Manual

The Placer County Land Development Manual (LDM) contains a storm drainage section that supplements the Stormwater Management Manual. This section of the LDM provides objectives and standards that seek to provide a uniform drainage system throughout the County, with primary consideration for avoiding property damage and maintaining natural conditions. The LDM's storm drainage section identifies minimum requirements for drainage reports and Improvement Plans, and establishes minimum criteria and standards for drainage infrastructure design and maintenance.

Flood Damage Prevention

Placer County Flood Damage Prevention Ordinance (Article 15.52 of the Placer County Code) addresses floodplain management. The ordinance limits construction within the 100-year floodplain to prevent damage to structures and to limit the effect of development on base flood elevations and velocities.

Erosion Prevention

The Placer County Grading and Erosion Prevention Ordinance (Article 15.48 of the Placer County Code) requires implementation of measures to protect water quality by controlling erosion and sediment discharge during and following construction activities. This ordinance specifies permitting requirements and design standards for projects that involve grading of more than one acre or earthwork affecting more than 250 cubic yards of soil. Grading permit conditions are detailed in §15.48.240 of the Placer County Code. These conditions include requirements for erosion and sediment control, safeguarding watercourses from excessive deposition of sediment or debris, and mitigation of adverse environmental impacts identified in any environmental review document. The grading ordinance also specifies that grading projects cannot be allowed to violate the NPDES program or to interfere with the natural flow of stormwater. Grading plans must be designed to address long-term erosion and sediment control. Grading plans must also include measures to be implemented to control erosion and prevent offsite discharge of sediments during construction activities. An erosion control plan showing all facilities and measures to be implemented to control erosion and prevent offsite discharge of sediment must be submitted for review and approval by the Engineering and Surveying Department (ESD) as part of the grading permit application.

The LDM provides additional guidance on developing and designing erosion/sediment control features that are intended to be employed in concert with measures required under the Grading Ordinance.

6.3 IMPACTS

Significance Criteria

The analysis conducted for the Initial Study determined that the proposed project would have less than significant impacts with respect to the following significance criteria:

- Deplete groundwater supplies; interfere substantially with groundwater recharge; alter direction or rate of flow of groundwater;

- Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map;
- Expose people or structures to flood risks from a levee or dam failure; and
- Inundation by seiche, tsunami, or mudflow.

The analysis in the Initial Study stated that there would be no structures placed within the 100-year flood hazard area. However, the Preliminary Trail Plans do include placement of some trail features within the 100-year flood hazard area. Therefore, the analysis below includes consideration of the following criteria:

- Place within a 100-year flood hazard area structures which would impede or redirect flood flows;

The analysis below also evaluates the potential for the project to result in significant hydrology and water quality impacts related to the following criteria:

- Violate water quality standards or waste discharge requirements (such as through soil erosion or runoff of polluted water), or degrade surface water quality;
- Substantially alter drainage patterns; increase rate or amount of surface runoff;
- Contribute runoff water exceeding the capacity of stormwater drainage systems; provide substantial additional sources of polluted runoff; and
- Otherwise substantially degrade water quality.

IMPACT 6.1:	**Violate Water Quality Standards or Waste Discharge Requirements, Provide Substantial Additional Sources of Polluted Runoff, or Otherwise Substantially Degrade Water Quality**	
APPLICABLE POLICIES AND REGULATIONS:	Clean Water Act National Pollutant Discharge Elimination System Water Quality Control Plan for the Lahontan Region Placer County General Plan Placer County Stormwater Management Manual Placer County Grading and Erosion Prevention Ordinance Martis Valley Community Plan	
	Valley Alignment	**Highway Alignment**
SIGNIFICANCE WITH POLICIES AND REGULATIONS:	Potentially Significant	Potentially Significant
MITIGATION MEASURES:	Mitigation Measures 6.1a through 6.1d	Mitigation Measures 6.1a through 6.1d
SIGNIFICANCE AFTER MITIGATION:	Less than Significant	Less than Significant

The proposed trail alignment would cross several drainages, including bridge or boardwalk crossings of Martis Creek and a tributary to Martis Creek within the Martis Creek Lake Project, and would require grading and other construction work adjacent to and within delineated wetland areas. The proposed trail would be paved, which would increase the amount of impervious surfaces in the project area.

The project would not introduce any new point sources of pollutants to the project area but would generate potential non-point sources of pollution through grading, trail construction, and trail maintenance. During any grading, excavation, or other ground disturbing activities, a release of sediment to surface waters could occur. Other impacts to water quality could result from releases of fuels or other fluids from vehicles and equipment during the construction process and/or during trail maintenance activities. Other than occasional maintenance vehicles, the trail will not support motorized use, reducing the potential for the trail to introduce pollutant sources associated with motor vehicles. However the proposed parking lot is a location where motor vehicle-related pollutants could adversely affect water quality. Further, the rate and volume of runoff from the impervious surfaces created by the project could increase. The increased runoff could cause increased soil erosion which could lead to sedimentation of adjacent waterways. Excessive siltation of Martis Creek and other drainages along the trail route could have an adverse effect on aquatic vegetation and species, with significant impacts to the local ecosystem.

The Valley Alignment trail (including Segments 3E and 4) would be 9.3 miles in length. With a 10-foot wide paved surface, the Valley Alignment would create 11.3 acres (491,040 square feet) of impervious surfaces. The Highway Alignment trail (including Segments 3E and 4) would be 10.4 miles in length. With a 10-foot wide paved surface, the Highway Alignment would create 12.6 acres (549,120 square feet) of impervious surfaces. Therefore, the potential for increased rates and volume of stormwater runoff leading to erosion and sedimentation as well as the potential for water quality impacts during construction would be greater under the Highway Alignment.

The project's stormwater management strategy is based on Low Impact Development techniques. Proposed measures for water quality treatment and control of stormwater runoff are identified in the Stormwater Management & Water Quality Plan (Auerbach Engineering Corporation 2012) and the Preliminary Soil Evaluation and Stormwater BMP Design Report (Holdrege & Kull 2012). These documents are provided in Appendix D to this Draft EIR. As stated in the Stormwater Management & Water Quality Plan and consistent with *Mitigation Measure 6.1a*, the BMPs selected for the project correspond to the California Stormwater Quality Association (CASQA) Stormwater BMP Handbooks and the Erosion and Sediment Control for Development Areas of the Sierra Foothills and Mountains (High Sierra Resource Conservation and Development Council 1991). Further, *Mitigation Measure 6.1a* requires that BMPs for the project are sufficient to meet the NPDES Phase II program requirements applicable to Placer County.

Construction Impacts

Measures to provide for water quality treatment and minimize erosion during construction will include temporary BMPs "designed to slow runoff velocity and intercept suspended sediment to prevent sediment discharge from the construction area while allowing runoff to continue down gradient" (Holdrege & Kull 2012). These may include fiber wattles, silt fences, water bars (which slow water as it travels down a disturbed slope and divert water to vegetated areas), sediment basins, mulching of disturbed soil areas, channel linings and drainage inlet protection.

Specific and detailed provisions for design, implementation, management and monitoring of construction BMPs will be provided in the SWPPP, consistent with *Mitigation Measure 6.1b.* The SWPPP must address BMPs for all components of trail construction, including equipment and material staging areas. BMPs specific to staging areas that may be incorporated in the SWPPP include providing perimeter barriers, constructing and maintaining temporary stabilized construction entrances, covering exposed materials stockpiles, and immediate clean-up of any leaks or spills.

Permanent Trail Impacts

Measures to provide for long-term water quality treatment and minimize erosion following construction will include permanent BMPs such as rock slope protection, vegetated swales, rain gardens, detention basins, rock energy dissipaters, vegetation of disturbed soil areas. In addition, the proposed trail design would maintain the existing sheet flow and infiltration characteristics of the areas such that stormwater runoff from the trail would be naturally filtered and treated before it enters local waterways. As required by *Mitigation Measure 6.1c,* the permanent BMPs to intercept and treat stormwater runoff from the trail surface must be detailed on the project Improvements Plans which are subject to approval from Placer County.

Trail Amenity Impacts

Trail amenities included the proposed picnic and rest areas, trail junctions, and the wildlife viewing area. These areas would be constructed using pervious surfaces and be designed to either provide full infiltration of runoff from the 10-year storm event within 12 hours or to include an underdrain system that collects filtered stormwater and releases the runoff downslope as sheet flow at a rate that is a maximum of 90 percent of pre-project conditions, as required by *Mitigation Measure 6.1d.* An additional trail amenity is the covered Native American Interpretive Area. *Mitigation Measure 6.1d* requires that this feature be constructed using pervious surfaces in areas that will receive direct rainfall and that runoff from the roof be routed to an adjacent rain garden sized to detain and infiltrate rainfall from a 10-year event and that includes an overflow system to route runoff from larger events as sheet flow to the downslope areas at a maximum rate of 90 percent of pre-project rates.

Trail Parking Lot Impacts

As discussed in **CHAPTER 3 PROJECT DESCRIPTION**, the project proposes to construct a new parking lot. Four potential locations for the parking lot have been identified, and the impacts of each location are evaluated in **CHAPTER 11 CEQA DISCUSSIONS**. Implementation of *Mitigation Measures 6.1a* through *6.1d* would ensure that water quality treatment facilities to appropriately detain, treat, and/or filter all water runoff from the project are constructed and maintained sufficient to ensure the project does not violate water quality standards or waste discharge requirements and does not otherwise degrade water quality. With implementation of these measures, this impact will be less than significant.

Programmatic Analysis of Segments 3E and 4

Impacts related to construction and use of Segments 3E and 4 would be similar to the impacts evaluated above. BMPs would be incorporated in trail plans for those segments consistent with the requirements of *Mitigation Measures 6.1a* through *6.1d*. Implementation of the applicable mitigation measures would ensure that water quality impacts associated with Segments 3E and 4 would be less than significant.

IMPACT 6.2:	**Substantially Alter Drainage Patterns; Increase Rate or Amount of Surface Runoff**	
APPLICABLE POLICIES AND REGULATIONS:	Placer County General Plan Placer County Stormwater Management Manual Placer County Flood Damage Prevention Ordinance Martis Valley Community Plan	
	Valley Alignment	**Highway Alignment**
SIGNIFICANCE WITH POLICIES AND REGULATIONS:	Less than Significant	Less than Significant
MITIGATION MEASURES:	None	None
SIGNIFICANCE AFTER MITIGATION:	Less than Significant	Less than Significant

As discussed above, paving the Martis Valley Trail would increase the amount of impervious surface along the trail route while construction of trail amenities would be accomplished using pervious surfaces and/or would be bordered with infiltration basins (rain gardens) such that they would not contribute to the overall impervious surface increases of the project. Further, the stormwater management strategy for the proposed trail is to maintain existing conditions and implement Low Impact Development techniques.

Alter Drainage Patterns

As a linear feature designed to maintain existing stormwater flow patterns, the proposed project would not alter the size or location of the overall Martis Creek watershed or subwatersheds within the project area. As stated in the Stormwater Management & Water Quality Study (Auerbach Engineering Corporation 2012), the trail design for most of the trail would maximize onsite infiltration and perpetuate existing sheet flow conditions by using "up slope swales that collect sheet flow and allow infiltration for low flow (2 and 10-year storm) events and route stormwater runoff to under-trail drains that disperse runoff as sheet flow on the downslope side of the trail…. Runoff from larger storm events will utilize the under-trail drains as well as cross the trail similar to existing sheet flow conditions."

The Project Hydrology Study included a hydraulic analysis to determine if the project would affect water surface elevations, based on the frozen event conditions. This analysis demonstrated that the project would slightly increase water surface elevations and floodplains for the 10-year and 100-year events, but that these increases would be localized and would not affect any private property. Because the project would not change watershed size or locations, would maintain existing stormwater infiltration and sheet flow conditions, and would not substantially change water surface elevations and floodplains, it would have a less than significant impact related to alteration of drainage patterns.

Increase Rate or Amount of Surface Runoff

This relatively small increase in impervious surface associated with the project would not result in any impacts related to increased flooding but could increase the rate and volume of surface runoff from the project site. The Project Hydrology Study evaluated the specific increase in peak flow rates during 2-year, 10-year, 100-year and 500-year storm events for each watershed within the project site of each project alternative. This analysis determined that, the project would increase peak flows from the 2-year storm event by amounts ranging from 0 to 2.3 cubic feet per second (cfs). Where the largest increases occur, the pre-project runoff rates are 1,982.6 and 2,142.9 cfs. The increases of 2.3 and 2.2 cfs are considered a less than significant impact; and the increases during the 2-year storm event for all other locations is also considered less than significant because these increases would not substantially alter drainage patterns or conditions within the receiving waterway. During the 10-year storm event, increases in runoff rate range from 0 to 1.9 cfs. The pre-project runoff rates in the locations of the two largest increases are 4,942.7 and 4,442.1 cfs. The increases of 1.9 and 1.5 cfs and less are considered less than significant. Similarly, during the 100-year storm event, the increases in runoff rate ranging from 0 to 0.9 cfs relative to pre-project runoff rates (8,335.7 cfs at the watershed node with the largest post-project increase) represent a less than significant impact of the proposed project.

The Project Hydrology Study computed runoff in a 25.6 square mile watershed around Martis Creek and reported a peak 100-year frozen condition runoff of 8446 cubic feet per second (cfs), and a warm event 100-year peak flow value of 7043 cfs. This translates to roughly 328 cfs per square mile for the frozen event (worst case scenario) and 274 cfs per square mile for the warm event. While the total area studied exceeds 10 square miles, and thus the warm event modeling is not required to include snowmelt rates, the Project Hydrology Study includes an assumed snowmelt rate of 0.06 inches per hour because local project creek crossings of concern did not exceed the 10 square mile requirement in most cases. By including the snowmelt rate, the modeling provides a conservative analysis of runoff conditions.

Impervious surface areas were computed for each watershed and applied in the model. *Table 6.1* summarizes the changes from the pre-project warm event peak flow results with the computed post-project peak flow rates for the 2-year, 10-year, 100-year and 500 year events.

Table 6.1
Pre- and Post-Project Runoff in Warm Storm Event

Storm Event	Pre-Project Runoff (cfs)	Post-Project Runoff (cfs)	Difference (cfs)	Percent Increase
500 Year	8462.6	8463	0.4	0.0047
100 Year	7076.3	7077	0.7	0.0099
10 Year	4440.6	4442.1	1.5	0.0338
2 Year	2140.7	2142.9	2.2	0.1028

Source: Civil Engineering Solutions 2011

As demonstrated in *Table 6.1* above, minor increases to the peak flow runoff rates would be expected with construction of the Martis Valley Trail. As noted in the Stormwater Management & Water Quality Plan, the analysis in the Project Hydrology Study does not include the effects of any of the proposed stormwater management BMPs. Use of BMPs, as discussed in Impact 6.1 above, would reduce the post-project peak flow rates. Because the peak flow rate increases reported in *Table 6.1* are minimal and because they would be reduced further with use of BMPs, the project's impact on peak flow rates and volumes is less than significant.

Programmatic Analysis of Segments 3E and 4

Construction of Segments 3E and 4 would further increase the project's effects on stormwater runoff rates and volumes and downstream water surface elevations and floodplains. Detailed hydrologic and hydraulic analysis would be necessary at the time construction is proposed to identify impacts and determine if mitigation is required. It is expected that impacts would be similar to those discussed above.

IMPACT 6.3:	**Contribute Runoff Water Exceeding the Capacity of Stormwater Drainage Systems**	
APPLICABLE POLICIES AND REGULATIONS:	Placer County General Plan Placer County Stormwater Management Manual Martis Valley Community Plan	
	Valley Alignment	**Highway Alignment**
SIGNIFICANCE WITH POLICIES AND REGULATIONS:	No Impact	No Impact
MITIGATION MEASURES:	None	None
SIGNIFICANCE AFTER MITIGATION:	No Impact	No Impact

The Project Hydrology Study included a hydraulic analysis to determine if the project would contribute runoff water that would exceed the capacity of existing and proposed bridges and culverts, based on the frozen event conditions. This analysis found that all existing and proposed bridges and culverts would be sufficiently sized to accommodate pre- and post-project runoff volumes. The project would have no impact related to the capacity of stormwater drainage systems and structures.

Programmatic Analysis of Segments 3E and 4

As noted above, a detailed hydraulic analysis would be necessary at the time construction of Segments 3E and 4 is proposed to determine the appropriate sizing for any culverts needed within those segments. Based on the linear nature of the trail and overall stormwater management strategy of using Low Impact Development techniques and maintaining existing drainage patterns, it is expected that impacts would remain less than significant.

IMPACT 6.4:	**Place Structures Within the 100-Year Flood Hazard Area**	
APPLICABLE POLICIES AND REGULATIONS:	Placer County General Plan Placer County Stormwater Management Manual Placer County Flood Damage Prevention Ordinance Martis Valley Community Plan	
	Valley Alignment	**Highway Alignment**
SIGNIFICANCE WITH POLICIES AND REGULATIONS:	Less than Significant	Less than Significant
MITIGATION MEASURES:	None	None
SIGNIFICANCE AFTER MITIGATION:	Less than Significant	Less than Significant

The proposed crossing of Martis Creek on Segment 3A would require replacing the existing Frank's Fish Bridge with a new structure. The existing bridge is within the 10-year flood hazard zone (and therefore also within the 100-year flood hazard zone); and the proposed structure would also be in this zone. This structure would be designed to withstand the impacts of inundation of the 10-year and 100-year flood events. Several other wetland and creek crossings would be located within the 100-year flood hazard zone, as shown on *Table 6.2*. Each structure would be constructed to withstand the impacts of inundation in the 100-year event and none of the structures are expected to create significant changes in backwater conditions or water surface elevations.

Table 6.2
Structures Within 100-year Flood Hazard Zone

Alignment	Segment/Station	Feature Crossed	Proposed Crossing Structure	Existing Crossing Structure
Valley Alignment	Segment 1, Station 58	Wetland swale	Boardwalk	None
	Segment 2A, Station 95	Wetland swale	Boardwalk	None
	Segment 2A, Station 129	Martis Creek	Bridge/boardwalk	No formal crossing structure. Eroded foot path at streambank.
	Segment 2A, Station 151	Unnamed perennial stream, tributary to Martis Creek	Boardwalk	None
	Segment 2B, Station 528	Unnamed ephemeral stream	No new structure, existing culvert to be used	Culvert

Alignment	Segment/Station	Feature Crossed	Proposed Crossing Structure	Existing Crossing Structure
Highway Alignment	Segment 1, Station 58	Wetland swale	Boardwalk	None
	Segment 3A, Station 1033	Martis Creek	Bridge	Bridge (Frank's Fish Bridge)
	Segment 3B, Station 1500	Wetland swale	No new structure, existing culvert to be used	Culvert

Additionally, the 100-year flood event completely inundates portions of the proposed trail system. Specifically, small portions of Segments 1, 2A and 2B would be located within the 100-year flood hazard zone (a total of 0.8 acre of the Valley Alignment) while most of Segment 3 would be located within this zone (a total of 1.9 acres of the Highway Alignment). The portion of Segment 1 located within the 100-year flood hazard zone includes the covered Native American interpretive exhibit. The Project Hydrology Study demonstrates that the trail and structures (bridges and boardwalks) will not impede the flow of these larger events.

It is also noted that a portion of the trail system would be located within the Martis Reservoir gross pool elevation. That elevation is 5,838 feet above mean sea level. Small portions of Segments 1 and 2A as well as most of Segment 3 would be located below this elevation and within the Martis Creek Lake gross pool. However, as described in Chapter 3 Project Description, existing deficiencies with Martis Creek Lake dam prevent the USACE from maintaining the lake at gross pool conditions. Martis Reservoir is typically maintained at a minimum pool condition with a water surface elevation of 5,810. At this elevation, no portion of either potential trail alignment would be submerged.

Because the trail and associated structures would not impede the flow of flood waters, would not substantially alter flood surface elevations, and would be designed to withstand flood flows, the placement of the trail and associated structures within the flood hazard area would result in less than significant impacts related to flood hazards or changes in flooding conditions.

Programmatic Analysis of Segments 3E and 4

Segments 3E and 4 are not located within the 100-year flood hazard zone and would have no impact related to placement of structures within a 100-year flood hazard area.

6.4 MITIGATION MEASURES

Violate Water Quality Standards or Waste Discharge Requirements, Provide Substantial Additional Sources of Polluted Runoff, or Otherwise Degrade Water Quality

Mitigation Measure 6.1a: Water quality treatment facilities (BMPs) shall be designed according to the guidance of the California Stormwater Quality Association Stormwater Best Management Practice Handbook for New Development/Redevelopment and the Erosion and Sediment Control for Development Areas of the Sierra Foothills and Mountains. In addition, BMPs shall be designed to mitigate (minimize, infiltrate, filter, or treat) stormwater runoff in accordance with "Attachment 4" of Placer County's NPDES Municipal Stormwater Permit (State Water Resources Control

Board NPDES General Permit No. CAS000004), pursuant to the NPDES Phase II program.

Mitigation Measure 6.1b: Northstar CSD shall prepare a SWPPP and obtain coverage under the SWRCB's NPDES General Permit for Storm Water Discharges Associated with Construction Activities. The project applicant shall provide to Placer County ESD evidence of a state-issued WDID number or filing of a Notice of Intent and fees prior to issuance of a grading permit/approval of a grading or improvement plan. The SWPPP and project Grading or Improvement Plans shall identify specific construction BMPs for all components of the construction project, including equipment and material staging areas. For each BMP, the SWPPP shall identify provisions for design, implementation, management and monitoring. BMPs are expected to include the following or equally effective measures:

A. Fiber wattles, silt fences, and or water bars;

B. Sediment basins;

C. Mulching of disturbed soil areas;

D. Channel linings and drainage inlet protection;

E. Staging areas perimeter barriers;

F. Temporary stabilized construction entrances;

G. Covering exposed materials stockpiles; and

H. Leak or spill response plans.

Mitigation Measure 6.1c: Permanent BMPs shall be identified in the SWPPP and included on project Grading or Improvement Plans which are subject to approval by Placer County. BMPs shall be designed to mitigate (minimize, infiltrate, filter, or treat) stormwater runoff. Flow or volume based post-construction BMPs shall be designed at a minimum in accordance with the Placer County Guidance Document for Volume and Flow-Based Sizing of Permanent Post-Construction Best Management Practices for Stormwater Quality Protection. Post-construction BMPs for the project may include, but are not limited to: rock slope protection, vegetated swales, rain gardens, detention basins, rock energy dissipaters, vegetation of disturbed soil areas. Northstar CSD shall provide monitoring, irrigation where necessary, and remedial actions to ensure that vegetation in vegetated swales, rain gardens, and revegetated disturbed areas becomes established within three years following construction. All BMPs shall be maintained as required to insure effectiveness. Northstar CSD shall maintain records providing proof of on-going maintenance.

Mitigation Measure 6.1d: Trail amenities including trailheads, trail junctions, rest areas, picnic areas, and wildlife viewing areas shall be constructed using pervious surfaces. These features shall either be designed to provide full infiltration of runoff from the 10-year storm event within 12 hours or include an underdrain system that collects filtered stormwater and releases the runoff downslope as sheet flow at a rate that is a maximum of 90 percent of pre-project conditions.

The covered Native American Interpretive Area trail amenity shall be constructed using pervious surfaces in areas that will receive direct rainfall. Runoff from the roof of this amenity shall be routed to an adjacent rain garden sized to detain and infiltrate rainfall from a 10-year event and that includes an overflow system to route runoff from larger events as sheet flow to the downslope areas at a maximum rate of 90 percent of pre-project rates.

Substantially Alter Drainage Patterns; Increase Rate or Amount of Surface Runoff

This impact has been determined to be less than significant. No mitigation is required.

Contribute Runoff Water Exceeding the Capacity of Stormwater Drainage Systems

The project would have no impact with respect to capacity of stormwater drainage systems. No mitigation is required.

Place Structures Within the 100-Year Flood Hazard Area

This impact has been determined to be less than significant. No mitigation is required.

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CHAPTER 7

TRANSPORTATION & CIRCULATION

CHAPTER 7 TRANSPORTATION AND CIRCULATION

This analysis of traffic and circulation impacts utilizes two technical memoranda prepared by LSC Transportation Consultants (LSC) for the trail project. *Martis Valley Trail Use Forecasts* (LSC 2011a) provides trail usage estimates and *Martis Valley Trail Access Intersection Analysis* (LSC 2011b) evaluates traffic impacts associated with access to the existing Wildlife Viewing Area parking area. Both of these memoranda are included in Appendix E of this EIR.

7.1 ENVIRONMENTAL SETTING

The proposed Martis Valley Trail would be located on the eastern side of the Sierra Nevada Mountains, north of Lake Tahoe and southeast of the Town of Truckee. Two potential alignments for the proposed multi-use trail are described in **CHAPTER 3 PROJECT DESCRIPTION**. The first (northern) segment of either alignment would begin near the Town of Truckee/Placer County boundary and end at the existing parking area for the Martis Creek Lake Project Wildlife Viewing Area. From that point, the Valley Alignment would generally follow a portion of the existing Tomkins Memorial Trail through Martis Valley to the Village at Northstar. The Highway Alignment would follow a segment of the Tomkins Memorial Trail along the southern side of State Route (SR) 267 and up Porcupine Hill to Northstar Drive, then cross to the south side of Northstar Drive and head westerly to reach the Village at Northstar. Leaving the Village at Northstar, both trail alignments would continue uphill (southerly) towards Sawmill Flat Reservoir and Forest Route 73. A new trailhead and parking area is also proposed. Four potential locations for the new parking area and trailhead have been identified. The transportation and circulation impacts of each location are evaluated at an equal weight in **CHAPTER 11 CEQA DISCUSSIONS.**

Roadways and Intersections

The primary roadway in Martis Valley is SR 267, a heavily traveled two-lane highway connecting Interstate 80 to SR 28 in the Lake Tahoe Basin. SR 267, which is designated as a scenic route by Placer County, crosses the valley floor on a slightly elevated west-east alignment.

Interstate 80 (I-80), the major east-west trans-Sierra highway, bisects the southern part of the Town of Truckee, providing an all-weather connection between Sacramento and Reno.

Schaffer Mill Road is a two-lane roadway with a posted speed limit of 45 mile per hour (mph). This roadway is designated as a scenic route in the *Martis Valley Community Plan*. Bike lanes are located on the roadway shoulders.

Northstar Drive is the main thoroughfare in the Northstar California resort community. It is generally a two-lane collector roadway that provides access to the residences and commercial areas associated with the resort development, including the Village at Northstar. The Village at Northstar is the terminus of both the Valley and Highway trail alignments. Northstar Drive is designated as a scenic route in the *Martis Valley Community Plan*.

Three intersections along SR 267 are in the vicinity of one or both of the proposed alignments:

- *Schaffer Mill Road* Near the western limit of the proposed trail, Schaffer Mill Road intersects SR 267 west of the Tahoe-Truckee Airport. The Martis Valley Trail would utilize a pedestrian crosswalk on Schaffer Mill Road at its intersection with SR 267 before continuing into the valley.
- *Wildlife Viewing Area* The road to the Martis Creek Lake Project Wildlife Viewing Area parking lot is located on the southwest side of SR 267 approximately 2,220 feet south easterly of the state route's intersection with Martis Creek Road. The parking area is a frequented location for walkers and other users seeking access to the existing Tompkins Memorial Trail and Martis Creek Lake Project area.
- *Northstar Drive* The Highway Alignment would cross Northstar Drive west of the traffic circle at Ridgeline Road, approximately 1,000 feet west of Northstar Drive's intersection with SR 267. The Valley Alignment trail would cross Northstar Drive near the trail terminus at the Village at Northstar.

Level of Service Standards

Analysis of significant environmental impacts for transportation facilities is based on the concept of Level of Service (LOS). The LOS of a facility is a qualitative measure used to describe operational conditions. LOS ranges from A (best), which represents minimal delay, to F (worst), which represents heavy delay and a facility that is operating at or near its functional capacity. Both intersections for which LOS is evaluated in this chapter are unsignalized, and descriptions of LOS for unsignalized intersections are provided in *Table 7.1*.

Table 7.1
Level of Service for Unsignalized Intersections

Level of Service	Control Delay per Vehicles (Seconds)	Description
A	0-10.0	Little or no delay
B	10.1-15.0	Short traffic delay
C	15.1-25.0	Average traffic delays
D	25.1-35.0	Long traffic delays
E	35.1-50.0	Very long traffic delays
F	>50.1	Extreme delays potentially affecting other traffic movements in the intersection

Source: Highway Capacity Manual, 2000

Existing Conditions

Traffic Volumes

Through Martis Valley, SR 267 is two lanes with one travel lane for each direction. The posted speed limit is 55 mph. Average Daily Traffic volume during summer months (July and August) on SR 267 is 14,400. This volume is provided from the California Department of Transportation (Caltrans) Traffic Census Station located on SR 267 near the intersection of Brockway Road/Soaring Way. Intersection turning movement counts conducted in the summer of 2009 at the intersections of SR 267/Northstar Drive and SR 267/Airport Road/Schaffer Mill Road indicate that there are 686 northbound and 740 southbound vehicles on SR 267 in the PM peak hour through Martis Valley, as adjusted to present peak summer conditions.

Traffic volumes at the existing driveway to the Wildlife Viewing Area for 2010 were provided by the U.S. Army Corps of Engineers. The peak month (June 2010) traffic volume totaled 3,417 two-way trips. The average daily two-way traffic volume of 114 was calculated by dividing the peak month volume by 30. This daily volume figure was increased by 50percent to provide a conservative estimate of a busy day, resulting in 171 two-way vehicle trips. Using the results of trail surveys conducted along the nearby Truckee River Trail, peak hour trail usage accounts for approximately 15percent of total daily trail usage. This results in a peak hour volume of 26 vehicles (13 entering and 13 exiting). Based on population distribution in the area, it is estimated that 75 percent of these trips will have an origin/destination to the north and 25 percent will have an origin/destination to the south.

Planned Improvements

Roadway improvements anticipated by Placer County and/or Caltrans in the area are shown in the *Martis Valley Community Plan* (Table V-1). These planned improvements include:

- Widen SR 267 to four lanes from Northstar Drive to the intersection of Joerger Drive/Brockway Road and install a separated bike path;
- Widen the southbound truck climbing lane on SR 267 to three lanes;
- Widen Northstar Drive between SR 267 and Basque Road to four lanes; and
- Signalize or install roundabouts at the intersections of Northstar Drive at SR 267 and Northstar Drive at Big Springs Drive.

Existing Bicycle/Pedestrian Facilities

Segments of the Pacific Crest Trail, Commemorative Emigrant Trail, and Tahoe Rim Trail are located in the north Tahoe Basin. A network of lesser-known formal trails also exists, including trails within the Northstar California Ski Area and Tahoe National Forest. The Tomkins Memorial Trail, which is maintained by the Northstar CSD, currently provides 14.6 miles of unpaved trails through the Northstar community and the Corps' Martis Creek Lake Project area. The majority of these trails are open to the public for bicycle and pedestrian use; the 0.8-mile trail segment along Martis Creek is limited to pedestrian use. The existing trails through the Martis Creek Lake Project area are some of the most popular trails in the Truckee area.

Regional on-street bikeways in and around Truckee include SR 89 northbound and southbound, and SR 267, both of which are currently signed as Class III bike routes. A Class III bike route is one that is designated by signs or permanent markings and shares the right-of-way with pedestrians or motorists.

The Town of Truckee is in the process of implementing their 2002 Trails Master Plan, one element of which will connect their downtown core to the Placer County line near the Truckee-Tahoe Airport. A major priority in that plan is the Truckee River Legacy Trail that is planned to extend from Donner Lake to Glenshire. The Town is also currently working to provide a Class I trail (a bicycle and pedestrian trail completely separated from vehicular traffic) along the Brockway Road corridor between the north end of the proposed Martis Valley Trail and the Regional Park. This trail would then tie into the Truckee River Legacy Trail.

7.2 REGULATORY SETTING

Federal Regulations

There are no federal regulations pertinent to the analysis of the project's potential impacts related to transportation and circulation.

State Regulations

California Department of Transportation

Caltrans is responsible for the design, construction, maintenance, and operation of the California State Highway System, as well as the Interstate Highway System within the State boundaries. Additionally, the Caltrans *Guide for the Preparation of Traffic Impact Studies* (2002) provides overall statewide guidance on procedures and standards to be used in preparing traffic studies.

Caltrans has prepared a Transportation Concept Report (TCR) for SR 267. The TCR identifies a concept (or target) LOS for SR 267 of LOS E. In 2000, the LOS on SR 267 between the Nevada/Placer county line and Brockway Summit was LOS E and the TCR projects that LOS E will be maintained on this segment through 2025.

As part of regulating the operating conditions for each state highway, Caltrans must approve any specific development activity that may physically affect a state facility prior to the implementation of any improvement. For example, an encroachment permit from Caltrans must be obtained before constructing any highway improvements, realigning any segment of a state highway, or installing new driveways or intersections on a state highway.

Local Regulations

Placer County General Plan

The goals listed below summarize the priorities of the *Placer County General Plan* Transportation and Circulation Element. Policies that support these goals establish minimum right-of-way criteria, LOS standards, parking requirements, and other requirements for the transportation network. LOS standards established by General Plan Policy 3.A.7 require a minimum of LOS C at most intersections, while LOS D is permitted within one-half mile of a state highway.

Goal 3.A To provide for the long-range planning and development of the county's roadway system to ensure the safe and efficient movement of people and goods.

Goal 3.C To maximize the efficient use of transportation facilities so as to: 1) reduce travel demand on the County's roadway system; 2) reduce the amount of investment required in new or expanded facilities; 3) reduce the quantity of emissions of pollutants from automobiles; and 4) increase the energy-efficiency of the transportation system.

Goal 3.D: To provide a safe, comprehensive, and integrated system of facilities for non-motorized transportation.

Goal 5.C: To develop a system of interconnected hiking, riding, and bicycling trails and paths suitable for active recreation and transportation and circulation.

Martis Valley Community Plan

The goals listed below summarize the priorities of the *Martis Valley Community Plan* Transportation and Circulation Element pertinent to the analysis of the project's potential impacts related to transportation and circulation.

Goal 5.C: To maximize the efficient use of transportation facilities so as to: 1) reduce travel demand on the county's roadway system; 2) reduce the amount of investment required in new or expanded facilities; 3) reduce the quantity of emissions of pollutants from automobiles; and 4) increase the energy-efficiency of the transportation system.

Goal 5.D: To provide a safe, comprehensive, and integrated system of facilities for non-motorized transportation.

Town of Truckee Trails and Bikeways Master Plan

The goals listed below summarize the priorities of the *Town of Truckee Trails and Bikeways Master Plan*. While the proposed project is located outside the Town of Truckee, it would contribute to attainment of these goals and would expand and complement the Town's trail system.

Planning Goal 1 - Trail and Bikeway System: The trail and bikeway system should provide a full-range of safe and convenient recreation and alternative transportation opportunities for multiple users.

Planning Goal 2 – Connectivity and Continuity: The trail and bikeway system should link the Town's historic downtown, residential and commercial areas, and recreational, educational, natural, and historical resources utilizing public and private lands as necessary and appropriate.

Placer County Regional Bikeway Plan

The Placer County Regional Bikeway Plan, prepared by the Placer County Transportation Planning Agency, contains a system of existing and planned bikeway facilities to provide for transportation and recreational bicycle travel. Twelve individual goals were identified in this plan, each with separate policies. The overall goal for the Placer County Regional Bikeway Plan is:

- To promote safe, convenient, and enjoyable cycling by establishing a comprehensive system of regional bikeways that links the communities of Placer County.

Tahoe Regional Bicycle and Pedestrian Plan

The Lake Tahoe Bicycle and Pedestrian Plan presents a guide for planning, constructing, and maintaining a regional bicycle and pedestrian network and support facilities and programs. While the proposed project is located outside the boundaries of this plan, it would contribute to attainment of regional goals for bicycle pedestrian facilities. Applicable goals of this plan include:

Goal 1: Complete a bicycle and pedestrian network that provides convenient access to Basin destinations and destinations outside the basin.

Goal 3: Provide environmental, economic, and social benefits to the Region through increased bicycling and walking.

7.3 IMPACTS

Significance Criteria

As evaluated in the Initial Study circulated with the Notice of Preparation for this project (and provided in Appendix A), the project would have less than significant impacts with respect to the following significance criteria:

- Conflict with an applicable congestion management program;
- Result in a change in air traffic patterns, including either an increase on traffic levels or a change in location that results in substantial safety risks;
- Result in inadequate emergency access; and
- Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities.

The analysis below evaluates whether the project would result in significant project impacts related to transportation and circulation based on the following significance criteria:

- Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system; or
- Substantially increase hazards due to a design features or incompatible uses.

Project Impacts

Transportation and circulation impacts could occur associated with trail users who drive (rather than walk or bike) to access the trail. As noted above, under either the Valley or Highway Alignment, vehicular access would be at the new parking lot proposed in one of four potential locations or at the existing parking lot at the Martis Creek Lake Project Wildlife Viewing Area. The following impact discussions focus on the use of the existing Martis Creek Lake Project Wildlife Viewing Area parking lot while analysis of impacts associated with use of the new parking lot is presented in **CHAPTER 11 CEQA DISCUSSIONS**. Because use of both parking lots would be the same for either the Valley Alignment or the Highway Alignment, transportation and circulation impacts would be the same for either alignment and the impact analysis does not distinguish between impacts associated with each alignment.

IMPACT 7.1:	Substantially Increase Traffic or Conflict with Level of Service Standards	
APPLICABLE POLICIES AND REGULATIONS:	Caltrans SR 267 TCR Placer County General Plan Martis Valley Community Plan	
	Valley Alignment	**Highway Alignment**
SIGNIFICANCE WITH POLICIES AND REGULATIONS:	Less than Significant	Less than Significant
MITIGATION MEASURES:	None	None
SIGNIFICANCE AFTER MITIGATION:	Less than Significant	Less than Significant

Intersection LOS for the following analysis was determined using *Highway Capacity Software* (McTrans 2003, as cited in LSC 2011b) applying the methodologies in the Highway Capacity Manual.

The Wildlife Viewing Area access road intersection is located on SR 267, a Caltrans facility within unincorporated Placer County. The Placer County portion of SR 267, outside of the Tahoe Regional Planning Agency (TRPA) area, has a LOS standard of E.

As noted above, the current peak hour traffic volume of this parking lot is assumed to be 13 vehicles (26 total trips). The *Martis Valley Trail Use Forecast* memorandum (LSC 2011a) estimates that during the peak hour of trail usage (11AM to noon, J. Briedis, pers. comm.), ten vehicles associated with the use of the proposed Martis Valley Trail would be parked at the existing Wildlife Viewing Area parking lot. For the purpose of the LOS analysis, it is conservatively assumed that all ten of these vehicles will generate one inbound and one outbound trip during the peak hour. As noted above, this is a conservative approach since most trail users will remain parked for longer than one hour. The traffic analysis assumed that 85 percent of vehicle trips using the Wildlife Viewing Area parking lot will travel to/from the north on SR 267 and 15 percent will travel to/from the south on SR 267. Applying these percentages yields eight outbound left-turns, two outbound right-turns, two northbound left-turns from SR 267, and eight southbound right-turns from SR 267 in the peak hour.

Adding the estimated traffic volumes at the existing driveway location to the existing traffic volumes on SR 267 (both through traffic and existing turning movements into and out of the Wildlife Viewing Area parking lot) would result in a driveway LOS of D. Because the resulting driveway LOS of D would meet the LOS standard of E on the Placer County portion of SR 267 and would meet Placer County's LOS standard of D within one-half mile of a state highway, this impact is considered to be less than significant. The LOS calculations are provided in the appendix of the *LSC Martis Valley Trail Access Intersection Analysis* memo (LSC 2011b, provided in Appendix F).

Programmatic Analysis of Segments 3E and 4

Completion of Segments 3E and 4 would provide greater recreation value to the Martis Valley Trail due to enhanced connectivity with trails in the Lake Tahoe Basin. The modeling of trail usage conducted by LSC included construction and use of Segments 3E and 4. It is expected that these segments of the trail would have fewer users than other segments of the Martis Valley Trail due to steeper grades and because these segments do not provide a direct connection between residential and commercial uses (LSC 2011a). Under a future scenario, trail usage is expected to increase somewhat but trail congestion on these segments is expected to be "low to none" (LSC 2011a). Given the expected future usage of these segments, it is not expected that drive to/from trail users will substantially increase traffic or affect LOS on any adjacent roadways or access points.

IMPACT 7.2:	**Substantially Increase Hazards due to a Design Feature Or Incompatible Uses**	
APPLICABLE POLICIES AND REGULATIONS:	California Highway Design Manual Martis Valley Community Plan Placer County General Plan	
	Valley Alignment	**Highway Alignment**
SIGNIFICANCE WITH POLICIES AND REGULATIONS:	Less than Significant	Less than Significant
MITIGATION MEASURES:	None	None
SIGNIFICANCE AFTER MITIGATION:	Less than Significant	Less than Significant

Safety and Sight Distance Criteria

Two types of sight distance criteria are considered when evaluating a driveway location: stopping sight distance and corner sight distance. Stopping sight distance is the minimum distance required by a driver on the main highway approaching a driveway or intersection to see an object in their travel path and to safely stop. Corner sight distance is the minimum distance that a driver waiting at a cross street or driveway should be able to see in either direction along the main highway to accurately identify an acceptable gap in through traffic. The minimum stopping and corner sight distance requirements are a function of roadway design speed.

The design speed along SR 267 is 60 mph, which requires 580 feet of stopping sight distance and 660 feet of corner sight distance. The existing Wildlife Viewing Area driveway has a corner sight distance of up to 850 feet to the north and up to 900 feet to the south.

. Therefore, adequate stopping and corner sight distances are provided up to a design speed of 65 mph (660 feet and 715 feet, respectively). The area is located in a flat valley with no visual obstructions due to buildings, signs, or topography. The horizontal curve located along SR 267 near the Wildlife Viewing Area driveway does not restrict sight distance, as there are no visual obstructions within the curve.

Accident rates along SR 267 in the vicinity of the Wildlife Viewing Area parking lot are 42 percent lower than statewide averages for roadways with similar characteristics and the roadway does not have an unduly high accident potential. Turn lane warrant evaluations were conducted by LSC to determine the need for both left and right turn lanes. The need for turn lanes at uncontrolled intersections along state highways is governed by the *California Highway Design Manual* (6th Edition, Caltrans, 2006-2007). Based on the traffic volume, accident data and anticipated turning movements the evaluations concluded that neither right turn lanes nor left turn lanes are warranted.

Because the vehicles entering and exiting the existing Wildlife Viewing Area driveway have adequate sight distance, there is no substantial accident potential, and turn lane warrants are not met. In addition, the Highway Alignment is located a minimum of five feet from the southern shoulder of SR 267. This complies with the minimum standards in the Caltrans Highway Design Manual. The proposed project would not result in a substantial increase in hazards due to a design feature or incompatible use and this impact is considered less than significant.

Programmatic Analysis of Segments 3E and 4

The future construction of Segments 3E and 4 does not include construction of new parking areas. Access to these segments would come from existing trail connections and parking areas, Sight distance associated with the existing access points would not change as a result of construction and use of Segments 3E and 4. No increase in hazards is expected with construction of Segments 3E and 4.

7.4 MITIGATION MEASURES

Substantially Increase Traffic or Conflict with Level of Service Standards

This impact is determined to be less than significant. No mitigation measures are required.

Substantially Increase Hazards due to a Design Feature or Incompatible Uses

This impact is determined to be less than significant. No mitigation measures are required.

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CHAPTER 8

VISUAL RESOURCES

Chapter 8 Visual Resources

The following analysis identifies potential impacts due to project-related visual change as experienced by existing and future viewers with exposure to the project site. These effects are discussed in terms of compatibility of character and visual quality in relation to visual sensitivity of these viewers.

The Northstar Community Services District (CSD) proposes to construct the Martis Valley Trail; to be located on the eastern side of the Sierra Nevada Mountains, north of Lake Tahoe and southeast of the Town of Truckee. Two potential alignments for the proposed multi-use trail are described in **Chapter 3 Project Description**. The first (northern) segment of either alignment would begin near the Town of Truckee/Placer County boundary and end at the existing parking area for the Martis Creek Lake Project Wildlife Viewing Area. From that point, the Valley Alignment would generally follow a portion of the existing Tomkins Memorial Trail through Martis Valley to the Village at Northstar. The Highway Alignment would follow a segment of the Tomkins Memorial Trail along the southern side of State Route (SR) 267 and up Porcupine Hill to Northstar Drive, then cross to the south side of Northstar Drive and head westerly to reach the Village at Northstar. Leaving the Village at Northstar, both trail alignments would continue uphill (southerly) towards Sawmill Flat Reservoir and Forest Route 73. A new trailhead and parking area is also proposed. Four potential locations for the new parking area and trailhead have been identified. The transportation and circulation impacts of each location are evaluated at an equal weight in **Chapter 11 CEQA Discussions.**

A visual impact analysis was prepared by North Fork Associates to describe the existing visual characteristics of the project area and evaluate visual changes that would be caused by construction and use of the Valley Alignment (NFA 2009). This report is provided in Appendix F1 to this EIR. The analysis evaluated physical changes that would occur, considering both natural and constructed features, and considered the project in the context of planning guidance documents applicable to the project area, including the *Martis Valley Community Plan, Placer County General Plan*, and the 1977 *Martis Creek Lake Master Plan*. No local roadways are designated as National Scenic Byways or as State Scenic Highways (or eligible for state designation).

An addendum to the visual impact analysis was prepared by North Fork Associates in October 2011. This report is provided in Appendix F2 to this EIR. The addendum was completed to address public comments related to visual resources that were received in response to circulation of the Notice of Preparation and the public scoping meeting for the Martis Valley Trail Environmental Impact Report. The addendum expands the analysis provided in the visual impact analysis to Segments 3A, 3B, and 3F, which comprise the portions of the Highway Alignment that were not evaluated in the 2009 analysis.

8.1 Existing Setting

Regional Landscape Setting

The proposed project is within the *Martis Valley Community Plan* area, set on the eastern side of the Sierra Nevada Mountains, north of Lake Tahoe and southeast of the Town of Truckee, at elevations between approximately 5,880 and 6,200 feet. The diverse regional setting includes mountains, forests, streams, meadow and chaparral on the valley floor.

Long range views within the region include Castle Peak and the Sierra Nevada crest to the west. Martis Peak and other mountain peaks surrounding the Lake Tahoe Basin are visible generally east of the valley. Views to these regional features from SR 267 are possible only in the vicinity of the northernmost portion of Segment 3B and along the Segment 3A alignment. Long range views to regional features from SR 267 and Northstar Drive in the vicinity of Segments 3B and 3F are largely precluded by the low elevation position of the roadways in relation to surrounding steep topography. Filtered views northwest to Castle Peak and the Sierra Crest are visible from Northstar Drive in the vicinity of the Ridgeline Road / Northstar Drive roundabout (Segments 3B and 3F). Highlands View Road, near the alignment of Segment 3F, is located on a steep slope which allows for expansive views to Martis Valley, the Sierra Crest, and other regional features from much of the roadway south of its intersection with Ridgeline Road.

Important natural features seen in mid-range views include the flat expanse of Martis Valley and the forest, scrub, meadow, and riparian vegetation communities that occupy the valley and surrounding slopes. These features are seen for SR 267, Schaffer Mill Road and existing trails in the Wildlife Management Area.

Constructed features that typify the area include State Route 267, office/commercial development in the vicinity of Truckee-Tahoe Airport Road and Soaring Way, the Truckee-Tahoe Airport, recreational facilities and trails associated with Martis Creek Lake and Martis Creek Lake project Wildlife Viewing Area (portions of the Tompkins Memorial Trail system), Lahontan Golf Club and residential development, and the Northstar Community (including Northstar California golf course, residential development, and public facilities). Policy 4.C.1 of the *Martis Valley Community Plan* designates SR 267, Schaffer Mill Road, and Northstar Drive as scenic routes and designates the Martis Creek Lake Project Wildlife Viewing Area as a Scenic Overlook.

Local Landscape Setting

The following description of existing setting is supported by a series of photographs, the location from which each photograph was taken is shown in *Figure 8-1* and *Figures 8-2A* through *8-2H* provide photographs referenced in the discussion. All figures are provided at the end of the chapter. Each potential trail alignment passes through areas that are undeveloped and developed areas with the Northstar community. The project area is characterized by gently rolling to generally flat topography within Martis Valley, and steep slopes outside of the valley towards Northstar and south of Northstar towards Sawmill Flat Reservoir and Forest Route 73. The following discussion highlights the local landscape setting for each potential alignment.

Vegetation communities in the project area include coniferous forest, sagebrush scrub, wet meadow, and riparian. These features are visible from SR 267 and the Tompkins Memorial Trail. Martis Creek is the primary drainage in the valley. The floor of Martis Valley is characterized by wide and relatively flat meadows associated with Martis Creek and its tributaries. Riparian vegetation, primarily willows, occurs as a distinct feature along the meandering courses of Martis Creek and its tributaries and contrasts in color and relief with adjacent meadow vegetation (Photos 1 and 2). The riparian vegetation is generally a linear feature breaking up views of the meadow. Sagebrush scrub vegetation is generally adjacent to and at a slightly higher elevation than meadow vegetation, occurring on flat to gently rolling topography in the vicinity of SR 267 (Photo 3). Dense, even-aged coniferous forest occupies higher elevations, dominating the slopes east and south of the valley and the terrain in the vicinity of the Village at Northstar (Photos 2 and 4). When under snow cover, the valley is characterized by flat expanses of snow distinctly contrasting with the darker conifer forest on the slopes surrounding the valley floor.

SR 267, a heavily traveled two lane highway connecting Interstate 80 to SR 28 in the Lake Tahoe Basin, bisects the valley floor on a slightly elevated west-east alignment and represents a prominent constructed landscape feature through the valley (Photos 1, 3, and 9). SR 267 also represents the primary viewpoint from which the trail alignment and Martis Valley are viewed, as it provides a slightly elevated vantage point to many motorists crossing the valley daily. SR 267 is designated by Placer County as a scenic route. The Valley Alignment trail and trail users would also be visible from portions of the existing Tompkins Memorial Trail.

At the north end of the study area in the vicinity of Schaffer Mill Road/Truckee Tahoe Airport Road/ SR 267 intersection, dominant constructed landscape features include office/commercial development on the north side of SR 267 where airplane hangars and rows of self-storage buildings are visually prominent (Photos 5 and 6). Ski runs in the Lookout Mountain portion of the Northstar ski area are visually prominent as a modified natural feature as linear swaths where trees have been removed. These linear swaths generally appear as an "N" shape when viewed from the valley or SR 267 to the north (Photo 2). They are more distinct in winter as snow cover contrasts with dark hues of the conifer forest. While existing unpaved multi-use trails exist on the slopes south of Martis Valley, they are screened by dense forest and are not visible from the valley floor or SR 267. In the vicinity of the existing parking area for the Martis Creek Lake Project Wildlife Viewing Area, portions of the unpaved multi-use Tompkins Memorial Trail are visible from SR 267, particularly the section leading southwest from the parking area through a bench of sagebrush scrub habitat (Photo 7). Portions of the existing Tompkins Memorial Trail in the vicinity of the crossing of West Martis Creek and running along Middle Martis Creek are also visible from the highway. Snow cover obscures these portions of trail during much of winter and into spring.

Martis Creek Dam is a visually prominent feature of the landscape north of SR 267, appearing as a level and elevated embankment when not under snow cover (Photo 8). At its current level, Martis Creek Lake is not a prominent feature as viewed from SR 267 (Photo 8). When not under snow cover, the north end of the Northstar California golf course is a prominent landscape feature at the east side of the valley at the base of the coniferous forest, as the bright green of the course contrasts with the color of natural vegetation in the valley (Photos 9 and 10). Homes situated on the south and east edge of the golf course are visible from the valley and SR 267, but are somewhat screened by mature conifers and are not considered a primary visual component of the landscape. Other constructed landscape features visible in the valley include power poles at the east end of the valley floor, fencing, and a sewer lift station building south of SR 267, just north of the Northstar California golf course (Photo 10).

Within the Northstar community, the constructed landscape is characterized by residential development visually screened by dense conifer forest. Near Big Springs Drive, the Northstar

CSD office and fire station is visible south and east of Segment 2B and is visually characterized by a parking lot, cleared area, and several smaller buildings (Photo 11). The existing unpaved multi-use trail within the Northstar community is largely obscured by conifer forest and shrubby vegetation and is not a prominent landscape feature in the vicinity of the Northstar community or as viewed from Northstar Drive. The existing unpaved multi-use trail is likely visible from several condominium units at the end of Gold Bend Road, Conifer Road and Basque Drive in the Northstar community. The trail is not considered a prominent landscape feature in this area as vegetation provides substantial screening of views to the trail. In winter the trail surface is covered by snow and is not visible, although use for cross-country skiing or snowshoe recreation may be evident as tracks in the snow. In all seasons, trail users would draw attention to the presence of the trail.

Existing Trail Facilities

The views from the existing trail system in the valley are dominated by near-distant views to meadow areas associated with Martis Creek and its tributaries, broken up by linear riparian shrub vegetation following the course of the streams. Primary views from the existing portion of the Tompkins Memorial Trail east of the Wildlife Viewing Area are generally to the meadow, forested slopes, and golf course; views to the north are restricted by the elevated SR 267 alignment. The Northstar California golf course is a prominent element along the portion of the Tompkins Memorial Trail adjacent to the golf course north of Basque Drive. While the raised alignment of SR 267 is visible from many portions of the existing trail system in the valley, the surface of the road is rarely visible and the road surface is not a primary visual component of the landscape as viewed from the existing trail system (Photos 13 and 14). However, cars traveling the roadway are visible and are distinct in the landscape, particularly along the portion of the existing trail that runs just south of the highway east of the Wildlife Viewing Area parking lot. As the existing trail climbs toward Northstar, views to the valley are obstructed or filtered by conifer forest. In places where views to the valley are possible, views are characterized by meadow features and Martis Creek Lake (Photo 15).). Long distance views from the existing unpaved multi-use path contouring around Porcupine Hill are mostly obscured by vegetation and forest immediately surrounding the trail. However, SR 267 is visible from the trail in many places and is considered a dominant constructed landscape feature along this portion of existing trail. No existing trails are in the immediate vicinity of the proposed Segment 3F.

Valley Alignment

The Valley Alignment would connect the Town of Truckee with the Village at Northstar and would construct a trail through Martis Valley. Segment 1 travels over relatively flat terrain within Martis Valley, south of and generally parallel to SR 267. Segment 1 would include a covered Native American interpretive exhibit. This exhibit would be located northwest of the existing Wildlife Viewing Area within the USACE Martis Creek Lake Project, at an elevation of approximately 5,838 feet above mean sea level (msl). The elevation of SR 267 in this location is approximately 5,870 feet msl.

The majority of Segments 2A and 2B follow portions of the existing Tompkins Memorial Trail. Segment 2A travels south and west through Martis Valley, moving away from SR 267, crossing Martis Creek and one perennial tributary to Martis Creek. The existing trail generally appears as light areas of bare soil contrasting with slightly darker surrounding. The natural landscape of

Martis Valley feature meadow and sagebrush areas. Segment 2B climbs into steeper terrain within the Northstar California property. This segment is characterized by conifer forest and the residential properties adjacent to the trail corridor. Segment 2B crosses Northstar Drive at Big Springs Drive near multifamily residential properties ending at the commercial area, Village at Northstar.

Highway Alignment

Segment 1 as described above would also be constructed under the Highway Alignment.

Segment 3A is located within a strip of sagebrush scrub vegetation between the toe of the fill slope for SR 267 and Martis Creek and a tributary to Martis Creek. Natural vegetation, including sagebrush and meadow and riparian vegetation are the primary natural landscape features, and are described in further detail in the 2009 Analysis.

The area around Segment 3B is characterized by dense conifer forest upslope and to the west of SR 267. SR 267 is a visually dominant constructed feature in the area of this proposed segment of trail. Other constructed features include the small commercial plaza at the corner of Northstar Drive and SR 267, Northstar Drive, and the large parking area north of the Ridgeline Road/Northstar Drive roundabout. The existing unpaved multi-use trail along this alignment is nearly entirely obscured from view from SR 267 by topography and forest vegetation and is not a dominant visual component of the landscape as viewed from either SR 267 or Northstar Drive (Photo 28). A sewer lift station, the Northstar-at-Tahoe sign, the golf course service road, and the golf course, are all visually prominent constructed landscape features located at the north end of this segment near the eastern termination of Segment 3A (Photo 29).

The area around the Segment 3F trail alignment is characterized by relatively dense, even-aged coniferous forest interspersed with resort development (Photo 27). The forest in this area has been thinned in places and the brush understory cleared as part of what is assumed to be forest health and fire-safety operations. The alignment crosses the small West Fork of Martis Creek, which runs in a channel west of the Village at Northstar. This area is characterized by dense riparian vegetation. Dominant constructed features in the area of this segment of trail include Northstar Drive, the large parking lot north of the Ridgeline Drive/Northstar Drive roundabout, Highlands View Road, the Northstar stables, and development associated with the Village at Northstar. Views to these constructed features from Northstar Drive, Ridgeline Road, and Highlands View Road are generally near distant as views of these features from farther away are obstructed by intervening topography and dense conifer forest.

Segments 3E and 4

Segment 3E starts in the vicinity of the Village at Northstar and the immediate area is characterized as resort commercial and residential. Segment 3E continues east crossing West Martis Creek and associated riparian vegetation. This segment also includes an at-grade crossing of Highlands View Road. Coniferous forest characterizes the habitat along the sections of the trail to an elevation of approximately 6,500 feet on a forested ridgeline where it would junction with Segment 4. Primary views of the trail would be from the Village at Northstar, adjacent residential development and it’s crossing at Highlands View Road.

Segment 4 would continue south from the end of Segment 3E and ascend the forested slope with a series of switchbacks generally following existing dirt roads. Segment 4 travels through heavily forested slopes previously disturbed by logging activities, passing Sawmill Flat Reservoir before end at the junction with the paved Forest Route 73. This segment is obscured from view by dense forest vegetation.

Sensitive Receptors: Key Viewpoints

Sensitive receptors are those viewers who would be most sensitive to changes in the character of the project site. Individuals may have high sensitivity to visual changes if they have frequent or lengthy exposure to the view, are familiar with the existing condition of the site, or have a unique view to the site. Sensitive receptors are often represented by residents of adjacent parcels with views to a project site or people viewing the site from public land.

The primary views of the Valley Alignment study areas are from SR 267, homes within the Northstar community, particularly those on the north side of Basque Drive, the west side of Skidder Trail, and at the end of Gold Bend Road; and portions of the existing Tompkins Memorial Trail. Views of the Highway Alignment study area are similar. They include views from SR 267, homes on the north side of Basque Drive and near the end of Skidder Trail and portions of the existing Tompkins Memorial Trail. For both alignments, these views are generally characterized by meadow and riparian vegetation, SR 267, golf course greens and fairways, conifer forest, and adjacent residential development. When snow cover is present, meadow and riparian vegetation, and golf course features are not as visually prominent. Views of the Highway Alignment study area also include distant views of mountains along the Sierra Crest and constructed resort features including parking lots, roadways, and buildings.

Viewer Sensitivity

Factors that influence the visual quality of the local landscape character include:

- The intact nature of the large meadow and linear riparian habitat on the valley floor;
- Intact long distance views west to the Sierra Crest and Castle Peak;
- Seasonal variety in views;
- Visual contrast and continuity associated with constructed and natural elements of the existing landscape;
- Previous alteration of the natural visual quality from constructed features including SR 267 (and cars traveling the highway), office / commercial development, golf courses, trails, ski area development, power lines, Martis Creek Dam, and residential development;

Considering these factors, the visual quality of the area may be characterized as moderate in terms of vividness, intactness, and unity, since the site is largely characterized by mixed natural and constructed visual components. However, visual response to the area is considered to be high, as the meadow and valley floor is the primary and dominant visual component of the landscape and, although bisected by SR 267 and altered by Martis Creek Dam and other constructed features, it remains largely intact and is a well used recreational area.

The *Martis Valley Community Plan* states that any development within the open meadow and sagebrush flats of the Martis Valley visible from SR 267 must be considered very carefully. Also noting that construction of roads and trails within the open valley or even recreational uses could result in substantial visual impacts and such facilities, although permitted, should be carefully sited.

8.2 REGULATORY FRAMEWORK

Federal Regulations

Martis Creek Lake Master Plan

The 1977 *Martis Creek Lake Master Plan* was prepared by the U.S. Army Corps of Engineers to guide management and development for Martis Creek Lake Project, which includes the large meadow area south of SR 267 accessed from the Wildlife Viewing Area. The Master Plan identifies the area south of SR 267 as a wildlife management area "for the protection and improvement of wildlife habitat" and assigns it a land use category of "Operations: wildlife management." The plan contemplates a "nature interpretive" trail system within the area and identifies resource use objectives for the areathat include providing quality outdoor recreation opportunities for a variety of activities, establishing and maintaining a wildlife management area (within the area south of SR 267), and preserving the aesthetics of the area for the recreating public. Primary scenic qualities of the valley cited in the Master Plan include open grassy meadows along Martis Creek and its tributaries, sagebrush covered alluvial terraces, and densely forested hillsides, as well as distant views of "often snow-covered granite peaks…" (page 13). An example of efforts to maintain the scenic value of the area is evidenced in the plan's call for grass seeding in the fluctuation area of Martis Creek Lake to avoid visual impacts associated with exposed dead vegetation below the high water mark during times of low pool in the lake (page 37).

U.S. Army Corps of Engineers National Sign Standards Program

The USACE Sign Standards Manual is available online. This document covers all aspects of signs for the USACE projects and lands. Generally, the manual includes recommendations and guidance for signage content and design, mounting methods and placement guidelines, material selection, and maintenance procedures. Mandatory standards for USACE signage include colors, fonts, formats, and proportions; the other standards are considered guidance rather than mandatory requirements. Interpretive signs are addressed in Section 13 of this manual, which states that "interpretive signs will vary greatly in content and design" and the section provides guidance and suggestions on planning the text and format of such signs.

State

There are no state regulations applicable to the analysis of the Martis Valley Trail's impacts on visual resources in the area.

Local

Placer County General Plan

The intent of the *Placer County General Plan* with respect to visual resources is summarized in the following goal:

Goal 1.K: To protect the visual and scenic resources of Placer County as important quality-of-life amenities for county residents and a principal asset in the promotion of recreation and tourism.

Martis Valley Community Plan

The project site is subject to the policies and goals of the *Martis Valley Community Plan*. The Community Plan provides the following goals relevant to the analysis of impacts to visual resources:

Goal 1.E: To designate land for and promote the development and expansion of public and private recreational facilities to serve the needs of residents and visitors.

Goal 1.G: To preserve and enhance open space lands to maintain the natural resources of the County.

Goal 4.A: To promote and enhance the visual environment of Martis Valley by requiring high aesthetic quality in all new development.

Goal 4.B: To protect the visual and scenic resources of Martis Valley as an important quality-of-life amenity for Martis Valley residents and a principal asset in the promotion of recreation and tourism.

Goal 4.C: To develop a system of scenic routes serving the needs of residents and visitors to Martis Valley and to preserve, enhance and protect the scenic resources visible from these scenic routes.

As noted above, Policy 4.C.1 of the *Martis Valley Community Plan* designates SR 267, Schaffer Mill Road, and Northstar Drive as scenic routes and designates the Martis Creek Lake Project Wildlife Viewing Area as a Scenic Overlook. The *Martis Valley Community Plan* also discusses implementation of the *Placer County Design Guidelines* as part of the development review process but the Design Guidelines are not applicable to recreational development.

Martis Valley Community Plan Design Guidelines

Section IV of the *Martis Valley Community Plan* also includes Design Guidelines for specific sub-areas of the plan area. Design Guidelines for recreational uses within the Northstar California community call for trail construction to include "erosion control and minimal grading or disturbance of the natural terrain." These Design Guidelines state that recreational development may include various improvements "compatible with the natural setting and a year-round resort community." Discussion of the western portion of Martis Valley within the Guidelines do not include specific details for trails but does recognize open meadow and Martis Creek as important natural and scenic resources. Further stating recreation uses such as golf or play fields could be permitted if appropriately set back and buffered by areas of native terrain vegetation.

8.3 IMPACTS

Significance Criteria

As evaluated in the Initial Study circulated with the Notice of Preparation for this project (and provided in Appendix A), the project would have less than significant impacts with respect to the following significance criteria:

- Cause a substantial adverse effect on a scenic vista;
- Substantially damage scenic resources, including but not limited to, trees, rock outcroppings, and historic buildings within state scenic highway;
- Substantially degrade the existing visual character or quality of the site and its surroundings; or
- Create a new source of substantial light or glare that would adversely affect day or nighttime views in the area.

Following professionally accepted practice in visual analysis, visual impacts that cross a threshold of "substantial adverse effect" are defined as a consequence of three primary factors: a) the existing scenic quality and character of an area (landscape attributes); 2) the level of viewer exposure and concern with visual change (viewer sensitivity); and c) the level of actual change to existing visual character and quality caused by the project as seen by a given viewer group (FHWA, 1988; BLM, 1987). The overall visual sensitivity of each key viewpoint, reflecting the anticipated level of viewer concern and visual exposure is first established. This rating is then considered together with the level of expected visual change experienced by key (existing) viewer groups and caused by the project to arrive at an assessment of potential impacts and their significance.

Project Impacts

IMPACT 8.1:	Adversely Affect a Scenic Vista	
APPLICABLE POLICIES AND REGULATIONS:	Martis Creek Lake Master Plan Placer County General Plan Martis Valley Community Plan and Design Guidelines	
	Valley Alignment	**Highway Alignment**
SIGNIFICANCE WITH POLICIES AND REGULATIONS:	Potentially Significant	Less than Significant
MITIGATION MEASURES:	Mitigation Measures 8.1a through 8.1b	None
SIGNIFICANCE AFTER MITIGATION:	Less than Significant	Less than Significant

As discussed above, the sagebrush meadow and riparian vegetation of the Martis Valley are considered important scenic resources by both the *Martis Valley Community Plan* and the *1977 Martis Creek Lake Master Plan*. While Section I.E the MVCP indicates that additional recreational uses could be accommodated without degrading the special visual qualities of the valley, it recognizes a need for careful consideration of any development, including trails, to ensure that visual impacts are kept to a minimum. The Martis Creek Lake Project Wildlife Viewing Area is a designated scenic vista. An analysis of impacts to visual quality at the Wildlife Viewing Area is presented below.

Views to the northwest from the Wildlife Viewing Area are of a sagebrush-covered rise that leads to SR 267 and a drainage swale that travels along the base of that rise, with rural homes in the background. From the Wildlife Viewing Area, an existing double-track gravel-surfaced trail is clearly visible leading southwest across a meadow area and continuing onto a bench of sagebrush scrub. The trail remains visible until gaining slightly in elevation on a sparsely forested knoll, as shown in Photo 7. The trail in this location appears as a small dirt and gravel road and is wide enough for motor vehicle access (formerly a road used by the Corps during construction of the Martis Creek Dam to access a borrow pit). The light color of the bare soil and gravel surface of the trail contrasts with the appearance of the natural meadow and sagebrush vegetation in the valley and is a visually prominent constructed feature in the landscape. Other single-track portions of the Tompkins Memorial Trail in the valley are visible from SR 267 and the Wildlife Viewing Area.

Segment 1

As shown on Sheet C4 of the Preliminary Trail Plans included in Appendix B, the project includes a covered structure providing a Native American interpretive exhibit at the end of Segment 1, approximately 400 feet northwest of the Wildlife Viewing Area. This feature is included in both the Valley and Highway alignment project alternatives. The structure would be placed near the base of the rise leading to SR 267, above the associated drainage swale. Construction of this feature would not disturb any of the vegetation associated with the drainage swale. This feature would introduce a new vertical constructed element in the viewshed west of the Wildlife Viewing Area. Preliminary plans for this structure indicate that materials would include a brown metal roof and interpretive panels mounted between pillars made of logs harvested from the project site. The structure would be similar in scale to the existing trailhead and information signage at the Wildlife Viewing Area. Although the structure would be constructed in close proximity to the Wildlife Viewing Area, its placement in relation to the drainage swale and site topography as well as its context-sensitive design and building materials would ensure that its affect on scenic vistas from the Wildlife Viewing Area would be less than significant.

Valley Alignment

Segment 2A of the Valley Alignment would follow the alignment of the existing gravel track leading southwest from the Wildlife Viewing Area until the proposed alignment departs from the existing path on the forested knoll, where it would turn south and descend along a deteriorated paved roadway through the former borrow pit area to a proposed new crossing of Martis Creek. The proposed new crossing of Martis Creek (Photos 16 and 17) and the proposed new trail alignment leading to the crossing area would be screened from view by vegetation and topography and would not be visible from the Wildlife Viewing Area. The primary viewshed from the Wildlife Viewing Area overlook is generally to the southwest, south, and southeast and is characterized by views of the natural valley features of meadow, riparian, conifer, and sagebrush vegetation. From the Wildlife Viewing Area, existing constructed features at the eastern edge of the valley, including the Northstar California golf course, homes at the valley edge, the sewer lift station, and powerpoles are in the distance and do not represent prominent landscape features. Recreational use of the valley, in the form of existing trails, is evident in the view from the Wildlife Viewing Area.

The proposed trail would replace the existing gravel and soil surfaced path visible from the overlook with a paved surfaced. The pavement would have a greater visual contrast with vegetation in the valley. In addition, the improved trail would result in an increase in trail users on the trail system (LSC 2011a). Therefore, the project would increase the visibility of the trail as viewed from the Wildlife Viewing Area and would potentially degrade the scenic quality of the area. Long distance views west to Castle Peak and the Sierra Crest would not be affected by the proposed trail.

To minimize the impact of the constructed trail feature, *Mitigation Measure 8.1a* requires that natural or earth tone colors be used for the trail surface of Segment 2A to reduce the contrast with existing vegetation or soils that characterize the natural meadow and sagebrush visual component of the valley as viewed from the overlook. This would ensure that the contrast in pavement and the addition of this constructed feature would result in a less than significant impact in the view of Martis Valley enjoyed from the Wildlife Viewing Area scenic overlook.

Construction Phase

Construction phase trail-building activities would temporarily place vehicles and construction equipment, construction materials stockpiles, and construction fencing within the scenic viewsheds identified and discussed above. The presence of construction equipment, materials, and fencing would present a limited, temporary adverse visual impact to the existing view available from the Wildlife Viewing Area and from SR 267. *Mitigation Measure 8.1b* requires that construction material staging areas be identified on project plans and placed within existing disturbed areas located, to the extent possible, to screen views of staging areas from the Wildlife Viewing Area and SR 267. Implementation of *Mitigation Measure 8.1b* would ensure that temporary construction period effects to scenic viewsheds remain less than significant.

Highway Alignment

In the area of Segment 3A, an existing dirt trail is visible leading east along the narrow band of sagebrush scrub separating the fill slope of the elevated SR 267 roadway alignment from the riparian area associated with Martis Creek. The dirt track of the trail viewed from this location is approximately eight feet wide and is only visible for a short distance. Segment 3A would follow this dirt track, replacing it a wider paved trail, introducing a more visually prominent linear constructed feature to the view east from the Wildlife Viewing Area. However, since the view east from the Wildlife Viewing Area is dominated by the SR 267 roadway alignment, and the proposed trail would replace the linear constructed feature of the existing trail which runs generally parallel to the highway, Segment 3A of the Highway Alignment would not be expected to result in a substantial adverse impact to the quality of the scenic views of the Valley presently experienced from the Wildlife Viewing Area. The view from the Wildlife Viewing Area along the SR 267 alignment is considered of lower quality and importance than views in other directions that are not dominated by the constructed feature represented by SR 267. Segment 3A is considered appropriately sited to avoid substantial impacts to scenic views experienced from the Wildlife Viewing Area. Views to other portions of the trail to the east from the Wildlife Viewing Area are obstructed by the elevated alignment and fill slope of SR 267, which is the dominant landscape feature in this direction. Segment 3A would cross Martis

Creek over a bridge at the existing trail bridge crossing location (Frank's Fish Bridge) and generally follow the alignment of the existing trail through sage scrub and along the northern perimeter of the golf course along the shoulder of SR 267 to its junction with Segment 3B.

Segments 3B and 3F would have no effect on the quality of the scenic views enjoyed from the Wildlife Viewing Area overlook, since these segments would not be visible from the overlook.

Construction Phase

Construction impacts from trail-building activities for the Highway Alignment will be the similar to those described above for the Valley Alignment. Implementation of ***Mitigation Measure 8.1b*** would ensure that temporary construction period effects to scenic viewsheds remain less than significant.

Programmatic Analysis of Segments 3E and 4

Segments 3E and 4 would also be screened by vegetation, topography and existing development in the Village at Northstar and would not be visible from the Wildlife Viewing Area.

IMPACT 8.2:	Substantially Damage Scenic Resources	
APPLICABLE POLICIES AND REGULATIONS:	Martis Creek Lake Master Plan Placer County General Plan Martis Valley Community Plan and Design Guidelines	
	Valley Alignment	**Highway Alignment**
SIGNIFICANCE WITH POLICIES AND REGULATIONS:	Potentially Significant	Potentially Significant
MITIGATION MEASURES:	Mitigation Measures 8.1b, 8.2a and 8.2b	Mitigation Measures 8.1b, 8.2a, and 8.2b
SIGNIFICANCE AFTER MITIGATION:	Less than Significant	Less than Significant

No roadways in the vicinity of either study corridor are designated State Scenic Highways. However, Policy 4.C.1 of the MVCP designates Northstar Drive, SR 267, and Schaffer Mill Road as County Scenic Routes. This analysis evaluates impacts to scenic resources as viewed from these County-designated scenic routes.

Valley Alignment

The view of the project area for passersby on SR 267 includes development in the vicinity of the airport (Photos 5 and 6), Martis Creek Dam to the north (Photo 8), wide expanses of sagebrush and meadow areas with trails on the valley floor and ski runs on forested slopes above the valley (Photo 2), and a golf course and homes at the eastern edge of the valley (Photo 10). Existing portions of the Tompkins Memorial Trail recreational trail system are visible to motorists traveling SR 267, particularly westbound lanes. These trail segments ranging from approximately 3 to 12 feet in width and are located between the entrance to the Wildlife Viewing Area and the sewer lift station building on the south side of SR 267 at the eastern edge of the valley floor. These trails generally appear as light areas of bare soil contrasting with slightly darker surrounding vegetation (Photos 2, 7, 10). The primary view along the SR 267 corridor through Martis Valley is characterized by the prominent natural features of the meadow and sagebrush areas, as well as by development consistent with passive and active recreational pursuits of a resort community.

From SR 267, the proposed trail alignment and surface of the trail along the segment from Schaffer Mill Road to the existing Wildlife Viewing Area would be sporadically visible where the alignment would run parallel to the highway through low sagebrush. Presently, no trail exists within these areas (Photos 3, 9, 18). The proposed trail would also be visible from the highway as it heads southwest from the Wildlife Viewing Area along the alignment of the existing trail, as discussed in Impact 8.1 above. The covered Native American interpretive exhibit would not be visible from SR 267 due to its placement below the elevation of the roadway.

The view from Schaffer Mill Road in the vicinity of the proposed trail alignment is generally characterized by meadow and sagebrush areas to the east and southeast, commercial development and residential to the north and northwest, and sparse conifer forest to the northeast. The trail alignment would be visible from northbound Schaffer Mill Road in several places both west and east of the proposed trail crossing of Schaffer Mill Road at the SR 267 / Schaffer Mill / Truckee-Tahoe Airport Road intersection (Photos 19, 20, 25 and 26).

The proposed trail would potentially be most visible as it travels within the stand of trees just east of the intersection and along the sagebrush scrub adjacent to SR 267. In this location, Schaffer Mill Road is at a lower elevation than the proposed trail. Therefore, views of the trail surface would be nearly entirely obscured by surrounding vegetation. In areas where the trail would be visible, it would appear as a linear feature, as it would be viewed in profile, and would not be considered a prominent visual feature of the landscape. The portion of the trail west of the intersection would be lower in elevation than the road, and thus slightly more of the trail surface may be visible from Schaffer Mill Road in this area. The view north and northwest from Schaffer Mill Road is dominated by existing commercial and residential development. This area does not contribute to the scenic corridor designation of Schaffer Mill Road. The proposed trail would not result in substantial impact to scenic views from Schaffer Mill Road.

Views from Northstar Drive in the vicinity of the trail alignment and limited by topography and dense conifer forest and are generally characterized by resort and community facilities and short to mid-range views of conifer forest. Development on Big Springs Drive, the Northstar CSD offices, and Northstar Fire Station are all located near the proposed trail alignment. An existing portion of the Tompkins Memorial Trail follows an alignment similar to the proposed alignment in the vicinity of Northstar Drive. Views from Northstar Drive to the existing trail are nearly entirely screened by vegetation and topography; views to the proposed trail would be similarly screened. Impacts of the proposed trail to views from Northstar Drive would be less than significant.

The proposed multi-use trail would be visually consistent with existing resort community and recreational development, including golf courses, resort signage, existing trails, and airport development along the scenic corridors of SR 267, Schaffer Mill Road, and Northstar Drive. However, as discussed in Impact 6.1 above, paving for the trail (rather than using gravel and dirt surfaces similar to existing trails) could degrade the visual landscape component represented by the open meadow and sagebrush area on the valley floor, particularly as viewed from SR 267.

Mitigation Measure 8.2a requires that natural or earth tone colors be used for the trail surface to reduce the contrast with existing vegetation or soils that characterize the natural sagebrush visual component of the valley (Segment 1) as viewed from SR 267. This would ensure that the proposed paved trail would result in less than significant impacts associated with degrading the view of the valley from SR 267.

Construction Staging Areas

During construction periods, fencing, vehicles, materials stockpiles, and other construction related equipment and disturbance, would result in temporary adverse effects to the views enjoyed from Highway 267, Schaffer Mill Road, and the Wildlife Viewing Area. While temporary effects would be less than significant, *Mitigation Measure 8.1b* requires that construction materials stockpiles and staging areas be located to minimize visibility of these areas from the Wildlife Viewing Area, Schaffer Mill Road and Highway 267. *Mitigation Measure 8.2b* further requires that the required Erosion and Sediment Control Plan include revegetation of disturbed areas. These measures would ensure that temporary construction disturbance is minimized to the extent feasible.

Highway Alignment

The above analysis of the Valley Alignment provides a description of the scenic resources viewable from SR 267 for Segment 1 common to both alignments. As discussed under *Impact 8.1*, Segment 3A would replace an existing dirt trail along the south side of SR 267. In areas where it is positioned near the toe of the highway fill slope at a lower elevation than the roadway, the existing dirt trail is only intermittently visible to motorists from the eastbound lane of 267. Farther east, where the existing trail and SR 267 are at similar elevations, the existing dirt trail appears as a narrow path between the highway and the golf course and sewer lift station. Since Segment 3A would occupy an area in the Valley dominated by existing constructed landscape features, including SR 267, the golf course, and the sewer lift station, and would be only intermittently visible from the highway, Segment 3A is considered appropriately sited to avoid substantial impacts to resources that contribute to the scenic values of SR 267.

The Segment 3B alignment would depart slightly from, but would generally follow the existing dirt trail on the slope above and parallel to SR 267 as it contours around Porcupine Hill to the south. While the existing dirt track in this location is wider than a typical foot path and accommodates maintenance vehicle access, vegetation and topographical undulations provide near total screening of it from SR 267. Where Segment 3B is proposed to run parallel to Northstar Drive up to the Ridgeline Road/Northstar Drive roundabout, it would depart slightly from the alignment of the existing dirt trail, but would be visually consistent with other resort development in this area, including parking lots, roads, and commercial structures. Similar to Segment 3B, portions of Segment 3F visible from Northstar Drive would be visually consistent with other resort development in the area, and most of the alignment would be screened from view by dense conifer forest. In addition to being mostly screened from view, Segments 3B and 3F would require a use permit from Placer County to ensure trail design and materials used are appropriate and consistent with policies and guidelines contained in the *Martis Valley Community Plan*. Natural screening and trail construction consistent with policies and guidelines contained in the *Martis Valley Community Plan* would ensure that Segments 3B and 3F would result in no substantial impacts to scenic resources viewed from SR 267 or Northstar Drive.

Proposed Highway Alignment Segments 3A, 3B, and 3F would not be within view from Schaffer Mill Road. *Mitigation Measures 8.1b, 8.2a and 8.2b* would be applicable to implementation of the Highway Alignment and ensure that impacts would remain less than significant.

Programmatic Analysis of Segments 3E and 4

Trail Segments 3E and 4 are not in the vicinity of Schaffer Mill Road and Northstar Drive and would be screened from view from SR 267 by topography and vegetation. These segments pass through heavily forested areas and a ridgeline separates most of Segment 4 from SR 267.

IMPACT 8.3:	**Substantially Degrade the Existing Visual Character or Quality of the Site and Its Surroundings**	
APPLICABLE POLICIES AND REGULATIONS:	Martis Creek Lake Master Plan Placer County General Plan Martis Valley Community Plan and Design Guidelines	
	Valley Alignment	**Highway Alignment**
SIGNIFICANCE WITH POLICIES AND REGULATIONS:	Less than Significant	Less than Significant
MITIGATION MEASURES:	None	None
SIGNIFICANCE AFTER MITIGATION:	Less than Significant	Less than Significant

The project would construct a trail consisting of a 10-foot wide paved section and two-foot wide unpaved shoulders on each side through Martis Valley and to the Village at Northstar. The visual character of the valley includes commercial, residential, and passive and active recreational development, in addition to natural landscape features. As discussed above, sensitive views of the valley include those available from SR 267 and other County-designated scenic routes and the Wildlife Viewing Area. The existing visual character and quality of the natural area of the Martis Valley is also observed by occupants of homes along the golf course, golfers, skiers at Northstar, and users of the existing Tompkins Memorial Trail system. Potential impacts to these viewer groups from each trail alignment are discussed in the following paragraphs.

Valley Alignment

Meadow/Valley

From the identified viewpoints the Valley Alignment trail would be most visually prominent along its alignment through the open meadow and sagebrush areas leading southwest away from the Wildlife Viewing Area (Segment 2A). Views west and northwest to the area of the proposed trail alignment and distant from areas on the east side of the valley floor, including residences, the golf course, and portions of the Tompkins Memorial Trail on the east side of the valley are shown in Photos 1, 14 and 21. The primary constructed features visible from within the trail system and areas on the east side of the valley floor are the road surface leading off of SR 267 to the Wildlife Viewing Area and the raised alignment of SR 267, although the surface of SR 267 is not visible (Photos 13, 14).

Existing trails within the valley are partially to fully screened by topography and vegetation from most viewing areas within and adjacent to the valley. As with existing trails, the portion of Segment 2A proposed through the Valley would be partially screened by vegetation and topography. Although the change to visual quality or character for the identified viewers from the construction of Segment 2A through the Valley is not considered substantial, implementation of *Mitigation Measure 8.1a* requiring the use of natural or earth tone trail surfacing will further reduce changes in view. New trail signage within this segment is proposed to be consistent with existing signs used for the Tompkins Memorial Trail and would be subject to approval by the USACE for portions of the trail on federal lands.

The area of the proposed new crossing of Martis Creek along Segment 2A is obscured by topography and dense vegetation and would not be visually prominent from any primary viewpoints (Photos 16, 17, 21). The proposed new crossing of Martis Creek would place the proposed trail in a location that would screen it from views of and from Lahontan golf course (the existing Tompkins Memorial Trail Valley Alignment allows for views directly to and from the trail to a fairway on the golf course (Photo 12)). The proposed new crossing of the perennial stream that is tributary to Martis Creek along Segment 2A would also be well-screened by vegetation and would not be visible except in the immediate vicinity of the crossing (Photos 22 and 23).

Forest/Residential Areas

Hillside portions of existing trails are entirely obscured by conifer forest and are not visible from the valley. While some trees would be removed and small retaining walls would be built to construct the trail, it is unlikely that portions of the trail on forested slopes would be visible from the valley floor. The proposed trail would be consistent with existing visual elements associated with recreational and resort uses in and around the valley and would result in less than significant impacts to the existing visual character or quality of the area presently experienced by viewers in and adjacent to the valley.

Views to the existing portions of the Tompkins Memorial Trail within the Northstar Community are nearly entirely obscured by conifers or shrubby vegetation in most places. The proposed alignment would follow a similar alignment to the existing Tompkins Memorial Trail and would travel through dense conifer forest. Similar to the existing trail, the proposed trail would be mostly obscured by understory vegetation and conifer forest (Photos 4, 24). The proposed trail would be visually consistent with other recreational and resort development within the Northstar Community. The proposed trail would result in no substantial impacts to the existing visual character or quality of the area presently experienced by viewers in and around the Northstar Community.

Highway Alignment

Meadow/Valley

As discussed in Impact 8.1 and Impact 8.2 above, the Highway Alignment would be largely screened from view by topography or vegetation and would be subject to review and approval by either Placer County or the USACE. Segment 3A would be the most visible in its alignment crossing the Valley to residents on the east side of the Valley and from the Northstar Golf Course. Because Segment 3A would run parallel to the SR 267 alignment and would follow the route of an existing dirt trail, it would have little impact on the visual character or quality of the Valley.

Forest/Residential Areas

The Highway Alignment Segments 3B and 3F would be consistent with other resort, recreational, and transportation development visible along SR 267 and Northstar Drive, as well as within the Northstar Community, and from the existing Tompkins Memorial Trail, and would not be expected to substantially degrade the visual character or quality of the site and its surroundings.

Programmatic Analysis of Segments 3E and 4

Segments 3E may be visible from few residential units near the Village at Northstar, however a paved trail would be consistent with the resort facilities in the immediate area. Views of Segment 4 will be obscured from homes and other resort and recreational amenities. These future segments are not expected to substantially degrade the existing visual quality or character of identified viewers.

IMPACT 8.4:	Create a New Source of Substantial Light or Glare Adversely Affecting Day or Nighttime Views in the Area	
APPLICABLE POLICIES AND REGULATIONS:	Martis Creek Lake Master Plan Placer County General Plan and Design Guidelines Martis Valley Community Plan and Design Guidelines	
	Valley Alignment	**Highway Alignment**
SIGNIFICANCE WITH POLICIES AND REGULATIONS:	Less than Significant	Less than Significant
MITIGATION MEASURES:	None	None
SIGNIFICANCE AFTER MITIGATION:	Less than Significant	Less than Significant

No lighting is proposed as part of the trail project. The proposed trail would be constructed using non-reflective materials and finishes for the surface of the pathway and retaining wall surfaces. Any reflective striping used for pathway markings would not result in substantial glare or adversely affect day or nighttime views in the area. Signage would be designed to avoid glare. Impacts resulting from glare or addition of lighting would be less than significant.

Programmatic Analysis of Segments 3E and 4

Similar to the analysis above, no lighting is proposed and non-reflective materials will be used for these future trail segments. No impacts from light and glare are expected.

8.4 MITIGATION MEASURES

Adversely Affect a Scenic Vista

Mitigation Measure 8.1a: Natural or earth tone surfacing shall be used for the portion of Trail Segment 2A extending from the present location of the Wildlife Viewing Area, southwest to the first crossing of Martis Creek. Surfacing colors shall be selected to minimize contrast with the natural colors of the vegetation and soils of the valley, as determined appropriate by a written recommendation from a landscape architect. Color and materials for surfacing the trail shall be approved by the Northstar CSD and the U.S. Army Corps of Engineers.

Mitigation Measure 8.1b: Stockpiling of materials onsite shall be minimized during construction. Construction staging areas and stockpile storage locations shall be identified on project plans and located within existing disturbed areas or as close to or within the areas of construction as possible, and shall be located to screen views of staging areas from the Wildlife Viewing Area, Highway 267 and Schaffer Mill Road to the extent feasible.

Substantially Damage Scenic Resources

Mitigation Measure 8.2a: Natural or earth tone surfacing shall be used for the portion of Trail Segment 1 viewed from SR 267. Surfacing colors shall be selected to minimize contrast with the natural colors of the vegetation and soils of the valley, as determined appropriate by a written recommendation from a landscape architect. Color and materials for surfacing the trail shall be approved by the Northstar CSD and the U.S. Army Corps of Engineers.

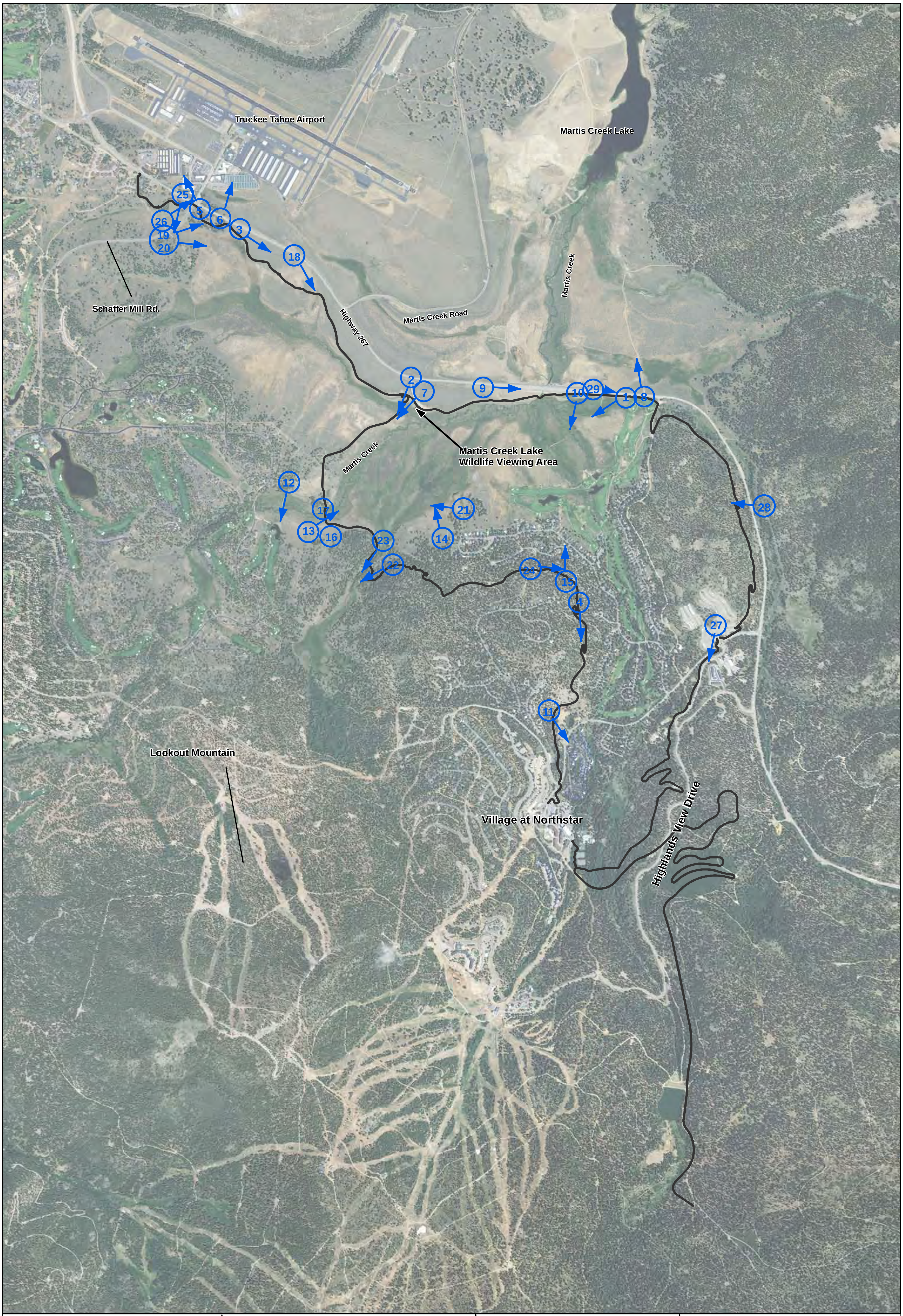
Mitigation Measure 8.2b: The Erosion and Sediment Control Plan prepared as required to obtain a grading permit shall include measures to revegetate areas disturbed by project construction activities.

Substantially Degrade the Existing Visual Character or Quality of the Site and Its Surroundings

This impact is determined to be less than significant. No mitigation measures are required.

Create a New Source of Substantial Light or Glare Adversely Affecting Day or Nighttime Views in the Area

This impact is determined to be less than significant. No mitigation measures are required.



Proposed Trail Alignment

Photopoint Location

Imagery: NAIP 2009

N

0 1,000 2,000 Feet

Scale in Feet

Figure 8-1

SITE PHOTOPOINTS

Martis Valley Trail

Placer County, California

Photo 1 – Looking west from Highway 267 across Martis Valley.

Photo 2 – View to south across Martis Valley from the entrance to the Wildlife Viewing Area. Note ski runs on Lookout Mountain.

Photo 3 – View from Highway 267 looking east across Martis Valley.

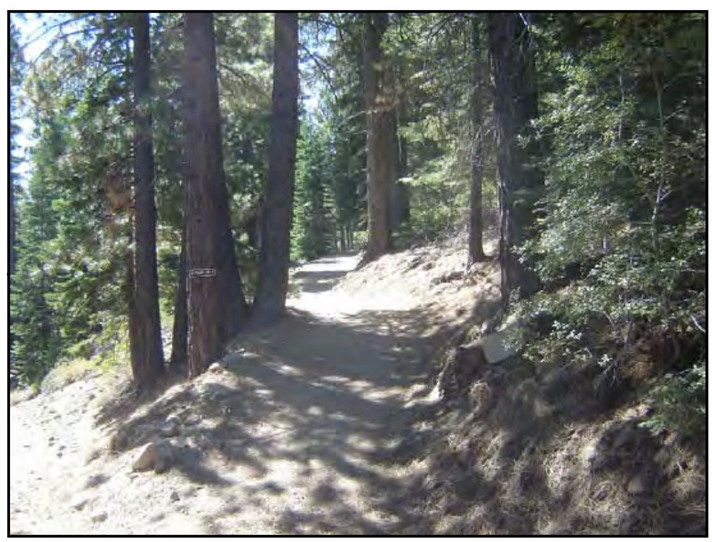


Photo 4 – Typical portion of existing trail through coniferous forest in the vicinity of the Northstar Community.

north fork associates

Photo Date: September 20, 2009

Figure 8-2A

SITE PHOTOS

Martis Valley Trail

Placer County, California

Photo 5 – Photo looking north to commercial development at Schaffer Mill Road / SR 267 intersection.

Photo 6 – View from 267 north to self-storage facility and airport area at west side of Martis Valley.

Photo 7 – View from Highway 267 looking southwest to portion of existing Tompkins Memorial Trail through sagebrush scrub.

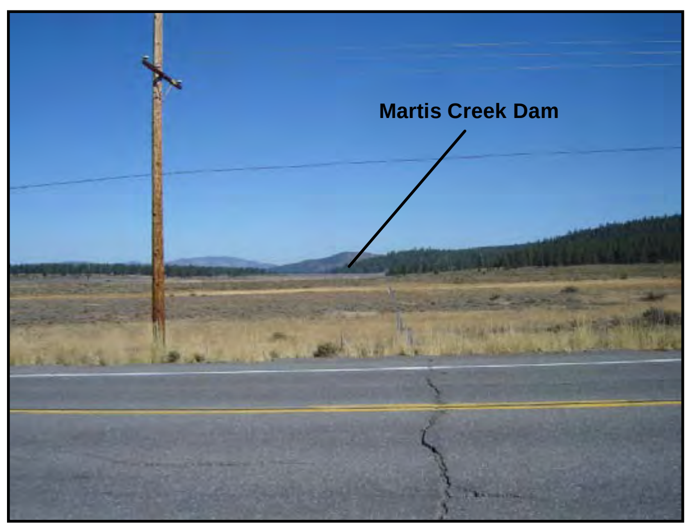


Photo 8 – Looking north from Highway 267 to Martis Creek Lake and dam.

north fork associates

Photo Date: September 20, 2009

Figure 8-2B

SITE PHOTOS

Martis Valley Trail

Placer County, California

Photo 9 – Looking east from Highway 267 in Martis Valley near the entrance to the Wildlife Viewing Area. The Northstar at Tahoe golf course is prominent at the east side of the valley floor.

Photo 10 – View from Highway 267 southwest to Northstar at Tahoe golf course. Ski runs on Lookout Mountain, homes at the edge of the golf course, and power poles are visible. Lift station is out of picture to left. No existing trails are visible within conifer forest area.

Photo 11 – Looking southeast from existing trail to Northstar CSDand Fire Department facilities area. Trail is east and downslope from the Gold Bend Condominiums in this location.

Photo 12 – Looking south from existing Tompkins Memorial Trail to existing crossing of Martis Creek. A fairway in the Lahontan golf course is clearly visible from this location.

north fork associates

Photo Date: September 20, 2009

Figure 8-2C

SITE PHOTOS

Martis Valley Trail

Placer County, California

Photo 13 – Looking northeast from section of existing Tompkins Memorial Trail near south of the existing crossing of Martis Creek.

Photo 14 – View looking north from the Tompkins Memorial Trail near Squeak's Bridge, west of Basque Drive. The Wildlife Viewing Area parking lot and airport development are visible.

Photo 15 – Filtered views north to Martis Valley from the existingTompkins Memorial Trail north of Martis Landing Road in the Northstar Community. Martis Lake is visible in the valley.

Photo 16 – Looking north from existing Tompkins Memorial Trail in area proposed for new crossing of Martis Creek. Forested knoll is visible at left. Meadow and riparian vegetation are visible in foreground along existing use path.

north fork associates

Photo Date: September 20, 2009

Figure 8-2D

SITE PHOTOS

Martis Valley Trail

Placer County, California

Photo 17 – Looking northeast to area of riparian and meadow area in vicinity of proposed new crossing of Martis Creek. Existing use trail crossing is visible in this photo.

Photo 18 – View southeast from shoulder of Highway 267 toward sagebrush in area proposed for new trail.

Photo 19 – View northeast from Schaffer Mill Road to area proposed for new trail.

Photo 20 – View from Schaffer Mill Road looking east toward proposed trail alignment along Highway 267.

north fork associates

Photo Date: September 20, 2009

Figure 8-2E

SITE PHOTOS

Martis Valley Trail

Placer County, California

Photo 21 – Looking west across the valley floor from existing Tompkins Memorial Trail approximately 500 feet north of Basque Drive. View is to forested knoll and riparian vegetation in area of proposed new crossing of Martis Creek.

Photo 22 – Looking west from existing Tompkins Memorial Trail to area proposed for new crossing of tributary to Martis Creek.

Photo 23 – Looking southeast from existing Tompkins Memorial Trail to area proposed for new crossing of tributary to Martis Creek. Area is characterized by dense riparian (willow) and forest vegetation.

Photo 24 – Example of dense conifer forest along Tompkins Memorial Trail in the Northstar Community.

north fork associates

Photo Date: September 20, 2009

Figure 8-2F

SITE PHOTOS

Martis Valley Trail

Placer County, California

Photo 25 – View to proposed parking lot
area north of Schaffer Mill Road.

Photo 26 – Looking east to knoll
area proposed for parking area
north of Schaffer Mill Road.

north fork associates

Photo Date: August 2, 2011

Figure 8-2G

SITE PHOTOS

Martis Valley Trail

Placer County, California

Photo 27 – View southwest to Castle Peak Way/Ridgeline Road/Northstar Drive roundabout. The north terminus of Segment 3F would begin in the forested area beyond the roundabout.

Photo 28– View from SR 267 west to Porcupine Hill. Segment 3B would generally follow the existing trail in forested area. The existing trail is not visible due to topography and vegetation.

Photo 29 – View east from shoulder of east bound SR 267. The Segment 3A alignment would parallel the road following the alignment of the existing dirt path.

Photo Date: August 2, 2011

Figure 8-2H

SITE PHOTOS

Martis Valley Trail

Placer County, California

CHAPTER 9

RECREATION

CHAPTER 9 RECREATION

This chapter describes the existing recreational resources and activities within the project area and impacts that the proposed project may have on these, and analyzes the potential for conflict among trail user groups.

9.1 ENVIRONMENTAL SETTING

The Northstar Community Services District (CSD) has defined two possible trail alignments for the proposed multiple-use trail, as shown on *Figure 3-2* in **CHAPTER 3 PROJECT DESCRIPTION**. The first segment of both alignments would be the same – starting near the Town of Truckee/Placer County boundary and ending at the existing parking area for the Martis Creek Lake Project Wildlife Viewing Area. From that point, the Valley Alignment primarily follows a portion of the existing Tompkins Memorial Trail through Martis Valley to the Village at Northstar . The Highway Alignment follows a segment of the Tompkins Memorial Trail along the southern side of State Route (SR) 267 and up Porcupine Hill to Northstar Drive, then crosses to the south side of Northstar Drive and heads westerly to reach the Village at Northstar. Leaving the Village at Northstar, both trail alignments would continue uphill (southerly) towards Sawmill Flat Reservoir and Forest Route 73. A new trailhead and parking area is also proposed. Four potential locations for the new parking area and trailhead have been identified. The recreation impacts of each location are evaluated at an equal weight in **CHAPTER 11 CEQA DISCUSSIONS.**

Constructing the Martis Valley Trail would entail widening and paving portions of the existing Tompkins Memorial Trail alignment, as well as constructing new trail segments. Both trail alignments run through private property and the U.S. Army Corps of Engineers (USACE) Martis Creek Lake Project area. The Martis Valley Trail project area is shown in *Figure 3-1 Project Vicinity* in **CHAPTER 3 PROJECT DESCRIPTION**.

Regional Setting

The proposed Martis Valley Trail would be located on the eastern side of the Sierra Nevada Mountains, north of Lake Tahoe and southeast of the Town of Truckee. Truckee is the major urban area in the Sierra Nevada Mountains north of Lake Tahoe, and serves as a regional center for business, commerce and transportation. SR 267, a heavily traveled two-lane highway connecting Interstate 80 (I-80) to SR 28 in the Lake Tahoe Basin, bisects the valley floor on a slightly elevated west-east alignment.

Regional Recreational Facilities

The entire Lake Tahoe Basin is a major destination for outdoor sports during both summer and winter, with numerous recreational opportunities including skiing, hiking, fishing, and cycling. The North Tahoe Public Utility District and the Tahoe City Public Utility District each operate several parks, beaches and trails around North Lake Tahoe. Camping and hiking opportunities are provided at national forests operated by the U.S. Forest Service and state campgrounds operated by California Department of Parks and Recreation. Other public recreational facilities in the region are operated by the USACE, Placer County Parks Division, and the Truckee-Donner Recreation and Park District (TDRPD).

Regional Trails and Bikeways

The northern Tahoe Basin includes segments of some of California's major trail systems, including the Pacific Crest Trail, Commemorative Emigrant Trail, and Tahoe Rim Trail. Refer to *Figure 3-3 Regional Trails Map* showing existing trails in the Tahoe-Truckee region. A network of lesser-known formal trails exists, including trails within the Northstar California Ski Area and Tahoe National Forest, although many of these lack the necessary continuity to provide for effective regional use. Future regional recreational trails, such as the Sawtooth Rim Trail planned by the U.S. Forest Service, will contribute to the Tahoe Basin's regional trail system. The region also has an extensive network of informal hiking and biking trails.

On-street bikeways in Truckee that provide regional connections include SR 89 northbound and southbound, and SR 267, both of which are currently signed as Class III bike routes. A Class III bike route is one that is designated by signs or permanent markings and shares the right-of-way with pedestrians or motorists. Donner Pass Road (Old Highway 40) provides a westward route over the summit. I-80 between Cisco Grove and SR 20 provides cyclists with a regional connection to the Sierra foothills.

Local agencies and advocacy groups have supported a regional multiple-use trail system to connect the communities of Truckee, Northstar, Kings Beach, and Tahoe City. Segments of trail are currently being planned along the Truckee River between Tahoe City and Truckee, and between Tahoe City and Kings Beach. In addition, the Town of Truckee is in the process of implementing their Trails Master Plan, one element of which will connect their downtown core to the Placer County line near the Truckee-Tahoe Airport. The proposed Martis Valley Trail would provide another key connection in this regional system, linking the Town of Truckee to Northstar and Northstar to trails that access Kings Beach and Tahoe City. When completed, the overall trail system would not only connect the communities mentioned, but would provide access to many existing recreational trail networks throughout the eastern portions of Placer and Nevada counties. The *Martis Valley Community Plan* also includes plans for trail connections between Northstar and the Town of Truckee. *Figure 3 Recreation Plan* in the Community Plan shows a proposed trail parallel to the south side of SR 267 between Schaffer Mill Road and the existing trails in the Martis Creek Project Wildlife Management Area. The Community Plan states that proposed trails are located to connect parks, resorts, Forest Service trails, adjoining wilderness areas and residential areas.

Local Setting

Land uses in the valley include the Northstar California resort (including Northstar California golf course, the Village at Northstar, residential areas of Northstar, and the Northstar California ski area), Lahontan Golf Club and residential development, Martis Camp residential development, Truckee-Tahoe Airport, USACE Martis Creek Lake Project, and undeveloped areas of Tahoe National Forest. Recreation opportunities in the local area are provided at Northstar California, the Martis Creek Lake Project, and a variety of public parks and trails in the Town of Truckee.

Northstar California

Northstar California is a resort community served by the Northstar CSD. The Northstar CSD currently serves 831 single-family homes, 897 condominiums, and 71 commercial establishments (pers. comm., Staudenmayer 2011). Recreation opportunities offered by Northstar California include an 18-hole golf course, cross country and downhill skiing, and a multipurpose trail system that traverses both the Northstar community and USACE property, which abuts the northern and western boundaries of the Northstar community.

Martis Creek Lake

The USACE Martis Creek Lake Project area covers 1,891 acres and provides non-motorized boating, hiking, picnicking, wildlife viewing, and camping opportunities. This area is generally open from the end of April to November 15th. The majority of the Martis Creek Lake Project area is north of SR 267 and includes the lake, campgrounds, hiking trails, and picnic facilities. The portion of the Martis Creek Lake Project area south of SR 267 is designated for Wildlife Management. It is crossed by portions of the Tompkins Memorial Trail, which is maintained by the Northstar CSD. Other facilities in this area include the Wildlife Viewing Area parking area, an interpretative exhibit, and a portable toilet. A gate to the Wildlife Viewing Area parking area is closed by the USACE during the off-season from mid-November through the end of April. As reported by USACE, visitation to the Martis Creek Lake Project area reached a high of 107,600 in 2009. Visitation dropped in 2010 to 94,600 and dropped again in 2011 to 85,400. Historically, visitation was between 20,000 and 40,000 between 1987 and 2000, and visitation increased steadily between 2000 and 2009. USACE currently has one permanent ranger who works seasonally and one year-round maintenance position to serve the Martis Creek Lake Project area.

Local Trails and Bikeways

The Tompkins Memorial Trail, which is maintained by the Northstar CSD, currently provides 14.6 miles of unpaved trails through the Northstar community and the USACE Martis Creek Lake Project area. The majority of these trails are open to the public for bicycle and pedestrian use; the 0.8-mile trail segment along Martis Creek is limited to pedestrian use. These existing trails through the Martis Creek Lake Project Wildlife Viewing Area are some of the most popular trails in the Truckee area. The heavy use of the trail along Martis Creek has led to water quality impacts as erosion of the trail and streambanks lead to sedimentation of the creek, and impacts to wildlife from the presence of humans and dogs in the area. The Truckee River Watershed Council and the USACE conducted restoration activities including small scale restoration related to trail re-alignment and meadow improvements in the Martis Creek Lake Project Wildlife Viewing Area, and spawning gravel augmentation below Martis Lake Dam. In 2010, the Truckee River Watershed Council began an assessment of the Martis Creek watershed. The assessment includes watershed attributes, an existing conditions inventory and identification of additional restoration opportunities. The field assessment has been completed and the final report is anticipated in April 2012. (D. Shaw, pers. comm.).

In 2002, the Town of Truckee adopted a Trails Master Plan which provides detailed guidelines for development of over 130 miles of trails and bikeways within the Town. A major priority in that plan is the Truckee River Legacy Trail that is planned to extend from Donner Lake to Glenshire. Phases 1, 2, and 3A of this trail have been completed, linking Truckee Regional Park to the Riverview Sports Park and extending from Riverview Sports Park to an overlook of an historic site just west of the Tahoe-Truckee Sanitation Agency plant. The Town is currently working on design and environmental review for Phase 3B, which would connect the trail to the Glenshire Subdivision. Future phases 4 and 5 would extend the trail from the Truckee Regional

Park to the Hilltop development, Donner State Memorial Park, and the Coldstream Specific Plan area.

The Town is also currently working to provide a Class I trail along the Brockway Road corridor between the north end of the proposed Martis Valley Trail and the Regional Park. A Class I bikeway provides a completely separated right-of-way designated for the exclusive use of bicycles and pedestrians with cross flows by motorists minimized. This trail would then tie into the Truckee River Legacy Trail. The Town has also recently begun planning for construction of the first phase of the Tahoe Donner to Downtown Recreational Trail.

The Donner Land Trust is undertaking development of the 22-mile Donner Lake Rim Trail, which is planned to encircle the peaks around Donner Lake. This trail provides several connections to local access trails, the Pacific Crest Trail, and the Town of Truckee's local trail system. The Donner Land Trust also maintains trails within the Waddle Ranch Preserve, which is accessed in Martis Valley through the USACE Martis Creek Lake Project area.

Other trails within Truckee are primarily informal trails, developed over many years of use and lacking any cohesiveness or planned connections. Other formal trails in the project area include a 60-mile trail system owned and maintained by the Tahoe Donner Association (the majority of which is located north of the Town of Truckee), and a portion of the U.S. Forest Service-maintained Commemorative Emigrant Trail.

The current on-street bikeway system was implemented beginning in 1998 when the Town installed the first Class I bikeway along Donner Pass Road from the east Gateway area to Coldstream. Class II bike lanes have since been continued on Donner Pass Road to the east end of Donner Lake and the along the length of Northwoods Boulevard loop in Tahoe Donner. A bike lane or Class II bikeway is defined as a portion of the roadway that has been designated by striping, signage and pavement markings for one-way bicycle travel on either side of a street or highway.

SR 267 is currently classified as a Class III bikeway; however, the Placer County Transportation Planning Agency's 2001 Regional Bikeway Plan proposes a Class II bike lane for SR 267 in the future. As noted above, the *Martis Valley Community Plan* anticipates construction of a trail through Martis Valley connecting the Town of Truckee and Northstar.

Existing Tahoe Basin Trail Usage

Pedestrian, bicycle, and equestrian trails are a high priority for the residents of and visitors to Martis Valley, the Town of Truckee, and the Lake Tahoe region. The technical memorandum, *Environmental, Economic and Public Health Impacts of Shared-Use Paths in Lake Tahoe* (Alta Planning + Design 2009), prepared for the Tahoe Regional Planning Agency (TRPA), summarized data regarding existing bicycle and pedestrian activity levels. This data was obtained through a series of counts and surveys conducted over twelve years by the Tahoe Coalition of Recreation Providers (TCORP), the Tahoe City Public Utility District (TCPUD), TRPA, and Stantec Consulting. Survey locations were distributed throughout the Tahoe region. The memorandum reaches the following findings regarding current non-motorized travel on shared-use paths:

- The region's existing shared-use paths are estimated to serve 5,690 bicyclists and 3,260 pedestrians on a typical peak summer day.

- Trail use generally peaks in mid-day (roughly 11 AM to 2 PM). This is consistent with automobile traffic patterns, and reflects the high proportion of recreational travel in the Tahoe region. In some locations, such as the Truckee River Trail, there is also a lower peak in the 5 PM hour, which probably indicates commute travel.
- Trail use levels vary substantially, even from one day to the next. For example, on two subsequent mid-week days (August 8 and 9 2007) total use of the Truckee River Trail varied 25 percent and total use on the West Shore Trail varied by 30 percent. This variation indicates that any evaluation of trail use and associated impacts should be considered to be only a rough approximation.
- Where shared-use path facilities parallel roadways, the preponderance of bicyclists use the facility rather than the roadway.
- The type of facility-user varies greatly between facilities. On the TCPUD trails and the trails serving El Dorado Beach and Camp Richardson, the preponderance of users were bicyclists. In more urbanized centers, such as at Stateline and along Incline's Lakeshore Drive, the preponderance was pedestrians.
- Overall, slightly more than half of trail users indicate that they are Tahoe residents, which can include seasonal residents. This proportion is higher for the more urban locations, and lower for those locations with more scenic amenities.
- Of the trail users that are Tahoe visitors, a very large proportion (on the order of 80 to 90 percent) are overnight visitors to the Tahoe Region, with only 10 to 20 percent indicating that they are day visitors.
- A substantial proportion of all trail users drive to the trail, rather than walk or bike from their residence or lodging facility. The rates at which users drive to the trail rather than walk or bike varies among facilities. Trails with greater connectivity to residential and commercial areas tend to exhibit lower proportions of users driving to the trail.

9.2 REGULATORY FRAMEWORK

Federal Regulations

U.S. Army Corps of Engineers Martis Creek Lake Master Plan

The *Martis Creek Lake Master Plan* was originally adopted in November 1977. It serves as a guide for preservation, development, and administration of recreation and other resources of the Martis Creek Lake Project. Portions of both potential alignments for the Martis Valley Trail are located within the Martis Creek Lake Project.

Martis Creek Lake provides flood control for the Truckee River through the City of Reno. It was authorized as the Truckee River and Tributaries Project under the Flood Control Act of 1962 and the identified project purposes were flood control and future water supply. However, it was also noted that the lake would not be operated for water supply purposes until a demand developed, which was anticipated to occur in approximately 25 years from adoption of the Master Plan.

The lake's spillway crest is at an elevation of 5,838 feet, while the top of the dam is at an elevation of 5,858 feet. At gross pool (filled to the top of the spillway crest), the lake would have a surface area of 770 acres and contains 20,400 acre-feet of water. The reservoir is currently maintained below its gross pool capacity because of significant safety issues with maintaining high water levels. Deficiencies with the dam that prevent attainment of the reservoir's full planned capacity, include seepage through the dam's foundation that increases as the water level in Martis Creek Lake rises, an undersized spillway that could cause water to overtop the dam during extremely large flood events, and a previously unknown earthquake fault line underlying the dam. In consideration of these deficiencies, USACE maintains the dam's outlet gates in an open position to prevent high water levels in the lake (USACE 2011).

The Master Plan covers an area of 1,891 acres. At the time of preparation of the Master Plan, recreational facilities in the plan area included a campground, a day use area, and access to the wildlife management area. The Master Plan noted that implementation of the development included in the plan would enhance recreational opportunities in the area, including by providing for wildlife observation and hiking and nature trails. However the Master Plan also noted that federal regulations required participation and funding by a non-federal entity, and there was a lack of interest from local agencies and organizations in funding and assuming responsibility for recreation facilities in the Master Plan area at the time the Master Plan was adopted.

Chapter VII of the Master Plan identifies the Physical Plan of Development for the Master Plan area. Planned improvements include: increasing the total number of campsites from 25 to 75 by creating two new campgrounds; establishing a picnic area with parking for 10 cars and 10 picnic sites; expanding the day use area; and expanding the wildlife viewing area by constructing a total of 5 miles of nature-interpretive hiking trails. The Master Plan notes that it will be updated to be consistent with changing public use needs.

The Master Plan includes data regarding recreation use of the Martis Creek Lake Project for the years 1974, 1975 and 1976, and projections for future use. The Master Plan found that the maximum practical use that could be expected for the Martis Creek Lake Project is 75,000 recreation days, and that level of use was expected to be reached in 2025. As noted in the Master Plan, due to the elevation of the lake and Master Plan area, the majority of recreation use occurs between mid-May and mid-September.

State Regulations

There are no state regulations applicable to the analysis of the project's impacts related to recreation.

Local Regulations

Placer County General Plan

The *Placer County General Plan* Recreational and Cultural Resources section establishes goals and policies pertaining to recreation facilities and trails. The following goals relate to recreational resources and trails and are applicable to this chapter's analysis of the potential impacts to those resources.

Goal 5.A: To develop and maintain a system of conveniently-located, properly-designed parks and recreational facilities to serve the needs of present and future residents, employees, and visitors.

Goal 5.C To develop a system of interconnected hiking, riding, and bicycling trails and paths suitable for active recreation and transportation and circulation.

Placer County Regional Bikeway Plan

The Placer County Regional Bikeway Plan (PCTPA 2002) contains a system of existing and planned bikeway facilities to provide for transportation and recreational bicycle travel. Twelve individual goals were identified in this plan, each with separate policies. The overall goal for the Placer County Regional Bikeway Plan is:

- ❖ To promote safe, convenient, and enjoyable cycling by establishing a comprehensive system of regional bikeways that links the communities of Placer County.

Martis Valley Community Plan

The *Martis Valley Community Plan* Recreation and Trails section establishes goals and policies pertaining to recreation facilities and trails. The following goals relate to recreational resources in the Community Plan area and are applicable to this chapter's analysis of the project's potential recreation impacts

Public Recreation and Parks.

Goal 7.A: The County shall work with the TDRPD and other recreation providers to implement this Plan and to provide recreation facilities/opportunities within the Plan area to meet the needs of present and future residents.

Goal 7.B: To provide a wide range of recreational opportunities in the Martis Valley Community.

Goal 7.C: To encourage the development of private recreation facilities.

Trails

Goal 7.E: To develop a system of interconnected hiking, riding, and bicycling trails and paths suitable for active recreation as well as transportation and circulation.

Tahoe Regional Bicycle and Pedestrian Plan

The Tahoe Regional Bicycle and Pedestrian Plan presents a guide for planning, constructing, and maintaining a regional bicycle and pedestrian network and support facilities and programs. Although the project site is outside the boundaries of the Tahoe Basin and the Tahoe Regional Bicycle and Pedestrian Plan, the project may contribute to regional attainment of the goals identified in that plan. These goals are:

Goal 1: Complete a bicycle and pedestrian network that provides convenient access to basin destinations and destinations outside the basin.

Goal 2: Raise awareness of the bicycle and pedestrian network and encourage safe and increased bicycling and walking.

Goal 3: Provide environmental, economic, and social benefits to the Region through increased bicycling and walking.

Town of Truckee Trails and Bikeways Master Plan

The trailhead for the proposed Martis Valley Trail would be located adjacent to the Town of Truckee, and the trail would provide access to trails within Truckee, thus contributing to attainment of some of the goals of the Town of Truckee Trails and Bikeways Master Plan. These goals include the following:

Planning Goal 1 - Trail and Bikeway System: The trail and bikeway system should provide a full-range of safe and convenient recreation and alternative transportation opportunities for multiple users

Planning Goal 2 - Connectivity and Continuity: The trail and bikeway system should link the Town's historic downtown, residential and commercial areas, and recreational, educational, natural, and historical resources utilizing public and private lands as necessary and appropriate.

Planning Goal 5 - Land Use and User Conflicts: The trail and bikeway system should be planned to minimize land use and user conflicts to provide a safe and enjoyable experience for the user.

Planning Goal 6 - Community Resources: The trail and bikeway system should seek to access, protect, and enhance the natural and historic resources of Truckee.

Planning Goal 7 - Plan Support: Community and responsible agency support is critical to successfully implement the planned trail and bikeway system. Open and consistent involvement and education in the final planning and implementation of the Plan should be encouraged and regularly provided.

Development Goal 3 - Construction: The trail and bikeway system should be constructed consistent with the goals of the Plan and incorporate measures to ensure protection of the natural environment.

Development Goal 4 - Project Planning: Careful project-specific planning is necessary to ensure consistency with the goals of the Plan and should be made a mandatory element of all trail and bikeway construction projects.

Management Goal 1 - Stewardship: Cooperation and coordination with both public and private entities should be established to ensure the careful and responsible management of the trail and bikeway system.

Management Goal 2 - Maintenance: Quality and consistent long and short-term maintenance of the trail and bikeway system is paramount for the success of the system.

9.3 IMPACTS

Significance Criteria

Although the analysis in the Initial Study prepared for the Martis Valley Trail found that the project would not have any significant impacts related to recreation, comments received on the Notice of Preparation for this EIR raised concerns regarding the potential for the trail project to result in conflicts between pedestrians and bicyclists, changes in the current non-paved trail experience, and increases in recreation use of the area leading to requirements for increased maintenance and staffing of existing facilities. Therefore, the analysis below evaluates the impacts of the proposed project in consideration of the following significance criteria:

- Adversely Affect Use of Existing Recreational Facilities;
- Create Conflicts Between Trail User Groups; and
- Conflict with U.S. Army Corps of Engineers *Martis Creek Lake Master Plan*

The physical environmental effects associated with construction and operation of the proposed trail are evaluated in chapters 4 through 8 of this Draft EIR as well as in the Initial Study that was circulated with the Notice of Preparation.

Project Impacts

IMPACT 9.1:	Adversely Affect Use of Existing Recreational Facilities	
APPLICABLE POLICIES AND REGULATIONS:	Martis Creek Lake Master Plan Placer County General Plan Martis Valley Community Plan	
	Valley Alignment	**Highway Alignment**
SIGNIFICANCE WITH POLICIES AND REGULATIONS:	Potentially Significant	Potentially Significant
MITIGATION MEASURES:	Mitigation Measure 9.1a	Mitigation Measure 9.1a
SIGNIFICANCE AFTER MITIGATION:	Less than Significant	Less than Significant

The proposed trail alignments would pass through private properties including the Northstar California resort and community as well as the Martis Creek Lake Project area, which is managed by the USACE. The existing trail network in the area is the 14.6 mile Tompkins Memorial Trail, which is maintained by Northstar CSD. As noted above, the existing trail along Martis Creek through the Martis Creek Lake Project Wildlife Management Area is one of the most popular trails in the Truckee/North Tahoe area. The Tompkins Memorial Trail network is currently used by pedestrians, bicyclists, and other forms of non-motorized transportation. Constructing either of the proposed trail alignments, the Highway Alignment or the Valley Alignment, would entail widening and paving portions of the existing Tompkins Memorial Trail alignment as well as constructing new trail segments. The trail would allow for pedestrian and bicycle use, and would be constructed to meet the standards of the Americans with Disabilities Act (ADA). The maximum grade of the trail would be five percent. The width of the paved portion of the trail would generally be ten feet, and two-foot wide unpaved shoulders would be provided on both sides of the pavement.

The proposed project would replace a portion of the Tompkins Memorial Trail with a paved surface. This would decrease the availability of unpaved trails in the project area. Under the Valley Alignment, approximately 1.14 miles of the existing Tompkins Memorial Trail would be converted to paved surfaces. Under the Highway Alignment, approximately 1.16 miles of the existing Tompkins Memorial Trail would be converted to paved surfaces. Under either alignment, several short sections of the Tompkins Memorial Trail would be abandoned and revegetated.

Four potential locations for a new parking lot have been identified. Impacts associated with construction and use of each potential parking lot are evaluated in **CHAPTER 11 CEQA DISCUSSIONS**. Primary access to the northern section of either of the proposed Martis Valley Trail alignments (between the trailhead and the Village at Northstar) would be from the proposed new parking lot, connections from the existing Tompkins Memorial Trail and trails in the Town of Truckee, the parking lot for the Martis Creek Lake Project Wildlife Viewing Area, and residential areas and the commercial center within the Northstar community. Access to the southern sections of the trail, Segments 3E and 4, (between the Village at Northstar and Sawmill Flat) would come from existing trails and roadways to and near the Village at Northstar as well as from Forest Route 73.

Projected Martis Valley Trail Usage

Construction of the Martis Valley Trail and paving portions of the existing trail would attract more trail users and could potentially result in changes in the use of portions of the trail. LSC Transportation Consultants, Inc. (LSC) prepared a memorandum, Martis Valley Trail Use Forecasts (2011a), evaluating the level of bicycle and pedestrian activity projected for the Martis Valley Trail. The LSC memorandum provides daily, peak hour, and annual trail usage estimates for the following three analysis locations:

1. A point immediately south of Schaffer Mill Road;
2. The point where the trail crosses the boundary between the Martis Creek Lake Project and the Northstar area; and
3. The point just to the southeast of the Village at Northstar where the trail begins climbing towards Sawmill Flat.

To evaluate the potential trail use activity, LSC developed a specific bicycle/pedestrian usage model for the study area, using the existing Town of Truckee TransCAD Model and based on the methodologies used to develop the Tahoe Region Bicycle and Pedestrian Corridor Use Model, as described in Tahoe Bike/Pedestrian Model Memo (LSC 2010) and used in the preparation of the 2010 Lake Tahoe Regional Bicycle and Pedestrian Plan. The Tahoe Bike/Pedestrian Model Memo is available for review at:

http://www.tahoempo.org/documents/TahoeBikePedSimplifiedModelInstructions.PDF

The trail use estimates in the LSC study were determined based on the maximum feasible demand, as adjusted based on specific reduction factors that account for site-specific trail characteristics. The maximum feasible demand is defined as the greatest number of users that would be expected if all conditions along the facility were perfect, and the specific methodology for calculating maximum feasible demand is described in the Tahoe Bike/Pedestrian Model Memo. The reduction factors include consideration of trail class, grade, continuity, maintenance, recreational value, and congestion.

The LSC model developed for the proposed project generated estimates for the number of trail users in the following categories:

- Residents biking directly to/from the trail from home
- Visitors biking directly to/from the trail from lodging
- Residents or visitors driving to the trail to bicycle

- Residents walking directly to/from the trail from home
- Visitors walking directly to/from the trail from lodging
- Residents or visitors driving to the trail to walk

The "walk" category also includes other non-motorized and non-bicycle travel modes, such as in-line skaters. The LSC model also provided estimates of parking demand based on the trail usage estimates. The usage estimates generated by the LSC model are summarized in *Table 9.1* under both existing (2011) and future (2025) conditions. It is noted that the LSC model assumed that the connection between the Martis Valley Trail and the Town of Truckee trail system at the northern terminus of the Martis Valley Trail was in place in both the existing and future conditions. As indicated in the Town of Truckee Trails and Bikeways Master Plan, the Town is actively working to provide a Class I separated multiuse path along the Brockway Road corridor between the north end of the Martis Valley Trail and the Regional Park, where it will tie to the Legacy Trail extending from Donner Lake to Glenshire.

Table 9.1
Estimated Martis Valley Trail Use

Scenario	User Group	Analysis Locations		
		South of Schaffer Mill Road	North of Northstar	South of Northstar
2011 – Busy Summer Day	Bicyclists	262	338	161
	Pedestrians	23	90	62
	Total	285	428	202
2011- Total Annual Use		29,000	43,000	20,000
2025 – Busy Summer Day	Bicyclists	1,094	891	281
	Pedestrians	62	110	80
	Total	1,185	1,001	361
2025 – Total Annual Use		121,000	102,000	37,000

Source: LSC 2011a

The LSC analysis concluded that:

- Under 2011 conditions, the location that received the highest use was on the north side of the Northstar area and on the southern boundary of the USACE Martis Creek Lake Project. If the trail were built today, approximately 428 person-trips would pass this point over a busy summer day, and approximately 43,000 over an entire year.
- The preponderance of trail use at the analysis locations would consist of bicyclists. Of the total users, 91 percent are forecast to be bicyclists at the northern location (south of Schaffer Mill Road), and 79 percent at the other two locations.
- Approximately two-thirds of trail users are expected to walk or bicycle to the trail and one-third will drive to/from the trail.
- Trail use will grow substantially in the future, reflecting development along the trail corridor. In particular, use of the northernmost portion of the trail will grow, associated with development along Schaffer Mill Road as well as in the portions of Truckee just to

the north. 2025 levels at the northernmost analysis point will be roughly four times current estimates, making this the busiest section of the trail.

Based on the methodology described above, LSC estimated that the trail would support approximately 66,000 person-trips per year if it were built today (existing conditions), increasing to 168,000 person-trips per year by 2025. The proposed project has been designed to be a multiple-use accessible trail that would accommodate user demand. The trail use forecasts at the three analysis points indicate that trail congestion in the future condition would be low to moderate.

Increased Congestion on Existing Trails

The proposed project is expected to increase trail usage in the project area. Paving portions of the existing trail system would increase public accessibility to other portions of the existing trail system that remain unpaved, and construction of the Martis Valley Trail would not cut off access to the existing unpaved trails in the area. While the majority of the increased trail usage would occur along the proposed Martis Valley Trail, new users of this proposed facility may also use the existing trails in the area. For example, a hiker may walk along the Martis Valley Trail for a portion of their hike, and then walk along the Tompkins Memorial Trail for another portion of their hike. However, because trail use forecasts for the Martis Valley Trail indicate low to moderate congestion levels, and the Tompkins Memorial Trail would have greater reduction factors based on trail class and connectivity, it is expected that trail congestion on the Tompkins Memorial Trail would remain low. Because access to the existing trails would be preserved and trail congestion would remain low, impacts related to trail congestion from increased trail usage that may be generated by use of the proposed Martis Valley Trail are considered less than significant.

Physical Deterioration of Existing Trails

As discussed above, construction of the Martis Valley Trail under either the Valley Alignment or the Highway Alignment could lead to an increase in the use of area trail networks. The proposed Martis Valley Trail alignments would connect to several existing unpaved trails. Northstar CSD maintains the existing Tompkins Memorial Trail system and would maintain the Martis Valley Trail. Continued maintenance of the Tompkins Memorial Trail system would ensure that the increased use of the existing trails associated with use of the Martis Valley Trail would not cause or accelerate their substantial physical deterioration. The proposed project would have a less than significant impact related to deterioration of existing trails.

Maintenance activities including sweeping, crack sealing, surface restoration, vegetation control, and removal of slough would be performed by Northstar CSD staff or volunteers, and maintenance of both the Tompkins Memorial Trail and the Martis Valley Trail would occur annually or as needed. Additional maintenance may be required as a result of weather-related events (e.g., removal of downed trees and slide removal), routine wear from trail use, and unauthorized activities such as vandalism.

Martis Creek Lake Project Operational Effects

As discussed above, the proposed trail would pass through the Martis Creek Lake Project, which is managed by the USACE. Expansion of the trail system and the associated increase in recreational activity levels in the Martis Creek Lake Project could result in the need for additional maintenance of USACE facilities and law enforcement. As discussed above, USACE currently has one full-time ranger position from the end of April through mid-November and one year-round maintenance position to serve the Martis Creek Lake Project.

Access to either alignment of the proposed trail would be provided from the Martis Creek Lake Project Wildlife Viewing Area parking lot on the south side of SR 267. The increase in trail usage associated with the proposed trail could cause an increased demand for visitor services from the USACE. While trail maintenance would continue to be provided by Northstar CSD, other cost increases would be associated with parking lot maintenance, additional law enforcement/ranger services staffing, and emergency response. These additional costs could result in a decline in operations at the Martis Creek Lake Project area. In order to construct the proposed trail, either the Highway or Valley Alignment, an operating agreement between the USACE and Northstar CSD would need to be executed. To ensure that impacts to operations and visitor services at the Martis Creek Lake Project are reduced to a less than significant level, *Mitigation Measure 9.1a* requires that the agreement describe increased operational requirements at the Martis Creek Lake Project and identify funding sources to meet these increased requirements.

Programmatic Analysis of Segments 3E and 4

The LSC report on estimated trail usage evaluated the entire proposed Martis Valley Trail, including Segments 3E and 4, south of the Village at Northstar. Projected future trail use for the area south of the Village at Northstar is provided in *Table 9.1* above. As concluded above, access to existing trails would be preserved and trail congestion would remain low, impacts related to trail congestion from increased trail usage that may be generated by use of the proposed Martis Valley Trail are considered less than significant.

Trail maintenance for Segments 3E and 4 will be the responsibility of Northstar CSD. These segments will provide connection to several trails in the Lake Tahoe Basin Trail System, however trail usage, as shown in *Table 9.1*, for these segments is substantially less than the remainder of the Martis Valley Trail. Physical deterioration of existing trails as a result of providing access to these trails through the construction of Segments 3E and 4 is expected to be less than significant.

IMPACT 9.2:	Create Conflicts Between Trail User Groups	
APPLICABLE POLICIES AND REGULATIONS:	Martis Creek Lake Master Plan Placer County General Plan Martis Valley Community Plan	
	Valley Alignment	**Highway Alignment**
SIGNIFICANCE WITH POLICIES AND REGULATIONS:	Potentially Significant	Potentially Significant
MITIGATION MEASURES:	Mitigation Measure 9.2a	Mitigation Measure 9.2a
SIGNIFICANCE AFTER MITIGATION:	Less than Significant	Less than Significant

Because the proposed trail would be a multiple-use trail and because it would intersect with other trails, the potential exists for conflicts between pedestrians, bicyclists, and other non-motorized transportation. Concerns regarding potential safety conflicts between bicyclists and pedestrians and dogs were specifically raised in comments on the Notice of Preparation for this Draft EIR. In particular, comments noted that the area within the Wildlife Management Area near the Wildlife Viewing Area parking lot is currently used as an off-leash dog walking area, and that fast-moving bicyclists (or other wheeled trail users such as in-line skaters) could collide with dogs. While user conflicts do not constitute an effect on the physical environment under CEQA, an increase in potential for user conflicts could adversely affect the quality of the recreation experience.

The Federal Highway Administration and the National Recreational Trails Advisory Committee report *Conflicts on Multiple-Use Trails: Synthesis of the Literature and State of the Practice* (1994) concluded that conflict in outdoor recreation settings (such as trails) can best be defined as "goal interference attributed to another's behavior." As such, trail conflicts can and do occur among different user groups, among users within the same user group, and as a result of factors not related to users' trail activities. Conflict has been found to be related to activity style, focus of trip, expectations, attitudes toward and perceptions of the environment, level of tolerance for others, and different norms held by different users.

Multiple-use trails are becoming increasingly common. It is also becoming increasingly common for trail users to encounter other users (or evidence of use) on trails. Some encounters are with trail users participating in the same activity (such as two pedestrians), and some are with trail users engaged in different activities (such as a pedestrian and a bicyclist). While most trail encounters tend to be pleasant or neutral, some are unpleasant. As the number of trail users and diversity of trail activities increases, the potential for conflict resulting from unpleasant encounters also increases (FHWA 1994).

As stated above, the proposed Martis Valley Trail would be utilized by pedestrians, bicyclists, and other forms non-motorized transportation. While the trail use and potential for conflicts is expected to be similar for either the Valley Alignment or the Highway Alignment, there is currently considerable pedestrian and dog activity occurring south of the existing Martis Creek Lake Project Wildlife Viewing Area parking lot. Therefore, there is expected to be a slightly higher potential for dog-related conflicts in the vicinity of the parking lot and southerly along the Valley Alignment.

A study conducted in 2004 assessed trail-related conflicts and their resolutions at state parks throughout the United States. This study, the results of which are presented in the U.S. Forest Service's (USFS) *State Park Trail Conflicts and Resolution Strategies, Proceedings of the 2004* Northeastern Recreation Research Symposium, found that of the five types of conflicts studied (among or between trail users, between trail users and other recreationists, between trail users and adjacent private property owners, within a trail use activity, or with non-recreation land users and uses), conflicts among or between trail users were rated as the most serious by a majority of respondents identifying a most serious conflict.

The USFS State Park trail study found that conflict between users was most common between non-motorized uses. Conflict among trail users with and without dogs occurs in a majority of states. To reduce dog related conflicts, leash laws and their enforcement, prohibition of dogs from trails, etiquette training and mandatory dog feces removal are used in various states. These approaches have proven to be moderately successful (USFS 2004).

As discussed above, LSC estimated the potential level of congestion that would occur on the Martis Valley Trail. The estimates were based on the "Shared Off-Street Path" level of service (LOS) methodology in the Highway Capacity Manual (Transportation Research Board 2000 as cited in LSC 2011a). LOS is based on the number of passing events that occur during the peak hour of trail use. A passing event is defined as either passing a bicycle/pedestrian traveling in the opposite direction or overtaking another bicycle/pedestrian traveling in the same direction. LSC reached the following conclusions regarding trail congestion at the three analysis locations:

- South of Schaffer Mill Road (northern section of trail) – low congestion (LOS B or C) in existing conditions, moderate congestion in 2025.
- North of Northstar (middle section of trail) – roughly same as northern section – low under existing conditions, moderate in 2025.
- South of Northstar (southern section of trail) – fewer trail users than the northern section – no congestion under existing or 2025 conditions.

The proposed Martis Valley Trail would incorporate several measures to reduce user conflicts. These measures include a ten-foot paved trail width with two-foot unpaved shoulders on each side, informational signage to remind trail users of trail courtesy along the trail route, and signage regarding trail etiquette and dog leash requirements posted at trail entrances. These measures are consistent with the recommendations of the studies cited above as well as the information presented in several of the trail design publications available at the American Trails Organization resource library (http://www.americantrails.org /resources/trans/index.html). The proposed trail width could reduce potential user conflicts compared to the current narrower trail width; however the number of trail users and variety of trail use activities are projected to increase with the proposed trail which could result in increased conflicts.

Several segments of both of the trail alignments being evaluated occur on private property in unincorporated Placer County. Placer County has adopted a strict leash law requiring that dogs off their owners' property be restrained by leash, lead or adequate enclosure. This law would apply to those segments of the proposed trail outside the Martis Creek Lake Project and compliance with this law would minimize the potential for dog-related trail user conflicts. Enforcement of the County's leash law is the responsibility of the Placer County Sheriff's

Department. Trail signage will include requirements for use of dog leashes consistent with County regulations.

Code of Federal Regulations Title 36, which establishes nationwide park rules and regulations, would apply within the Martis Creek Lake Project. Section 327.11 requires that dogs be on a leash no greater than six feet in length, or otherwise physically restrained. This regulation applies to existing trails as well as any future trails; however the requirement is not currently enforced. USACE personnel have indicated that the current use of the area as an off-leash dog walking area has led to several incidents of people being bitten by dogs, harassment of wildlife by dogs, and adverse effects on wildlife and water quality related to dog excrement not being removed by dog owners (T. Hershey, pers. comm.). By increasing trail usage in the area, the proposed project could exacerbate these existing problems.

As stated above, the measures included in the proposed project including the trail width and trail courtesy and etiquette signage are measures consistent with recommendations for reducing trail conflicts. Despite these measures, user conflicts may still occur on the proposed trail, in particular conflicts between trail users and off-leash dogs. *Mitigation Measure 9.2a* would require that the operating agreement between the Northstar CSD and USACE for the trail through the Martis Creek Lake Project area address the enforcement and monitoring of trail use and user conflicts.

Programmatic Analysis of Segments 3E and 4

The analysis above regarding trail user conflicts addresses the entire length of the proposed Martis Valley Trail and is applicable to Segments 3E and 4. No separate analysis is necessary for the future construction of Segments 3E and 4.

IMPACT 9.3:	**Conflict with U.S. Army Corps of Engineers Martis Creek Lake Master Plan**	
APPLICABLE POLICIES AND REGULATIONS:	Martis Creek Lake Master Plan	
	Valley Alignment	**Highway Alignment**
SIGNIFICANCE WITH POLICIES AND REGULATIONS:	Less than Significant	Less than Significant
MITIGATION MEASURES:	None	None
SIGNIFICANCE AFTER MITIGATION:	Less than Significant	Less than Significant

Either of the Martis Valley Trail alignments being evaluated would cross through the USACE Martis Creek Lake Project. Paragraph 31 and plate 3 of the *Martis Creek Lake Master Plan* delineates land use zones for the 1,891-acre project area. Land uses are allocated into the following categories and classifications: Operations: recreation-intensive use; Operations: recreation-low density use; and Operations: wildlife management. Lands south of SR 267 are designated Operations: wildlife management. Paragraph 32d of the Master Plan states that a total of five miles of nature-interpretive trail would be constructed within the Wildlife Management area. Paragraph 47 of the Master Plan states that trails would generally be three feet wide and would be surfaced with crushed fines or wood chips.

The Master Plan provides the following descriptions for Wildlife Management lands and Low Density uses:

Operations: Wildlife Management: These lands were acquired for project operations and allocated as habitat for wildlife. These lands are continuously available for low density recreation activities.

Operations: Recreation – Low Density Use: These lands were acquired for project operation purposes and are allocated for low density recreation activities. These lands are required for extensive recreation uses (as opposed to intensive recreation uses at the developed sites), for maintenance of resources for public enjoyment of the lake area, and as open space.

The interpretation of the language in the Master Plan and determination of what uses are allowed in the Martis Creek Lake Project is the responsibility of the USACE. The USACE will determine if a paved trail facilitates low density recreational activities or is considered a manmade intrusion and if mitigation is needed or can be provided. It is noted the USACE comment letter in response to the Notice of Preparation for this Draft EIR states that the proposed paved trail is not consistent with the Master Plan, and that the proposed trail would vary from the Master Plan description of the trails anticipated in the Wildlife Management Area. However, it has also been noted by USACE staff that the USACE is planning to update the Master Plan (D. Grothe, pers. comm.) which could allow an opportunity to modify language in the Master Plan related to trails in this area.

Consistency with a land use plan or plan policies is not considered a physical environmental effect under CEQA unless that plan is in place to avoid or mitigate an environmental effect. The *Martis Creek Lake Master Plan* is an operational plan for the project area, with the first priorities of the Martis Creek Lake Project being flood control and water supply, but the Master Plan does contain components that are intended to protect wildlife. Specifically, the Master Plan indicates that the Martis Creek Lake Project Wildlife Management Area was established as mitigation for habitat loss that occurred when Martis Creek Lake was created. Construction of the proposed trail would result in additional habitat loss. Implementation of mitigation measures included in **CHAPTER 4 BIOLOGICAL RESOURCES** would reduce impacts related to habitat loss to less than significant levels. Therefore, the proposed project would not conflict with the Master Plan as it relates to mitigation of environmental effects and this impact would be less than significant.

Programmatic Analysis of Segments 3E and 4

Future construction of Martis Valley Trail Segments 3E and 4 will not result in conflict with the USACE *Martis Creek Lake Master Plan* as these segments are located outside of the Martis Creek Lake Project.

9.4 MITIGATION MEASURES

Adversely Affect Use of Existing Recreational Facilities

Mitigation Measure 9.1a: The operating agreement between the USACE and the Northstar CSD shall determine potential USACE operating costs associated with use of the Martis Valley Trail and identify funding sources to meet these costs. These shall include maintenance and operations at the Martis Creek Lake Project Wildlife Viewing Area parking lot, ongoing maintenance of the trail system on the south side of SR 267, enforcement and monitoring of responsible trail behavior and demand for emergency services.

Create Conflicts Between Trail User Groups

Mitigation Measure 9.2a: The operating agreement between the USACE and the Northstar CSD described in *Mitigation Measure 9.1a* shall address enforcement and monitoring of responsible trail behavior, including enforcement of USACE regulations related to dog control.

Conflict with U.S. Army Corps of Engineers Martis Creek Lake Master Plan

This impact is determined to be less than significant. No mitigation measures are required.

CHAPTER 10

CUMULATIVE IMPACTS

CHAPTER 10 CUMULATIVE IMPACTS

In accordance with CEQA Guidelines Section (§) 15126, this chapter identifies the cumulative impacts of development within the project region and evaluates the extent to which the proposed project would contribute to each cumulative impact identified.

10.1 CUMULATIVE DEVELOPMENT SCENARIO

Cumulative impacts are those that occur as a result of regional development activity. Analysis of cumulative impacts is required under the CEQA Guidelines §§15130 and 15355. The following is an excerpt from §15355 explaining cumulative impacts:

> Cumulative impacts refer to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts. The cumulative impact from several projects is the change in the environment, which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time.

CEQA Guidelines §15130(b)(1) details two methods by which cumulative impacts may be evaluated. One of these is to summarize growth projections in an adopted general plan or in a prior certified environmental document. The other method involves the compilation of a list of past, present, and reasonably foreseeable future projects producing related or cumulative impacts.

For this analysis, both methods have been used. The growth projections from the Martis Valley Community Plan and the Town of Truckee General Plan have been combined with development assumptions associated with current and reasonably foreseeable projects in the vicinity. The growth projections from the Martis Valley Community Plan and the Town of Truckee General Plan are summarized in *Tables 10.1* and *10.2*, while the current and reasonably foreseeable projects in the vicinity are summarized in *Table 10.3*. These current and reasonably foreseeable projects were identified by review of the Placer County CEQA Active Projects list, the Nevada County Current Planning Projects, the Town of Truckee Major Development Projects list and the Town of Truckee Planning Application List. Although many of these projects are on-hold or inactive, they are included in the cumulative scenario as projects that are likely to be constructed within the lifetime of the proposed Martis Valley Trail.

Table 10.1
Martis Valley Community Plan Growth Projections

Land Use Designation	Acres
General Commercial	39
Forest (1 du/40 ac)	17,065
High Density Residential (10 – 15 du/ac)	18
Medium Density Residential (5 – 10 du/ac)	457
Low Density Residential (1 – 5 du/ac)	2,648
Rural Residential (0.4 – 1 du/ac)	834

Land Use Designation	Acres
Forest Residential (2.5 – 10 ac/du)	250
Tourist/Resort Commercial (15 du/ac)*	49
Professional Office	6
Public/Quasi Public	31
Open Space	3,660
Water	509
Holding Capacity for Potential Dwelling Units (Gross)	20,467
Adjusted Holding Capacity (20% reduction applied, adjusted for actual proposed unit count for active projects at time of Community Plan adoption)	9,220

Source: Placer County 2003b
du = dwelling unit
ac = acres
* Except for ski mountain commercial areas

Table 10.2
Town of Truckee General Plan Growth Projections

Residential Units	Town Limits	Sphere of Influence
Single-Family Residential*	15,293	522
Multi-Family Residential **	3,644	0
Second Units	1,145	105
Total Buildout Capacity	20,082	627
Year-Round Units	10,844	
Seasonal/Vacation Units	9,238	
Development Type		**Quantity**
Commercial (including General Commercial, Retail, Restaurant, Highway Commercial)		1,994,000 square feet
Office (includes General Office, Medical Office and Government Office)		952,000 square feet
Light Industrial/Warehouse		1,259,000 square feet
Religious Institution		85,700 square feet
Lodging		1,392 rooms

Source: Town of Truckee 2006
* Includes mobile homes.
** Assumes that 20 percent of all future single-family units will include secondary dwelling units.

Table 10.3
Current and Reasonably Foreseeable Projects

Project Name	Use and Size	Location
Projects Within Placer County		
Cabin Creek Biomass Facility Project	Placer County proposes to construct a two-megawatt wood-to-energy biomass facility. The facility would be constructed on two acres. It would include an 11,000 square-foot, two-story structure that would house the power generating and emissions control equipment, two 400 square-foot pads to accommodate transformer and phase-shifting equipment, and an approximately one acre material storage area.	Eastern Regional Materials Recovery Facility and Transfer Station

Project Name	Use and Size	Location
Northstar California Overall Mountain Master Plan	Northstar California proposes an Overall Mountain Master Plan outlining a long-term improvement program for the existing ski resort area. Improvements anticipated to be addressed in the Plan include new ski trails and ski lifts, expanded snowmaking and associated infrastructure, skier bridges, new half pipe and existing half pipe relocation, relocation of the cross country center, relocation of ropes course and tree canopy tours, additional mountain bike trails, new skier service sites, and a new backside campsite area.	Northstar California
Northstar California Alpine Coaster	Northstar California proposes to construct an all-weather toboggan ride that would cover 7,195 linear feet.	Village at Northstar
Northstar California Ski Trail Widening	Northstar California proposes to relocate a snowmaking hydrant and widen existing ski trails.	Northstar California ski area
Sawmill Heights Employee Housing Parking	This project would construct up to 36 parking spaces to serve existing residential structures.	West of intersection of Highlands View Road and SR 267
Projects Within Nevada County		
Boy Scouts of America – Royal Gorge Reconstruction	The project proposes to replace the Wilderness Lodge at Camp Pahatsi, which burned in October 2003. The project proposes to construct a 6,826 square foot dining facility and 14 small cabins (each including a restroom). The total construction area would be approximately 11,000 square feet. The facility would host a Boy Scouts of America summer camp between June 1 and September 15 each year and may be operated as a backcountry ski hotel between December and April each year, as was done at the previous Lodge.	Camp Pahatsi, near Donner Summit
Royal Gorge Lodge and Homesites	A proposed expansion of the Royal Gorge cross country ski facility into Nevada County, including General Plan Amendment and Rezone, Vesting Tentative Final Map proposing the creation of 18 residential home sites (ranging between 1.0 and 1.38 acres in size) and 6 recreation parcels, and Use Permit for the development of a Comprehensive Master Plan for the Recreation zoning district. A new Day Lodge and maintenance shop/employee housing structure would be supported on two of the recreation parcels; three recreation parcels would remain vacant; the sixth recreation parcel (containing Lake Van Norden and some existing cross country ski trails) would be set aside as Open Space under a preservation easement.	Royal Gorge
Projects Within Town of Truckee		
Truckee Redevelopment	The Truckee Redevelopment Plan identifies goals of encouraging employment opportunities, providing public infrastructure improvements and community facilities as necessary for effective redevelopment, and increasing and improving the community's supply of affordable housing.	approximately 1,000 acres within the Town of Truckee
Canyon Springs	A proposed subdivision of six parcels totaling 283.76 acres into 177 single-family parcels, eight parcels for affordable housing and approximately 171 acres of open space.	Glenshire/Martis Peak Road

Project Name	Use and Size	Location
Pollard Station Senior Neighborhood	Pollard Station is proposed to be an age-restricted senior neighborhood located on 8 acres. The proposal includes a variety of housing options to serve a range of needs from fully independent seniors to those needing assistance with various activities of daily living. In total, the project proposes 120 separate residential units, including 78 assisted living units in the 76,689 square foot congregate care lodge and 42 two-bedroom condominium units for independent senior living.	Hilltop Master Plan area
Gregory Creek Subdivision	A planned development located on 32.1 acres in the western portion of the Town of Truckee. The project consists of a Tentative Map, Planned Development, Use Permit, and Lot Line Adjustments to provide for 17 market-rate single-family lots, 10 duplex units, and four attached multi-family units. Approximately 75% of the project site would be deed restricted and designated for open space preservation. The proposed project includes construction of a bridge to cross the Gregory Creek channel, underground utilities, drainage and flooding improvements, infiltration systems, asphalt paved roadways, and a public trail segment to connect to the Donner Lake Rim Trail with an on-site staging area/parking area with four parking spaces.	Town of Truckee, Donner Lake area
Coldstream Specific Plan (PC-1)	The specific plan proposes up to 70,000 square feet of retail and commercial uses and approximately 345 residential units on 178 acres at the western end of the Town of Truckee, adjacent to Donner Memorial State Park. The specific plan includes a mixed-use village component, several residential districts, seven acres of recreational use, and over 100 acres of open space.	Coldstream Road
Joerger Ranch Specific Plan (PC-3)	A mixed-use project on 70 acres within five zoning districts. The preliminary project design includes approximately 300 dwelling units and 330,000 square feet of retail, office, and light industrial land uses.	SR 267 and Brockway Road
Truckee-Donner Recreation and Parks District Cultural Arts Center	A proposal to convert the District's Church Street Community Center to a 252-seat performing arts theater with an art/dance classroom component. The project would demolish portions of the existing structure and construct new facilities, increasing the building size from 10,226 square feet to 13,989 square feet. In addition, the District is requesting approval of an alternative parking plan to allow for decreased on-site parking and use of public parking.	Town of Truckee

10.2 CUMULATIVE IMPACT ASSESSMENT

Impacts that result from ongoing development within the project region can be greater or more severe than impacts from each individual project. Such impacts are identified in the following cumulative impact assessment. This assessment also considers whether the proposed project would make a substantial contribution to any identified cumulative impacts. The analysis in this Draft EIR concluded that impacts of the proposed project associated with Biological Resources, Cultural Resources, Hydrology and Water Quality, Transportation and Circulation, Visual Resources, and Recreation would be less than significant with implementation of mitigation measures.

The project's potential contribution to cumulative impacts in the project region is evaluated below. For each topic, the geographic area applicable to the analysis is defined, the types and extent of cumulative impacts are identified, and the project's contribution to each impact is assessed.

The analysis throughout this Draft EIR evaluates two project alternatives – the Valley Alignment and the Highway Alignment. The project would contribute equally to most cumulative impacts under either alternative and unless otherwise identified, the cumulative impact assessment below applies to each alternative.

Biological Resources

The geographic area for consideration of cumulative impacts to biological resources is all of Martis Valley, which consists of approximately 70 square miles (44,800 acres) in Placer and Nevada counties. Features that support biological resources in Martis Valley include Donner Lake, Martis Reservoir, the Truckee River and associated tributaries to the Truckee River (e.g., Martis Creek, Donner Creek, Cold Creek, Juniper Creek). Vegetation communities in Martis Valley include sagebrush scrub, mixed coniferous forest, montane chaparral, ruderal (which describes areas that have been affected by development or other disturbance), montane meadow, red fir forest, and riparian scrub.

IMPACT 10.1:	**Result in Habitat Loss and Loss of Federally-Protected Wetlands**	
APPLICABLE POLICIES AND REGULATIONS:	Clean Water Act Placer County General Plan Martis Valley Community Plan	
SIGNIFICANCE OF CUMULATIVE IMPACT:	Significant	
	Valley Alignment	**Highway Alignment**
MITIGATION MEASURES:	Mitigation Measures 4.2a, 4.2b and 4.3a through 4.3d	Mitigation Measure 4.2a, 4.2b and 4.3a through 4.3d
CONTRIBUTION TO CUMULATIVE IMPACT AFTER MITIGATION:	Less than Cumulatively Considerable	Less than Cumulatively Considerable

Development in the project region would result in direct and indirect impacts to habitats and vegetation communities, as well as the wildlife that rely on those habitats. As identified in the Martis Valley Community Plan EIR, impacts to habitats in the region would include loss of habitat and forage lands, habitat degradation due to encroaching urbanization, habitat fragmentation, obstruction of movement corridors, and conflicts between wildlife and human activity. Development under the Martis Valley Community Plan is expected to result primarily in the loss of mixed conifer forest habitat (over 2,200 acres). It would also directly impact approximately 149 acres of montane meadow, 127 acres of great basin sagebrush scrub, 21 acres of red fir forest, 16 acres of montane chaparral, and 1 acre of riparian scrub.

The proposed project would contribute to loss of the habitats through which the trail passes. Under either alignment, the project would affect coniferous forest, sagebrush scrub, dry meadow, and riparian habitats. In addition, the Valley Alignment would also affect wet meadow habitat.

As identified in **CHAPTER 4 BIOLOGICAL RESOURCES**, the project would affect small amounts of each habitat type. The Valley Alignment (including Segments 3E and 4) would affect approximately 22.87 acres of coniferous forest, 5.87 acres of sagebrush scrub, 0.12 acres of dry meadow, and 0.06 acres each of wet meadow and riparian habitat. The Highway Alignment (including Segments 3E and 4) would have similar effects, impacting 24.17 acres of coniferous forest, 7.31 acres of sagebrush scrub, 0.085 acres of dry meadow, and 0.19 acres riparian habitat. Either alignment of the project would also affect less than 0.2 acres of federally-project wetlands. The project's potentially significant impacts to riparian habitat would be reduced by the provisions of a Streambed Alteration Agreement approved by CDFG, as required by *Mitigation Measure 4.2a.* These provisions would likely include construction Best Management Practices (BMPs) for erosion and sediment control, limited operating periods, revegetation, restoration, and monitoring. The project's potentially significant impacts to federally-protected wetlands would be reduced by obtaining appropriate permits from the USACE and RWQCB in accordance with the Clean Water Act to provide for replacement of the impacted habitat at a minimum 1:1 ratio (required under *Mitigation Measures 4.3a* and *4.3b*), and by implementing Best Management Practices (BMPs) to control erosion and maintain water quality (required under *Mitigation Measure 4.3c*). In addition, *Mitigation Measures 4.2b* and *4.3d* would ensure that construction staging areas do not affect sensitive habitat and federally protected wetlands.

The project's impacts to sagebrush scrub and coniferous forest would occur in areas that have already experienced some disturbance – based on proximity to SR 267, Schaffer Mill Road, and residential and commercial development, as well as the presence of existing trails and dirt roads. As a narrow linear feature providing for non-motorized transportation in previously disturbed areas, the proposed project would not adversely affect the habitat values of the sagebrush scrub and coniferous forest through which it passes.

Based on the nature of disturbance to each habitat type and with implementation of *Mitigation Measures 4.2a, 4.2b, 4.3a, 4.3b, 4.3c,* and *4.3d,* the proposed project's contribution to cumulative habitat loss and loss of federally-protected wetlands would be less than cumulatively considerable.

Programmatic Analysis of Segments 3E and 4

Construction of Segments 3E and 4 of the proposed trail would affect additional areas of coniferous forest and riparian habitat. The mitigation measures discussed above would be applicable to any riparian habitat impacts of the project, ensuring that the project would have a less than cumulatively considerable contribution to impacts to federally-protected wetlands and riparian habitat. Segments 3E and 4 would generally follow existing trails and dirt roads. As discussed above, the construction and use of a narrow linear feature through previously disturbed areas would not adversely affect the habitat values of the areas through which the trail passes. Construction and use of Segments 3E and 4, or of the entire Martis Valley Trail is not expected to make a cumulatively considerable contribution to habitat loss and loss of federally-protected wetlands in the region.

IMPACT 10.2:	Adversely Affect Special-Status Species	
APPLICABLE POLICIES AND REGULATIONS:	Federal Endangered Species Act California Endangered Species Act Placer County General Plan Martis Valley Community Plan	
SIGNIFICANCE OF CUMULATIVE IMPACT:	Significant	
	Valley Alignment	**Highway Alignment**
MITIGATION MEASURES:	Mitigation Measures 4.1a through 4.1i	Mitigation Measures 4.1a through 4.1i
CONTRIBUTION TO CUMULATIVE IMPACT AFTER MITIGATION:	None	None

Ongoing development in the region could result in take of special-status species or their habitat. Development and use of the proposed Martis Valley Trail would contribute to potential loss of the special-status plant species Plumas ivesia, Davy's sedge, woolly-fruited sedge, mud sedge, American mannagrass, slender-leaved pondweed, and alder buckthorn as well as the special-status wildlife species Lahontan cutthroat trout, Sierra Nevada yellow-legged frog, northern leopard frog, northern goshawk and other raptors, willow flycatcher, yellow warbler, Sierra Nevada snowshoe hare, and Sierra Nevada mountain beaver. *Mitigation Measures 4.1a* through *4.1h* require Northstar CSD to complete surveys and management plans and conduct monitoring to ensure that impacts to each of these special-status species are avoided, minimized, and/or compensated for to ensure that the project does not result in any take of species listed under the state or federal Endanger Species Acts and does not result in significant impacts to other species with special status. *Mitigation Measure 4.1i* requires that construction staging areas be located outside of habitats that could support special-status species. With implementation of these mitigation measures, the project would have no contribution to cumulative loss of special-status species.

Programmatic Analysis of Segments 3E and 4

Based on the habitat types present in the Segment 3E and 4 study areas, Plumas ivesia and Lahontan cutthroat trout are not expected to occur, but all other special-status species identified above have potential to occur. With implementation of *Mitigation Measures 4.1b* and *4.1d* through *4.1h,* construction of Segments 3E and 4 would have no contribution to cumulative loss of special-status species.

Cultural Resources

The geographic area for consideration of cumulative impacts to cultural resources is all of Martis Valley, which supports extensive archaeological resources associated with Native American activities and historic resources associated with settlement and economic development, as discussed in **CHAPTER 5 CULTURAL RESOURCES**.

IMPACT 10.3	Loss of Cultural Resources	
APPLICABLE POLICIES AND REGULATIONS:	National Historic Preservation Act Placer County General Plan Martis Valley Community Plan	
SIGNIFICANCE OF CUMULATIVE IMPACT:	Significant	
	Valley Alignment	**Highway Alignment**
MITIGATION MEASURES:	Mitigation Measures 5.1a, 5.1b, and 5.2a	Mitigation Measures 5.1a, 5.1b, and 5.2a
CONTRIBUTION TO CUMULATIVE IMPACT AFTER MITIGATION:	Less than Cumulatively Considerable	Less than Cumulatively Considerable

Ongoing development in the project region would adversely affect cultural resources by disturbing archaeological and historic resource sites. As noted in the Martis Valley Community Plan EIR, development anticipated under that plan as well as expansions of recreational land uses in the vicinity could conflict with known cultural resources and culturally sensitive areas. Ongoing development in this highly sensitive area could reduce the integrity and continuity of the regional resource base, particularly if impacts occur before important data from resource sites can be inventoried, evaluated and interpreted, resulting in a significant cumulative impact.

Both of the potential trail alignments have been designed to avoid impacts to cultural resources where feasible, however impacts to cultural resource sites could not be avoided in many locations. All impacts to each site would be reduced to less than significant levels. Mitigation for these impacts includes capping of resource sites and conducing data recovery consistent with a Research Design and Testing Plan where capping is not possible. Additionally, the project includes Native American interpretive information.

As described in *Mitigation Measure 5.1a,* capping resource sites involves placing a layer of chemically stable fill soil over the resource before constructing the trail. Where hat is not feasible, *Mitigation Measure 5.1b* requires preparation and implementation of a Research Design and Testing Plan which must identify the research questions that may be answered by each potentially affected resource site, outline a Testing Plan for conducting further exploration of each potentially affected resource site, describe methods and approaches to evaluate each site, and identify specific treatment measures to provide for avoidance, interpretation, and data recovery. In addition, *Mitigation Measure 5.2a* identifies requirements for treatment of any presently unknown cultural resources that may be discovered during project construction. Through the project design allowing for capping most resource sites consistent with *Mitigation Measure 5.1a* and with implementation of *Mitigation Measures 5.1b* and *5.2a* ensuring that appropriate interpretation and data recovery is conducted to obtain the relevant scientific and cultural information from each affected site, the project's contribution to cumulative impacts to cultural resources would be reduced to a level that is less than cumulatively considerable.

Programmatic Analysis of Segments 3E and 4

Cultural resource inventories have not been completed for Segments 3E and 4. These would be completed at the time that construction of these segments is proposed. There is potential for the study corridor for each segment to contain archaeological and historic resources. Identification, evaluation, and treatment of any archaeological and historic resources in compliance with state and federal regulations would ensure that the project's contribution to cumulative cultural resource impacts would remain less than significant.

Hydrology and Water Quality

The assessment of cumulative impacts to hydrology and water quality considers the overall watershed that drains to the Truckee River downstream of Lake Tahoe, known as the Middle Truckee River Basin. This watershed covers 1,190 square miles that include portions of Nevada, Placer and Sierra counties in California and portions of Washoe, Storey and Lyon counties and Carson City in Nevada. In California, the watershed includes the drainage areas surrounding the Truckee River between Lake Tahoe and the Town of Truckee, the Donner Lake drainage area west of Truckee, the Martis Creek drainage south and east of Truckee, the Prosser Creek and Little Truckee River drainage areas north and east of Truckee, and the upper Truckee Canyon below Hirschdale to the Nevada state line at Verdi.

The proposed project is located within the Martis Creek drainage area, which covers 26,204 acres (Truckee River Watershed Council 2011). The primary drainage feature in the project area is Martis Creek. This creek and several drainages that are tributary to the creek flow through Martis Valley, into the dammed Martis Creek Lake, and below the dam to a confluence with the Truckee River south of Interstate 80.

IMPACT 10.4	**Alter Drainage Conditions and/or Impair Water Quality**	
APPLICABLE POLICIES AND REGULATIONS:	Federal Clean Water Act National Pollutant Discharge Elimination System Lahontan Regional Basin Plan Placer County General Plan Martis Valley Community Plan	
SIGNIFICANCE OF CUMULATIVE IMPACT:	Significant	
	Valley Alignment	**Highway Alignment**
MITIGATION MEASURES:	Mitigation Measures 6.1a through 6.1d and 6.2a	Mitigation Measures 6.1a through 6.1d and 6.2a
CONTRIBUTION TO CUMULATIVE IMPACT AFTER MITIGATION:	None	None

Ongoing development within the Middle Truckee River Basin would alter drainage conditions, rates, volumes, and water quality, which could result in potential flooding and stormwater quality impacts within the watershed.

As discussed in **CHAPTER 6 HYDROLOGY AND WATER QUALITY**, the proposed project would slightly increase stormwater runoff from the project site into Martis Creek and its tributaries. However, the project would not change watershed size or locations, would maintain existing stormwater infiltration and sheet flow conditions, and would not substantially change water surface elevations and floodplains. Therefore, the project would have a less than significant impact related to alteration of drainage patterns. Further, *Mitigation Measures 6.1a* through *6.1d* require implementation of Best Management Practices to avoid erosion and ensure that the project does not impair water quality during construction and during use and maintenance of the trail. Implementation of these mitigation measures would avoid significant increases in runoff and impairment of water quality from the proposed project, which would ensure that the project's contribution to changes in drainage conditions under the cumulative development scenario would be less than cumulatively considerable.

Programmatic Analysis of Segments 3E and 4

Construction of Segments 3E and 4 would further increase impervious surfaces, which would increase stormwater runoff. A detailed analysis of the runoff rates and volumes from these segments would be prepared at the time their construction is proposed. However, compliance with local, state, and federal regulations related to stormwater management and water quality would be required, as well as implementation of *Mitigation Measures 6.1a* through *6.1d*. This would ensure that construction and use of Segments 3E and 4 would have a less than cumulatively considerable contribution to changes in drainage conditions under the cumulative development scenario.

Transportation and Circulation

With respect to cumulative impacts to transportation and circulation, this analysis considers conditions within Martis Valley, including the Town of Truckee. The primary circulation routes in this area are Interstate 80 and State Route 267.

IMPACT 10.5	Increase Traffic Volumes or Conflict with Level of Service Policies	
APPLICABLE POLICIES AND REGULATIONS:	Placer County General Plan Martis Valley Community Plan	
SIGNIFICANCE OF CUMULATIVE IMPACT:	Significant	
	Valley Alignment	**Highway Alignment**
MITIGATION MEASURES:	None	None
CONTRIBUTION TO CUMULATIVE IMPACT AFTER MITIGATION:	Less than Cumulatively Considerable	Less than Cumulatively Considerable

Under full buildout of the Martis Valley Community Plan and Town of Truckee General Plan, along with other development anticipated in the cumulative scenario, it is expected that some intersection and roadway level of service standards would be exceeded. In addition, it is expected that portions of Interstate 80 would operate deficiently (Placer County 2003b). These conditions represent significant cumulative impacts.

As discussed in **CHAPTER 7 TRANSPORTATION AND CIRCULATION**, the proposed project would not substantially increase traffic volumes in the project area. The project would add less than 10 peak-hour trips to traffic on State Route 267 and would not contribute to any projected level of service deficiencies. This increase in traffic is considered less than cumulatively considerable.

Programmatic Analysis of Segments 3E and 4

The LSC calculation of traffic volumes associated with the proposed trail included assumptions regarding use of Segments 3E and 4. Therefore the analysis above applies to these segments.

Visual Resources

The geographic area for analysis of cumulative impacts to visual resources is the Martis Valley. As noted in the Martis Valley Community Plan EIR, roadways outside of the community plan area do not provide views of the Martis Valley as topography, vegetation, and other existing development intervene.

IMPACT 10.6	Adversely Affect Existing Scenic Resources and Scenic Vistas	
APPLICABLE POLICIES AND REGULATIONS:	Placer County General Plan Martis Valley Community Plan	
SIGNIFICANCE OF CUMULATIVE IMPACT:	Significant	
	Valley Alignment	**Highway Alignment**
MITIGATION MEASURES:	Mitigation Measures 8.1a, 8.1b, 8.2a and 8.2b	Mitigation Measures 8.1a, 8.1b, 8.2a and 8.2b
CONTRIBUTION TO CUMULATIVE IMPACT AFTER MITIGATION:	Less than Cumulatively Considerable	Less than Cumulatively Considerable

Buildout of the Martis Valley Community Plan and other development in Martis Valley (such as expansion of the Northstar California resort) is expected to substantially alter landscape characteristics in Martis Valley, particularly as viewed from the portion of State Route 267 that occurs within the Community Plan area, the Martis Creek Lake Project, and public roads and trails. The landscape changes noted in the Martis Valley Community Plan EIR include the addition of structures (residential and commercial), roads, golf courses, and recreational trails to areas that are currently forested or within the open valley.

As discussed in **CHAPTER 8 VISUAL RESOURCES**, development of the Martis Valley Trail along the Valley Alignment would introduce a paved trail feature and a paved parking area to the open valley, which would substantially alter landscape characteristics in this area. Although the valley is currently crossed by several unpaved trails and roads, addition of paved features to the valley would detract from the undeveloped visual character of the area. Development of the Martis Valley Trail along the Highway Alignment would also introduce a paved trail feature to portions of the open valley; however the trail would be much closer to the existing pavement of State Route 267, which would reduce the degree of visual change associated with the proposed project. While both alignments would create new trails within forested areas, the trail segments through forested areas are not expected to be visible from offsite locations.

Without mitigation, the project would make a considerable contribution to the significant cumulative impact to visual resources in the Martis Valley. Mitigation measures for impacts to visual resources include use of colored trail surfacing within the Martis Valley to reduce visual contrast and limitations on locations of trail construction materials. These measures would reduce the visual dominance of the trail and construction activities. The project does not propose substantial vegetation removal that would be visible from SR 267. Areas adjacent to the study corridor for each alignment through Martis Valley are designated to remain in open space, thus ongoing development in the area is not expected to alter viewsheds of the proposed project site. Because other development would not occur within or adjacent to the Martis Creek Lake Project area portion of the valley and because implementation of the identified mitigation would allow the proposed trail to blend into the natural landscape, the project's contribution to cumulative visual resource impacts is less than cumulatively considerable.

Programmatic Analysis of Segments 3E and 4

Segments 3E and 4 are proposed in heavily forested areas and in areas that currently support existing unpaved trails and roads. It is not expected that these segments would be visible from offsite locations and construction and use of these segments would not contribute to the cumulative visual resource impacts.

Recreation

The cumulative impact assessment for impacts related to recreation considers use of existing and future recreational amenities in Martis Valley, the Town of Truckee, and the greater Tahoe region. When fully constructed, the proposed Martis Valley Trail would provide a connection between the Town of Truckee and the Lake Tahoe basin through Martis Valley, and some users of the Martis Valley Trail would be expected to also use recreational amenities in the Town of Truckee and/or the Lake Tahoe basin.

IMPACT 10.7	Adversely Affect Use of Existing Recreational Facilities	
APPLICABLE POLICIES AND REGULATIONS:	Placer County General Plan Martis Valley Community Plan Martis Creek Lake Master Plan	
SIGNIFICANCE OF CUMULATIVE IMPACT:	Less than Significant	
	Valley Alignment	**Highway Alignment**
MITIGATION MEASURES:	None	None
CONTRIBUTION TO CUMULATIVE IMPACT AFTER MITIGATION:	Less than Cumulatively Considerable	Less than Cumulatively Considerable

Ongoing development in the Martis Valley is expected to lead to increases in the year-round and seasonal population in the region. This would increase demands for recreational facilities. If no new recreational facilities are provided, use of existing facilities would increase, which may lead to deterioration and overcrowding of existing facilities and increased maintenance and staffing requirements.

It is expected that local and regional land use agencies and public service districts would continue to implement recreation plans, such as the Town of Truckee *Trails and Bikeways Master Plan* and the 2010 *Lake Tahoe Regional Bicycle and Pedestrian Plan.* In addition, residential and commercial development is expected to include or contribute to development of new recreational opportunities consistent with local and regional land use plans and policies. Compliance with the local and regional land use plans and policies and ongoing implementation of recreation planning in the region is expected to provide sufficient recreational amenities to support the anticipated year-round and seasonal population of the region. Impacts related to use of recreational facilities in the cumulative scenario are expected to remain less than significant.

The proposed Martis Valley Trail would provide additional recreational facilities while not increasing the year-round or seasonal populations of the region. Therefore the proposed project would not alter the cumulative scenario with respect to adverse impacts associated with use of recreational facilities. The impact would remain less than significant and the project's contribution to the impact would be less than cumulatively considerable.

Programmatic Analysis of Segments 3E and 4

The construction and use of Segments 3E and 4 would also not increase year-round or seasonal populations of the region and would not alter the cumulative scenario related to use of recreational facilities. The impact would remain less than significant and the project's contribution to the impact would be less than cumulatively considerable.

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CHAPTER 11

CEQA DISCUSSIONS

CHAPTER 11 CEQA DISCUSSIONS

In accordance with CEQA Guidelines Section (§) 15126, this chapter identifies and evaluates the following:

- ❖ Significant environmental effects of the proposed project;
- ❖ Significant environmental effects that cannot be avoided if the proposed project is implemented;
- ❖ Significant irreversible environmental changes that would result from implementation of the proposed project;
- ❖ Growth inducing impacts of the proposed project; and
- ❖ Alternatives to the proposed project.

11.1 SIGNIFICANT ENVIRONMENTAL IMPACTS

Chapters 4 through 10 of this EIR comprehensively identify and evaluate the proposed project's environmental impacts, including cumulative impacts. Mitigation measures are identified throughout the EIR to avoid, minimize, or mitigate environmental impacts and each impact analysis identifies the level of significance both before and after mitigation measures are implemented. Each impact and mitigation measure included in this EIR is listed in **CHAPTER 2 EXECUTIVE SUMMARY**.

11.2 SIGNIFICANT AND UNAVOIDABLE ENVIRONMENTAL IMPACTS

CEQA Guidelines §15126.2(b) requires that an EIR describe any significant impacts that cannot be avoided or minimized to a less than significant level with the implementation of feasible mitigation measures. The project would not result in Significant and Unavoidable impacts.

11.3 SIGNIFICANT IRREVERSIBLE ENVIRONMENTAL IMPACTS

CEQA Guidelines §15126.2(c) mandates a discussion of any significant irreversible environmental effects that would be caused by the proposed project. The analysis required under this section must consider whether the project would:

- ❖ Have primary and secondary impacts that would generally commit future generations to similar uses;
- ❖ Involve a large commitment of nonrenewable resources;
- ❖ Unjustifiably consume resources (i.e., use energy or water wastefully); and
- ❖ Involve uses in which irreversible damage could result from any potential accidents associated with the project.

Development of the proposed Martis Valley Trail under either the Valley Alignment or the Highway Alignment would result in the commitment of the entire trail alignment to recreational use. This would preclude other land uses within the trail alignment for the lifespan of the project. Much of the trail alignment is proposed to be located in areas that already support non-paved trail surfaces. However, restoration of the site to pre-developed conditions or use of the trail alignment for other uses could be feasible in the future because of the minimal degree of disturbance associated with trail construction and maintenance. Development of the project would not commit any nearby land owners or governing agencies [such as the U.S. Army Corps of Engineers, Placer County, or Northstar Community Services District (CSD)] to development of similar uses.

Construction activities related to the proposed project would result in irretrievable commitment of resources such as wood products, asphalt, and concrete as well as nonrenewable energy resources, primarily in the form of fossil fuels, natural gas, and gasoline for automobiles and construction equipment. Operation of the project would result in ongoing consumption of the same resources for trail maintenance. Resource consumption associated with the project would be minimal and would not be considered unjustifiable as the proposed project would provide a valuable recreational amenity for residents of and visitors to the project region.

The project proposes to create a new recreation land use, which would not create a significant potential for irreversible accidental damage. While the project would result in the use, transport, storage, and disposal of minor amounts of hazardous materials during project construction and maintenance, all such activities would comply with applicable state and federal laws related to hazardous materials, which significantly reduces the likelihood and severity of accidents that could result in irreversible environmental damage.

11.4 GROWTH-INDUCING IMPACTS OF THE PROPOSED PROJECT

The CEQA Guidelines require an EIR to evaluate indirect or secondary effects of a project, which may include a project's contribution to regional growth and land use trends. CEQA Guidelines §15126.2(d) states that a project could be considered growth-inducing if it would "foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment." A development project may have growth-inducing potential if, for example, it removes obstacles to population growth, requires construction of new public facilities that may provide capacity to serve other new development, or encourages and facilitates other activities that could significantly affect the environment. For example, a project that extends infrastructure (e.g., water, sewer, roads) to undeveloped areas or increases the capacity of existing infrastructure may accommodate additional growth beyond the individual project.

Trail Usage

As described in the LSC Transportation Consultants Martis Valley Trail Use Forecasts memorandum (LSC 2011a, provided in Appendix E), it is expected that if the complete trail (from Segment 1 through Segment 4) were constructed today, the trail would support a total of 66,000 person trips annually. This includes all types of trail use patterns, from people making very short trips on small sections of the trail to people using the entire length of the trail and connecting to other trails in the region. Additionally, the Village at Northstar trail segment would be the busiest location, with 428 people passing by this location on a peak summer day, and a total of 43,000 person trips annually. In comparison, there are 8,950 trail users on a peak summer day on existing Class I trails in the Tahoe region (Alta Planning + Design 2009), with individual trails receiving daily usage that ranges between 70 (Sawmill Bike Path in Meyers) and 5,952 (on Interstate 50 West of Stateline).

Infrastructure and Housing

The proposed project would not affect any growth-supporting infrastructure in the area, such as water supply, treatment, and conveyance capacity, wastewater treatment capacity, and roadway capacity. The proposed project would not create any new infrastructure or expand any existing infrastructure. Therefore, the project would not induce growth indirectly through any changes in public service infrastructure.

Further the project does not include construction of or improvements to any housing or visitor accommodations that could support increased residential or visitor populations.

Recreational Amenities

The presence of extensive and varied recreational opportunities heavily influences the quality of life in the project region and is considered a significant attraction for both year-round and seasonal residents and visitors. The proposed project would supplement and complement existing and planned recreational facilities in the project area and would increase the attraction of the area for residents and visitors. As shown on the regional trail map, *Figure 3-3* in **CHAPTER 3 PROJECT DESCRIPTION**, the proposed Martis Valley Trail would provide a key linkage in the regional trail network by connecting trails in the Town of Truckee with the Lake Tahoe Basin Trail System. Additionally, the trail would add to the recreational opportunities available in the Northstar California resort.

The project would create approximately 10 miles of new multi-use trail in an area that already supports a robust network of trails. The existing trails in the immediate vicinity are unpaved multi-use trails and are not designed to meet Americans with Disabilities Act (ADA) requirements. The proposed trail would differ from the existing trails in that it is proposed to be paved and is being designed to meet ADA requirements. Despite these differences, the project would not provide a substantially unique type of recreation experience. The proposed trail would contribute to the overall attraction of the region for residents and visitors, and would indirectly support increases in visitation to the area. However, it is not expected to induce significant population growth that would require construction of additional housing and/or lodging beyond the amounts anticipated in existing planning documents.

Employment

The proposed project would create a few jobs during trail construction periods. However, these jobs would be seasonal and temporary. The project would increase the trail maintenance requirements of the Northstar CSD, however it is not expected that this increase would be sufficient to require any new permanent jobs.

Trail users are expected to frequent local businesses, primarily service and retail businesses, which would support employment. A portion of these users would be existing residents and visitors who are already using the local businesses. It is expected that the level of business activity generated by trail users would support existing businesses but would not be sufficient to create demand for new businesses.

The economic activity associated with the project is not expected to substantially affect the regional economy and employment to the extent that it would induce substantial population growth beyond the extent of growth already anticipated in regional and local planning documents.

Environmental Effects from Induced Growth

Regional population growth is associated with a number of environmental impacts throughout the Martis Valley and Town of Truckee. The impacts include: traffic congestion; air quality deterioration; contribution to global climate change; loss of open space; loss of habitat and wildlife; impacts on utilities and services; such as fire and police protection, water, recycled water, wastewater, solid waste, energy and natural gas; and increased demand for housing. The proposed project would not generate additional growth (beyond growth anticipated under existing community planning documents) that would make a substantial contribution to these impacts.

11.5 TRAIL ALIGNMENT ALTERNATIVES

Pursuant to CEQA Section 15126.6(a), an EIR shall describe "a range of reasonable alternatives to the project, or to the location of the project, which could feasibly attain most of the basic objectives of the project, but would avoid or substantially lessen any of the significant effects of the project, and evaluate the comparative merits of the alternatives." The evaluation of alternatives shall explain why the proposed project was selected over other development scenarios, including the "no project" alternative. Less detailed discussion may occur where an alternative causes one or more significant impacts in addition to those described for the proposed project. In addition, the alternatives analysis is used to identify the environmentally superior alternative.

The range of alternatives is limited by the "rule of reason," and the EIR should discuss the rationale for selecting the alternatives to be evaluated. The "rule of reason" is described in Section 15126.6(f):

> **Rule of reason.** *The range of alternatives required in an EIR is governed by a "rule of reason" that requires the EIR to set forth only those alternatives necessary to permit a reasoned choice. The alternatives shall be limited to ones that would avoid or substantially lessen any of the significant effects of the project. Of those alternatives, the EIR need examine in detail only the ones that the lead agency determines could feasibly attain most of the basic objectives of the project. The range of feasible alternatives shall be selected and discussed in a manner to foster meaningful public participation and informed decision-making.*

In accordance with these guidelines, this discussion will not include consideration of alternatives determined to be remote or speculative, that would not avoid or lessen significant impacts, or that could not attain the basic objectives of the proposed project. Alternatives that were initially considered but rejected from further analysis, and the reasons for their rejection, are discussed below.

Alternative Selection Process

As required in CEQA Guidelines §15126.6, project alternatives must be capable of meeting most of the basic project objectives and must also be capable of reducing or avoiding significant impacts of the proposed project. Thus, the process of selecting alternatives to be evaluated includes considering the Project Objectives, reviewing the significant impacts of the project, and identifying ways to avoid or reduce those impacts. Consideration of alternatives for the Martis Valley Trail project was also informed by the comments on the Notice of Preparation for this Draft EIR, which included suggestions of possible project alternatives.

Objectives of the Proposed Project

Project objectives for the proposed Martis Valley Trail project are as follows:

- ❖ Provide a convenient, safe and accessible non-motorized connection between the Town of Truckee, the Village at Northstar and Brockway Summit where it will connect to trails providing access to the North Shore of Lake Tahoe.
- ❖ Expand the community, recreational, and transportation opportunities available in Martis Valley.
- ❖ Expand and complement existing and planned regional trails; facilitate connections to adjacent residential areas as well as existing and planned trail systems and parking and transit centers throughout the area.
- ❖ Provide safe passage for all users, avoiding interface with automobiles to the greatest extent possible.
- ❖ Provide a trail that is accessible to the widest variety of potential users during all seasons of the year.
- ❖ Ensure respect and protection for scenic, natural, and cultural resources in the area during trail construction and use.
- ❖ Highlight the natural, cultural and social context of the region through interpretive opportunities.
- ❖ Provide an alternative to automobile transportation, creating a continuous route between regional commercial centers.

Impacts of the Proposed Project

As described in the Notice of Preparation (NOP) for this Draft EIR, the project proposal at the time the NOP was prepared was the project described throughout this Draft EIR as the Valley Alignment. Based on comments on the NOP, the Highway Alignment is also evaluated throughout this Draft EIR at an equal level of detail as the analysis of the Valley Alignment. The analysis in this Draft EIR identified significant and potentially significant impacts from both potential alignments in several resource areas including Biological Resources, Cultural Resources, Hydrology and Water Quality, Visual Resources, and Recreation. Environmental impacts of either alignment would be reduced to less than significant levels with implementation of the mitigation measures identified in this EIR.

Alternatives Selected for Analysis

This Draft EIR includes an equal-level analysis of two alternatives, the Valley Alignment and the Highway Alignment, in each technical chapter. The components and relative impacts of the Valley Alignment and the Highway Alignment are summarized below. Refer to each technical chapter for a detailed discussion of the potential environmental impacts of the Valley Alignment and the Highway Alignment. This level of detail for all alternatives is not required by CEQA, but was determined by the Northstar CSD to be appropriate in order to provide a full range of options for decision-making, to fully address public concerns, and to sufficiently disclose information.

The No Project/No Build Alternative is evaluated in this chapter in accordance with CEQA Guidelines §15126.6(e).

Alternative A – Valley Alignment

The Martis Valley Trail Valley Alignment would construct a trail through Martis Valley. The proposed Valley Alignment has been divided into five segments, as described in **CHAPTER 3 PROJECT DESCRIPTION** and shown in *Figure 3-2*. Segment 1 would begin at the Placer County/Town of Truckee line and extend southeast roughly parallel to State Route (SR) 267. It would end near the existing Wildlife Viewing Area parking lot. Segment 2A would begin at the end of Segment 1 and extend westerly through Martis Valley, crossing Martis Creek approximately 3,800 feet west of SR 267, and then head southeast towards the Northstar California property. Segment 2B would begin at the Northstar California property boundary and extend primarily to the south to reach the Village at Northstar. Segments 3E and 4 would extend south from the Village at Northstar towards Forest Route 73. Preliminary trail plans showing Segments 1, 2A, and 2B are provided in Appendix B1.

Alternative B – Highway Alignment

The Martis Valley Trail Highway Alignment would also construct a trail through Martis Valley, but would route the trail roughly parallel to SR 267 for most of its length through the valley. This alignment has been divided into six segments, as described in **CHAPTER 3 PROJECT DESCRIPTION** and shown on *Figure 3-2*. Segments 1, 3E, and 4 would be the same as under the Valley Alignment. Segment 3A would start where Segment 1 ends and would follow existing dirt trails from the Wildlife Viewing Area parking lot east between SR 267 and Martis Creek. Segment 3A would end just east of the Northstar California Golf Course. Segment 3B would then traverse up Porcupine Hill, again roughly parallel to SR 267, and end at the roundabout intersection of Northstar Drive and Castle Peak Way/Ridgeline Road. Segment 3F would extend southwest from the roundabout and end at the southern side of the Village at Northstar. Preliminary trail plans showing Segments 1, 3A, 3B, and 3F are provided in Appendix B1.

Alternative C – No Project / No Build Alternative

Alternative C assumes that no development would take place. The project site would remain as is and no new trail would be constructed. Other development proposals consistent with the adopted land use plans for the site could potentially be expected in the future. Given the open space and forestry designations for many of the parcels crossed by the proposed trail, future development proposals would likely be primarily recreation or resource-based development. However the proposal of some other action at the project site is not considered predictable and no other development is assumed to occur under this alternative. This alternative does not meet any of the project objectives, but is included in the analysis as required by CEQA Guidelines §15126.6(e).

Alternatives Considered and Eliminated from Further Analysis

As noted above, the comments on the NOP for this project provided several suggestions for project alternatives. In addition, some suggestions for project alternatives have been put forth by the U.S. Army Corps of Engineers (USACE) in consultation with Northstar CSD. Those alternatives that have been considered and eliminated from further analysis are briefly discussed below.

- Non-paved: This alternative would construct the proposed trail (in the Valley Alignment) but would not pave the trail. Instead the trail would be surfaced with dirt and gravel, similar to existing trails in the vicinity. This could reduce project impacts to visual resources. It could also reduce the amount of new impervious surfaces in the Martis Valley but could increase impacts to hydrology and water quality as a result of erosion of the trail surface. Additionally, this alternative may not meet the basic project objectives of accommodating a wide variety of trail users and providing a trail that is accessible as defined under the Americans with Disabilities Act. Therefore this alternative was not selected for further analysis.
- Routes on the north side of SR 267: This alternative would construct the proposed trail in a new alignment located primarily on the north side of SR 267. In order to start in the proposed location and reach the Village at Northstar, the trail would need to cross SR 267 twice. This alternative could reduce impacts related to recreation, but would increase impacts related to visual resources by placing a paved trail in an area that does not support existing trails and dirt roads and by constructing trail overpasses above SR 267. It could also increase impacts related to biological and cultural resources. The area on the north side of SR 267 is part of the Martis Creek Lake Wildlife Management area and supports wetlands and riparian habitat. This area has not been subject to the same level of disturbance that the area on the south side of SR 267 has. Additionally, previous surveys have identified cultural resource sites on the north side of SR 267, which, again have not been subject to as much disturbance as the cultural resource sites within the study corridors. As this alternative would not be capable of reducing or avoiding many impacts of the project, could increase the severity of some impacts compared to the proposed project, and would substantially increase project costs, it was not selected for further analysis.
- Using the existing Martis Creek crossing near Lahontan Golf Course: This alternative would alter the Valley Alignment to cross Martis Creek further west than is proposed, using an existing crossing instead of creating a new crossing of Martis Creek. However, this would also require extending the paved trail further west which could increase impacts to biological, cultural, and visual resources. Because this alternative would increase rather than decrease project impacts, it was not selected for further analysis.
- Providing a paved alignment for bicycles and a separate unpaved alignment for other users: This alternative would require creating two new trail routes instead of a single route. This could reduce impacts related to recreation (conflicts between user groups) but would likely increase impacts related to most other resources as it would result in a greater total area of disturbance. This alternative was not selected for further analysis because it would increase rather than decrease project impacts.

- Connections through Lahontan or Martis Camp developments: This alternative would adjust the proposed project to connect to the Northstar community via Schaffer Mill Road and through nearby residential areas. This alternative would increase the total length and area of disturbance associated with trail construction, which could increase impacts related to biological, cultural, and visual resources as well as hydrology and water quality. This alternative was not selected for further analysis because it would increase rather than decrease project impacts and it would not meet project objectives related to limiting trail users interface with automobiles and to increasing recreational opportunities in the Martis Valley. In addition, the owners of these developments have indicated that access through these developments is not available.

Alternatives Analysis

The impacts associated with Alternative A (Valley Alignment) and Alternative B (Highway Alignment) are evaluated in detail throughout chapters 4 through 10 of this Draft EIR. The relative impacts of each are summarized below and in *Table 11.1*. Analysis of the impacts of Alternative C – the No Project Alternative, as required under CEQA, is also presented below.

Alternative A – Valley Alignment

Biological Resources: The Valley Alignment would result in impacts to an estimated 0.18 acre of wetlands. This alignment would result in impacts within five different habitat types, including impacts to approximately 10.32 acres of coniferous forest, 0.12 acre of dry meadow, 0.06 acre of wet meadow, 5.87 acres of sagebrush scrub and 0.07 acre of riparian. The project could result in impacts to the following special-status plant species: Plumas ivesia, Davy's sedge, woolly-fruited sedge, mud sedge, American mannagrass, slender-leaved pondweed, and alder buckthorn. The project could also result in impacts to the following special-status animal species: Lahontan cutthroat trout, northern leopard frog, Sierra Nevada yellow-legged frog, northern goshawk, yellow warbler, willow flycatcher, Sierra Nevada snowshoe hare, Sierra Nevada mountain beaver, and nesting raptors. Implementation of mitigation measures would reduce impacts to less than significant levels.

Cultural Resources: The Valley Alignment would pass through or along a total of 14 isolated features, 15 linear features, and 5 archeological sites. All of the archeological sites that would be affected by the Valley Alignment are considered potentially eligible for listing in the National Register of Historic Places or California Register of Historic Resources. None of the isolated features or linear features are considered potentially eligible for listing or considered to be unique archeological resources under CEQA. The length of trail that passes through the sites considered potentially eligible for listing is 7,653 linear feet. As required by mitigation measures, most of those affected areas would be capped and data recovery would occur where capping is not feasible. Data recovery is expected to be required for a total of 2,323 linear feet.

Hydrology and Water Quality: The Valley Alignment would create 11.3 acres of new impervious surfaces and four new crossings of streams and wetlands. In addition, the project would replace one existing stream crossing structure. All five crossing structures as well as 0.8 acre of the trail surface would be located within the 100-year floodplain. With implementation of Best Management Practices to control erosion and preserve existing drainage patterns in the area and compliance with applicable policies and regulations regarding water quality, the proposed project would result in less than significant impacts related to hydrology and water quality.

Transportation and Circulation: Traffic generated by the proposed project is not expected to be substantial and would not affect traffic levels of service. The project would have no impacts to transportation and circulation, other than as directly related to the potential parking lots evaluated in Section 11.6 below.

Visual Resources: The proposed project would include a paved surface and removal of natural vegetation within and sometimes adjacent to the trail. The paved surface of a portion of the trail would be visible from SR 267 and the Wildlife Viewing Area as it crosses through Martis Valley. Trail construction would also result in temporary visual impacts. With implementation of mitigation measures regarding trail surface coloring and construction staging, the project's impacts to visual resources would be less than significant.

Recreation: The proposed project would increase recreational opportunities and is not expected to result in deterioration of existing recreational facilities in the area. The trail could result in an increase in trail user conflicts, particularly in the area south of the Wildlife Viewing Area. Project components such as trail width and signage as well as enforcement of leash laws will reduce impacts related to trail user conflicts. Mitigation measures are included for maintenance, funding for staffing and enforcement are included to ensure impacts remain less than significant.

Alternative B – Highway Alignment

Biological Resources: The Highway Alignment alternative would impact approximately 0.06 acre of wetlands. Impacts would occur within four different habitat types: approximately 11.61 acres of coniferous forest, 0.01 acre of dry meadow, 7.41 acres of sagebrush scrub and 0.19 acre of riparian. The project could result in impacts to the same special-status plant and wildlife species identified in the discussion of the Valley Alignment. Implementation of mitigation measures would reduce impacts to less than significant levels.

Cultural Resources: The Highway Alignment would pass through or along a total of 11 isolated features, 8 linear features, and 6 archeological sites. Four of the archeological sites and one linear feature that would be affected by the Highway Alignment are considered potentially eligible for listing in the National Register of Historic Places or California Register of Historic Resources. None of the other identified sites are considered potentially eligible for listing or considered to be unique archeological resources under CEQA. The length of trail that passes through the sites considered potentially eligible for listing is 6,390 linear feet. As required by mitigation measures, most of those affected areas would be capped and data recovery would occur where capping is not feasible. Data recovery is expected to be required for a total of 4,350 linear feet.

Hydrology and Water Quality: The Highway Alignment would create 12.6 acres of new impervious surfaces and one new crossing of wetlands. There would be a total of three crossings of creeks and wetlands; two of these crossing structures already exists (Frank's Fish Bridge and a culvert under Sawmill Flat Road). All three crossing structures as well as 1.9 acres of the trail surface would be located within the 100-year floodplain. With implementation of Best Management Practices to control erosion and preserve existing drainage patterns in the area and compliance with applicable policies and regulations regarding water quality, the proposed project would result in less than significant impacts to hydrology and water quality.

Transportation and Circulation: Traffic generated by the proposed project is not expected to be substantial and would not affect traffic levels of service. The project would have no impacts to transportation and circulation, other than as directly related to the potential parking lots evaluated in Section 11.6 below.

Visual Resources: The proposed project would include a paved surface and removal of natural vegetation within and sometimes adjacent to the trail. The paved surface of a portion of the trail would be visible from SR 267 and the Wildlife Viewing Area as it travels generally parallel to SR 267. Trail construction would also result in temporary visual impacts. With implementation of mitigation measures regarding trail surface coloring and construction staging, the project's impacts to visual resources would be less than significant.

Recreation: The proposed project would increase recreational opportunities and is not expected to result in deterioration of existing recreational facilities in the area. The trail could result in an increase in trail user conflicts. Project components such as trail width and signage as well as enforcement of leash laws will reduce impacts related to trail user conflicts. Mitigation measures are included for maintenance, funding for staffing and enforcement are included to ensure impacts remain less than significant.

Alternative C – No Project / No Build Alternative

As summarized above, this Draft EIR identified significant impacts requiring mitigation in the following resource areas: Biological Resources, Cultural Resources, Hydrology and Water Quality, Visual Resources, and Recreation. The No Project alternative would avoid each of these impacts and none of the mitigation measures identified in chapters 4 through 10 of this Draft EIR would be required.

Biological Resources: The No Project alternative would avoid all impacts to habitats, sensitive vegetation communities including federally-protected wetlands, and special-status species.

Cultural Resources: The No Project alternative would avoid all impacts to the archeological resources identified throughout the project site.

Hydrology and Water Quality: The No Project alternative would not introduce any new impervious surfaces to the project area and would not place any structures or trail surface within the 100-year floodplain.

Transportation and Circulation: The No Project alternative would not change any existing conditions, and would have no impacts on levels of service and safety. The proposed project would also have no impacts to Transportation and Circulation

Visual Resources: The No Project alternative would not placed any paved surfaces within Martis Valley and would not require removal of any vegetation.

Recreation: The No Project alternative would not change recreational uses in the area, would not increase trail user conflicts, and would not require any additional staffing, enforcement, or maintenance of recreational facilities.

Environmentally Superior Trail Alignment Alternative

According to CEQA Guidelines Section 15126.6(e), an EIR must identify the Environmentally Superior alternative other than the No-Project Alternative. As documented throughout this Draft EIR, the impacts of the Highway Alignment and the Valley Alignment are very similar in nature and extent. However, CEQA requires that an Environmentally Superior Alternative be selected. Based on the comparison of impacts between the Valley and Highway alignments shown in *Table 11.1*, Alternative B, the Highway Alignment, is identified as the Environmentally Superior Alternative. Compared to the Valley Alignment, the Highway Alignment would slightly reduce impacts to Cultural Resources, Visual Resources, and Recreation while it would slightly increase impacts to Hydrology and Water Quality. Impacts to Biological Resources would be generally equal under either alternative, while neither alternative would result in significant impacts to Transportation and Circulation.

Table 11.1
Trail Alternatives Comparison

	Valley Alignment	Highway Alignment	Summary
Biological Resources	Impacts to: 0.18 acre wetlands, 10.32 acres of coniferous forest (and associated potential impacts to nesting raptors), 0.12 acre of dry meadow, 0.06 acre of wet meadow, 5.87 acres of sagebrush scrub 0.07 acre of riparian(and associated potential impacts to Lahontan cutthroat trout, Sierra Nevada yellow-legged frog, northern leopard frog, willow flycatcher, yellow warbler, Sierra Nevada snowshoe	Impacts to: 0.06 acre wetlands, 11.61 acres of coniferous forest (and associated potential impacts to nesting raptors), 0.01 acre of dry meadow, No wet meadow, 7.41 acres of sagebrush scrub 0.19 acre of riparian (and associated potential impacts to Lahontan cutthroat trout, Sierra Nevada yellow-legged frog, northern leopard frog, willow flycatcher, yellow warbler, Sierra Nevada snowshoe	Impacts to forest, scrub, and riparian habitat areas under the Highway Alignment are greater than the Valley Alignment while impacts to wetlands, dry and wet meadows, and number of Plumas ivesia plants are greater under the Valley Alignment.

	Valley Alignment	Highway Alignment	Summary
	hare, and Sierra Nevada mountain beaver) [Note that the quality of some of the affected riparian habitat is adversely affected by existing recreation use, particularly off-leash dogs in the area.] Fewer than 500 individual Plumas ivesia plants	hare, and Sierra Nevada mountain beaver) [Note that the quality of most of the affected riparian habitat is adversely affected by the proximity to SR 267 and previous disturbance.] Fewer than 400 individual Plumas ivesia plants	
Cultural Resources	Would affect 14 isolated features, 15 linear features, and 5 archeological sites Of the affected sites, only the 5 archeological sites are considered potentially eligible for listing in national and/or state registers; none of the other sites are unique resources as defined by CEQA Would affect 7,653 linear feet of the sites considered potentially eligible for listing. Most of those affected areas would be capped and data recovery would occur where capping is not feasible. Data recovery is expected to be required for 1,700 linear feet of CA-PLA-5 and 623 linear feet in other sites.	Would affect 11 isolated features, 8 linear features, and 6 archeological sites Of the affected sites, 4 of the archeological sites and 1 linear feature are considered potentially eligible for listing in national and/or state registers; none of the other sites are unique resources as defined by CEQA Anticipated that most affected sites Would affect 6,390 linear feet of the sites considered potentially eligible for listing. Most of those affected areas would be capped and data recovery would occur where capping is not feasible. Data recovery is expected to be required for 2,500 linear feet of CA-PLA-5 and 1,850 linear feet in other sites.	Each alternative would affect the same number of significant sites but the Highway Alignment would affect a smaller total area of these sites. Impacts would be mitigated by capping (which avoids disturbance to a resource) or by data recovery. A greater amount of data recovery would be required under the Highway Alignment.
Hydrology and Water Quality	Would create 11.3 acres (491,040 square feet) of new impervious surface Would place 0.8 acres of trail within 100-year floodplain; five trail crossings (bridges, boardwalks, culvert) within 100-year floodplain. One of these crossings already exists.	Would create 12.6 acres (549,120 square feet) of new impervious surface Would place 1.9 acres of trail within 100-year floodplain; three trail crossings (bridge, boardwalk, culvert) within 100-year floodplain. Two of these crossings already exist.	Highway Alignment would create 1.3 acre more impervious surface and 1.1 acres more trail within 100-year floodplain, but two fewer crossing structures within the 100-year floodplain
Transportation and Circulation	No impacts to roadway levels of service, no roadway improvements needed	No impacts to roadway levels of service, no roadway improvements needed	No significant impacts or mitigation required under either alignment.
Visual Resources	Paved trail through valley (westerly from SR 267) would contrast with existing	Trail parallel to SR 267 would be visible from Wildlife Viewing Area but would be	Valley Alignment would be more visible and have a greater amount

	Valley Alignment	Highway Alignment	Summary
	conditions	similar in visual character to existing view disruption associated with SR 267	of contrast with existing conditions (even as mitigated)
Recreation	Increase user conflicts by mixing user types (bicyclists, other non-motorized transportation, pedestrians – including dog-walking) Increase needs for maintenance, demands for staffing/enforcement	Slight increase in user conflicts Increase needs for maintenance, demands for staffing/enforcement	Increase in user conflicts would be greater on the Valley Alignment as existing trails in the vicinity of the Valley Alignment receive more dog-walking use than the existing trails in the vicinity of the Highway Alignment Needs for maintenance would be slightly higher under Highway Alignment due to greater length

CEQA §21002 states that a Lead Agency "should not approve projects as proposed if there are feasible alternatives or feasible mitigation measures available which would substantially lessen the significant environmental effects of such projects." (This is reiterated in CEQA Guidelines §15021.) However, as evaluated throughout this Draft EIR, there would be no significant and unavoidable impacts associated with either of the potential trail alignments; and as demonstrated in *Table 11.1*, the impacts of the Highway Alignment are not substantially less than the impacts of the Valley Alignment. Further, CEQA §21002 allows the Lead Agency to consider "specific economic, social, or other conditions" in determining the feasibility of a project alternative.

11.6 PARKING LOT ALTERNATIVES

The proposed Martis Valley Trail project includes construction of a new parking lot. Four potential parking lot locations have been identified, and they are evaluated at an equal-level. Three of the proposed parking lot alternatives are located in the southwest quadrant of the SR 267/Schaffer Mill Road/Truckee Tahoe Airport Road intersection. The fourth alternative is south of SR 267 approximately 500 feet east of Martis Creek Road. Refer to *Figure 11-1 Parking Lot Alternatives* for locations of the proposed alternatives.

A description of the environmental setting and proposed design for each of the four parking lot locations is provided below. The impact analysis of parking lot alternatives and the need for mitigation is discussed by resource area. The Regulatory Framework for each resource area is the same as described in chapters 4 through 9 of this Draft EIR and is not repeated here.

Parking Lot Alternative 1

Parking Lot Alternative 1 is located on the south side of SR 267 approximately 500 feet east of Autumn Way. The parking lot site is approximately one-half acre. As shown in *Figure 11-2,* the parking lot would contain 22 parking spaces, a 5-foot walkway around the lot, and stormwater runoff improvements including a vegetated swale and rain garden/detention basin. A connection to the proposed trail (approximately 50 feet in length) would be provided by a 10-foot wide paved walkway. An information kiosk and trail map would be located on a pervious surface at the perimeter of the parking lot. Access to the parking lot would be constructed from the southeasterly corner of the Donner-Truckee Veterinary Hospital parking lot.

Land uses in the vicinity of Parking Lot Alternative 1 include residential and commercial uses at the eastern end of the Town of Truckee and the Truckee-Tahoe Airport. Site vegetation is characterized as sparse coniferous forest transitioning into sagebrush scrub.

Parking Lot Alternative 2

Parking Lot Alternative 2 is located on the north side of Schaffer Mill Road. The driveway to the parking lot is approximately 860 feet south of SR 267, where a 50-foot County access apron and easement is located. This alternative is similar to Parking Lot Alternative 2, with 22 parking spaces, a 5-foot walkway around the lot, a vegetated swale and rain garden/detention basin, and an area covered with a pervious surface and supporting an information kiosk and trail map, as shown in *Figure 11-3*. The location of the connection point on the trail is approximately 600 feet southwest from the intersection of Schaffer Mill Road and SR 267, at Station 13 of trail Segment 1. An approximately 500-foot trail segment would travel southeasterly to the parking lot. This trail connection segment would cross wetlands using a 78-foot long boardwalk section.

The Parking Lot Alternative 2 site is on a partially disturbed area containing an unsurfaced road and access apron surrounded by sagebrush scrub with a seasonal swale to the north. Open undeveloped lands surround this site.

Parking Lot Alternative 3

Parking Lot Alternative 3 is located on the north side of Schaffer Mill Road approximately 300 feet west of the SR 267/Schaffer Mill Road/Truckee Tahoe Airport Road intersection, as shown in *Figure 11-4*. This parking area would have 23 parking spaces, a 5-foot walkway around the lot, a vegetated swale and rip rap for runoff and an access driveway onto Schaffer Mill Road. The parking lot would be connected to the trail by a short segment of paved walkway; a trailhead exhibit providing trail information and maps would also be constructed where the walkway meets the trail, using a pervious surface. To improve sight distance towards SR 267, plans call for removing some of the low hill located along the northwest side of Schaffer Mill Road between the planned driveway location and SR 267.

Land uses in the vicinity of Parking Lot Alternative 3 are the same as Alternative 1 - residential and commercial uses at the southern limits of the Town of Truckee and the Truckee-Tahoe Airport. The habitat on this site is characterized as sparse coniferous forest.

Parking Lot Alternative 4

Parking Lot Alternative 4 is located on the south side of SR 267 approximately 400 feet southeast of Martis Creek Road. The parking lot would contain 22 parking spaces, a 5-foot walkway around the lot, and stormwater runoff improvements including a vegetated swale and rain garden/detention basin. An area adjacent to the parking lot containing an information kiosk and trail map would have a pervious surface. A driveway of approximately 150 feet accessing SR 267 and site improvements covering approximately one-half acre are proposed. A trail access connection, approximately 200 feet long, is shown to the southwest of the proposed parking lot in *Figure 11-5*.

Parking Lot Alternative 4 is within the Martis Creek Lake Project. The site habitat is sagebrush scrub.

Parking Lot Alternatives Impact Analysis

The analysis of parking lot alternatives below is provided by resource topic using the same potential impacts identified for the Valley and Highway alignments. For some resource areas (e.g., Recreation) the impact analysis is similar for all parking lot alternative sites. Other resource areas, such as Transportation and Circulation are site-specific and each alternative is addressed separately. The impacts analysis is followed by a summary table and the identification of the parking lot location determines to be the Environmentally Superior Alternative.

Biological Resources

Parking Lot Alternatives 1 and 3 and the connector trails serving these parking areas are in sparse coniferous forest at the margin of the sagebrush scrub community. Parking Lot Alternatives 2 and 4 and the connector trail for Parking Lot Alternative 4 are within a sagebrush scrub community. The connector trail for Parking Lot Alternative 2 crosses a seasonal swale that does not support any riparian habitat. Each of these parking areas would result in impacts to approximately 0.5 acre of the habitat community within which they are constructed.

Adversely Affect Special-Status Species

Special-Status Plants

As discussed under Impact 4.1, one special-status plant species, Plumas ivesia, was identified within sagebrush scrub habitat during focused surveys carried out onsite. These surveys and surveys completed for a separate, unrelated project (the Hopkins Ranch development) recorded no Plumas ivesia populations within any of the four parking lot alternative areas or associated connector trails. The EIR for the Hopkins Ranch development project is available for review from the Placer County Community Development Resources Agency located at 3091 County Center Drive, Auburn CA 95603.

The connector trail to Parking Lot Alternative 2 would cross a seasonally wet swale. The swale could potentially support special-status species of sedge and wetter areas have some potential to support American mannagrass. Construction of the trail crossing could result in impacts to these special-status species if they occur within the portion of the seasonal swale that would be disturbed. *Mitigation Measure 4.1b* requires that, prior to construction, floristic rare plant surveys be conducted within wetland, riparian, and stream habitats that would be disturbed by construction activities. This would apply to the area of the swale crossed by the connector trail from Parking Lot Alternative 2. If any special-status plant species are identified by the surveys, *Mitigation Measure 4.1b* requires that Northstar CSD implement a management plan to avoid or reduce adverse affects to special-status plant species to a less than significant level. These measures could include relocation of individual plants, soil/seed salvage, and avoidance. Implementation of *Mitigation Measure 4.1b* would ensure that impacts to special-status plant species associated with constructing Parking Lot Alternative 2 would be less than significant.

Special-Status Wildlife

Table 4.3 identifies eight special-status animal species that could occur in the project area. Sparse coniferous forest habitat in the area of Parking Lot Alternatives 1 and 3 provide marginally suitable nesting habitat for yellow warbler and Northern goshawk. Conifers on these sites also provide potential nesting habitat for other species of protected raptors. Construction disturbance and vegetation and tree removal in the Parking Lot Alternative 1 and Parking Lot Alternative 3 areas has potential to disrupt nesting of these species, which would be a significant impact. Implementation of *Mitigation Measures 4.1f* and *4.1g* would ensure that impacts to nesting raptors and yellow warbler resulting from construction of Parking Lot Alternatives 1 and 3 would be less than significant.

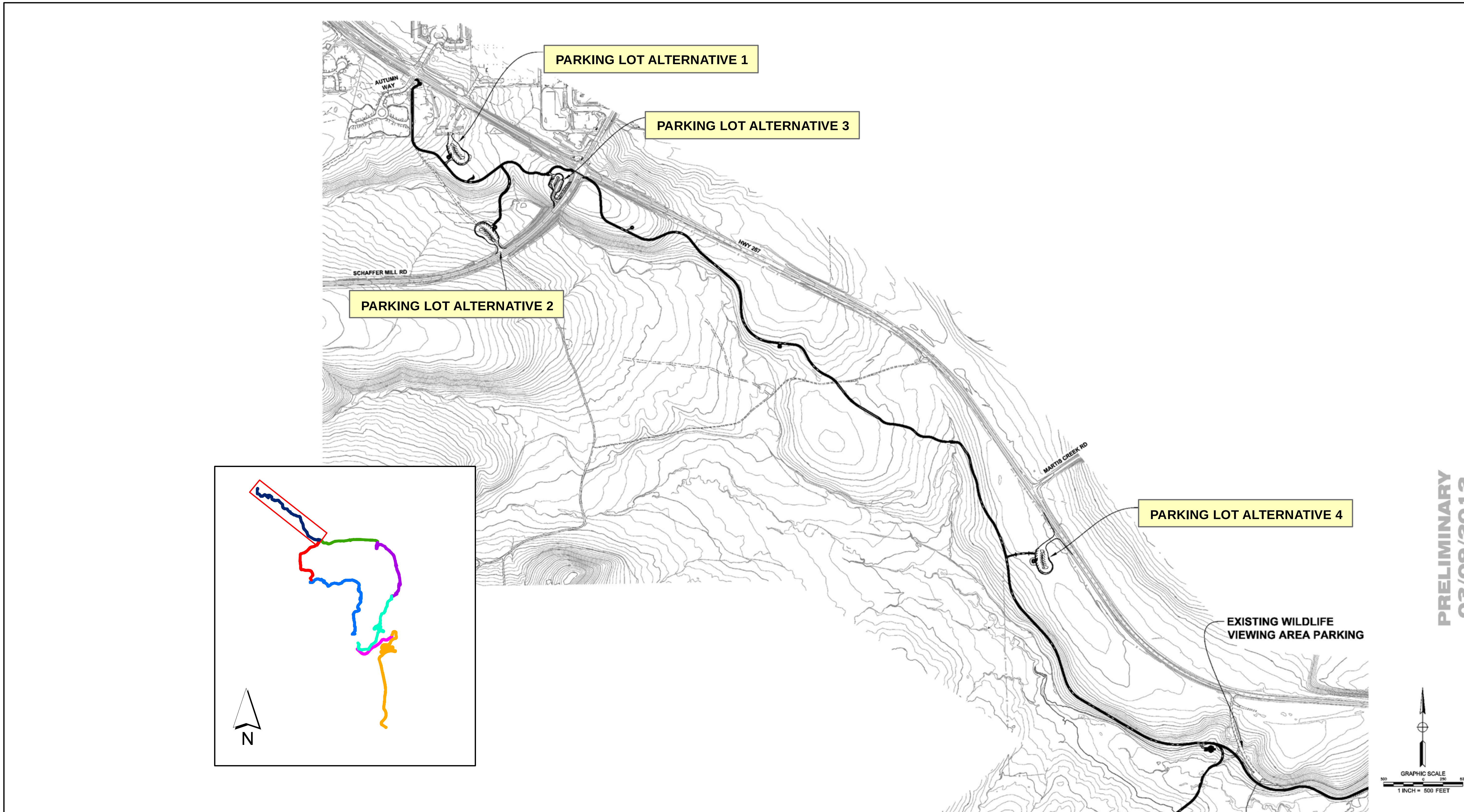
The seasonal wetland swale crossed by the trail that would connect Parking Lot Alternative 2 to the main Martis Valley Trail is not perennially wet and does not support any riparian habitat. This swale is not considered suitable habitat for Lahontan cutthroat trout, Sierra Nevada yellow-legged frog, or Northern leopard frog. Construction of this parking lot would not result in any direct impacts to these species.

Construction of any of the proposed parking lots could potentially degrade habitat by contributing to water quality degradation as a result of ground disturbing activities and changes in stormwater runoff (as evaluated in **CHAPTER 6 HYDROLOGY AND WATER QUALITY** and discussed below). Project effects to water quality are expected to be less than significant with implementation of measures identified in Chapter 6. Implementation of *Mitigation Measures 4.1c* and *4.1e* would ensure that impacts to potential downstream aquatic habitat that could support these special-status species would be less than significant by requiring consultation with USFWS regarding appropriate water quality BMPs to protect Lahontan cutthroat trout habitat and by ensuring that wetland areas temporarily disturbed by construction activities are restored to pre-project conditions and/or as required by the terms and conditions of permits required from the USACE, CDFG, and Lahontan RWQCB.

No suitable habitat for willow flycatcher, Sierra Nevada snowshoe hare, or Sierra Nevada mountain beaver occurs within any of the proposed Parking Lot Alternative areas. No impacts to these special-status species are likely to occur with implementation of any of the four alternative parking areas or their associated connector trails.

Adversely Affect Riparian Habitat or Other Sensitive Natural Community

The coniferous forest habitat in the location of Parking Lot Alternatives 1 and 3 is of marginal habitat value because of existing development and the isolated situation of this stand of trees. Specifically, the conifer forest that would be impacted in the vicinity of these parking areas is



north fork associates

NOT TO SCALE

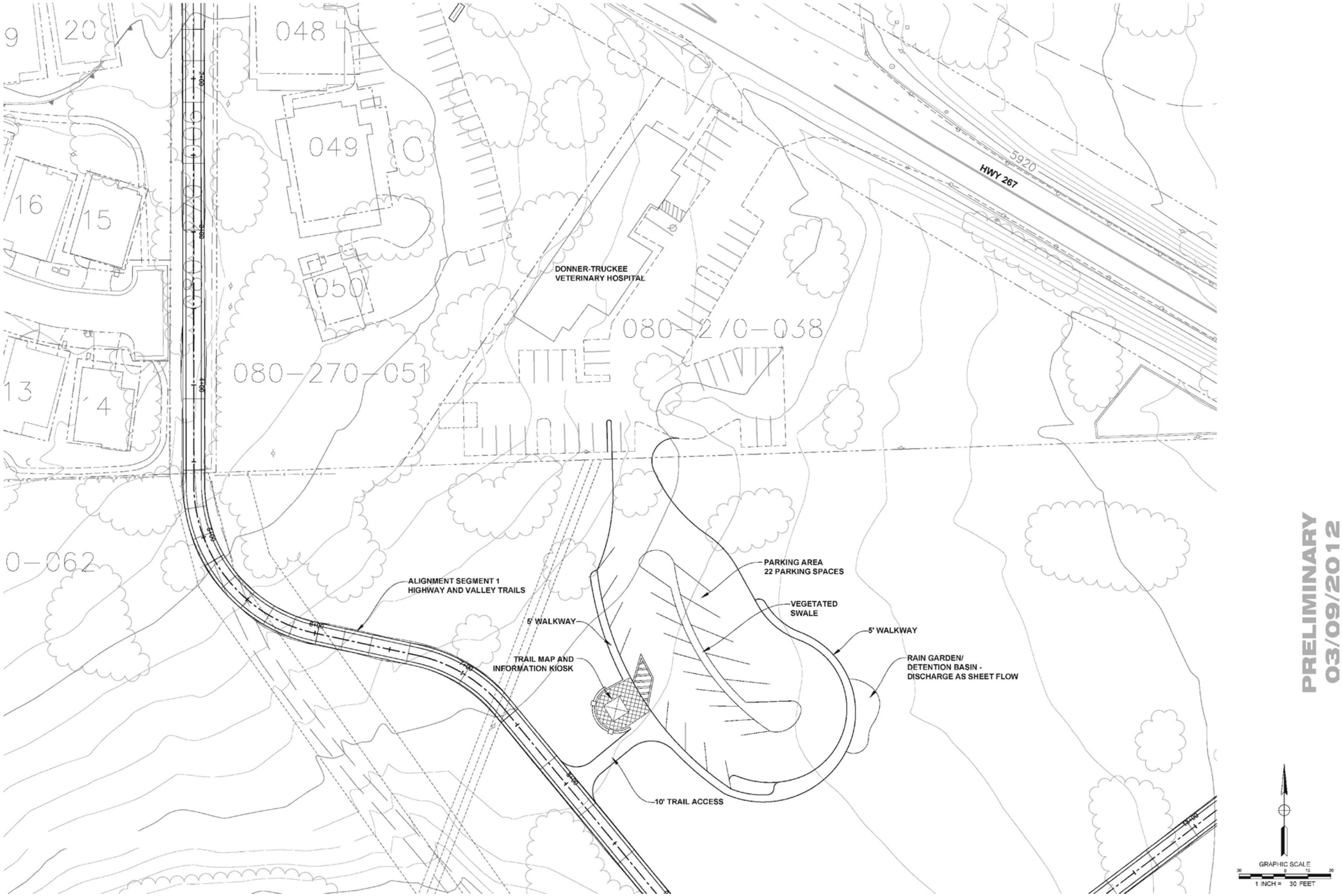
Source: Auerbach Engineering Corp. 2012

Figure 11-1

POTENTIAL PARKING LOCATIONS

Martis Valley Trail

Placer County, California



north fork associates

NOT TO SCALE

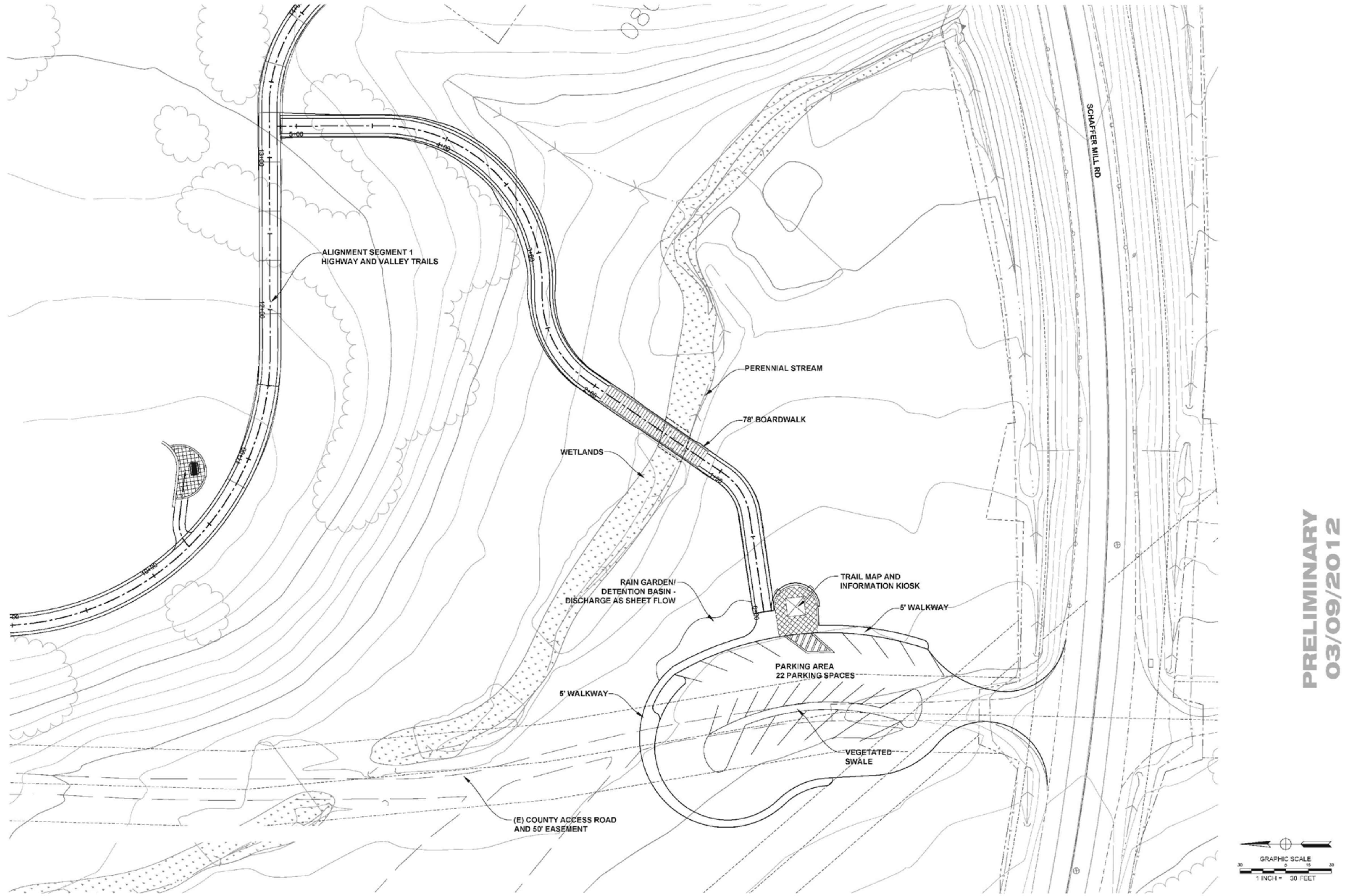
Source: Auerbach Engineering Corp.

Figure 11-2

PARKING LOT ALTERNATIVE 1

Martis Valley Trail

Placer County, California



NOT TO SCALE

Source: Auerbach Engineering Corp.

Figure 11-3

PARKING LOT ALTERNATIVE 2

Martis Valley Trail

Placer County, California

NOT TO SCALE

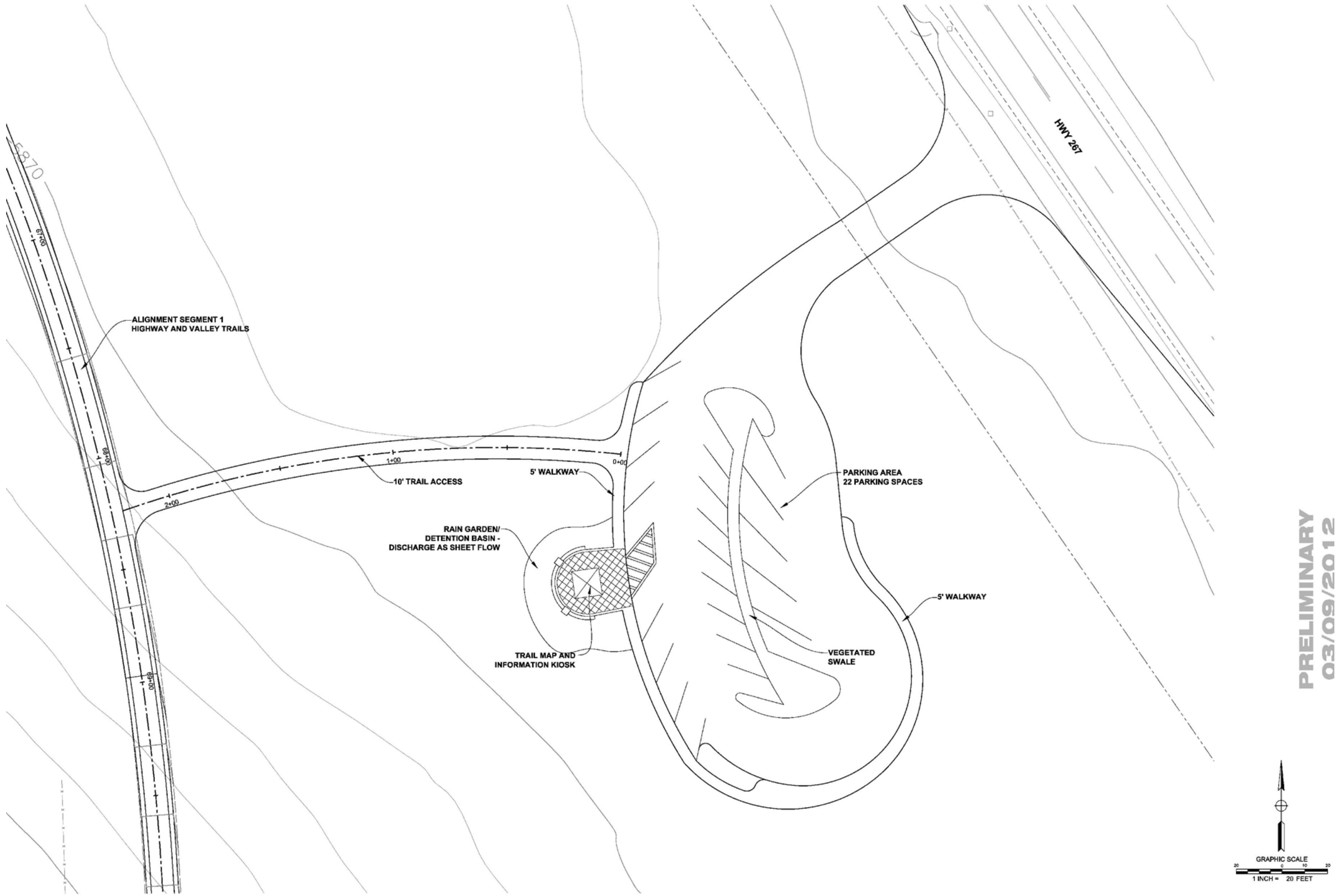
Source: Auerbach Engineering Corp.

Figure 11-4

PARKING LOT ALTERNATIVE 3

Martis Valley Trail

Placer County, California



north fork associates

NOT TO SCALE

Source: Auerbach Engineering Corp.

Figure 11-5

PARKING LOT ALTERNATIVE 4

Martis Valley Trail

Placer County, California

near the SR 267/Schaffer Mill Road/ Truckee Tahoe Airport Road intersection and existing residential and commercial development at the southern limit of the Town of Truckee. Impacts to these existing fragments of conifer forest habitat resulting from Parking Lot Alternatives 1 or 3 would be less than significant.

Parking Lot Alternative 2 is within sagebrush scrub habitat adjacent to Schaffer Mill Road. The driveway apron and parking lot area would impact approximately 0.5 acre of sagebrush scrub in this area. Impacts within this area of sagebrush scrub would not substantially diminish the existing habitat values of the sagebrush scrub community in this area, which has been previously affected by Schaffer Mill Road, SR 267, and existing development within the Town of Truckee.

The connector trail that would serve Parking Lot Alternative 2 would impact approximately 0.3 acre of additional sagebrush scrub habitat and would cross a seasonal wetland swale within this vegetation community, resulting in approximately 500 square feet of temporary impacts within this swale. This seasonal swale is not perennially wet and does not support riparian vegetation, but is considered sensitive due to the potential of the swale to support special-status plant species and because it provides a link to perennial aquatic habitat downstream that could be suitable for special-status wildlife species. Specific impacts to special-status species and mitigation measures are discussed in the previous impact discussion. Impacts to water quality and associated habitat degradation from construction of the connector trail and boardwalk over the swale are discussed below.

Construction of Parking Lot Alternative 4 would impact approximately 0.5 acre of sagebrush scrub habitat adjacent to SR 267. Disturbance associated with construction and operation of this parking area would be similar to disturbance within the sagebrush scrub community discussed in Impact 4.2 for Segment 1 of the proposed trail (both alignments) and would not be expected to substantially diminish the existing habitat values of the sagebrush scrub community in this area. The sagebrush scrub community in this area is known to support the special-status plant species Plumas ivesia but no populations of Plumas ivesia are known to occur within the Parking Lot Alternative 4 location, as discussed above.

Changes in stormwater runoff and ground disturbance and erosion and sediment generated by construction of any of the proposed parking areas and the connector trail to Parking Lot Alternative 2 could degrade aquatic habitat by adversely affecting water quality. As evaluated in **CHAPTER 6 HYDROLOGY AND WATER QUALITY** and discussed below**,** water quality effects could occur if construction and use of parking lots and associated trail components introduces sediment and other pollutants to onsite and adjacent waterways. Mitigation measures identified in Chapter 6, including BMPs and terms and conditions of project permitting, would ensure that impacts aquatic habitat resulting from degradation of water quality would be less than significant. In addition, implementation of *Mitigation Measures 4.1c* and *4.1e* would further ensure that impacts to the swale and downstream aquatic habitat would be less than significant by requiring use of appropriate water quality BMPs and by ensuring that wetland areas temporarily disturbed by construction activities are restored to pre-project conditions and/or as required by the terms and conditions of permits required from the USACE, CDFG, and Lahontan RWQCB.

Adversely Affect Federally Protected Wetlands

While Parking Lot Alternative 2 is within sagebrush scrub habitat, access to the main trail would require constructing a connector trail passing over a seasonal wetland swale on a 78-foot long boardwalk. The boardwalk would be constructed on piers to span the swale area and minimize permanent impacts to the swale. Constructing the swale crossing would result in temporary impacts of approximately 500 square feet within the delineated wetland swale. Permanent impacts within the delineated swale would be associated with placing pier foundations to support the boardwalk and would total less than 100 square feet.

Mitigation Measures 4.3a and *4.3b* require the project to obtain appropriate permits for wetland impacts from the USACE and RWQCB in accordance with Sections 404 and 401 of the Clean Water Act to implement BMPs and to provide for replacement of the impacted habitat at a minimum of a 1:1 ratio to ensure no net loss of wetlands. To address the potential for indirect effects to wetlands and waters of the U.S. adjacent to the site, *Mitigation Measure 4.3c* identifies BMPs that must be implemented to control erosion and maintain water quality. With implementation of *Mitigation Measures 4.3a* through *4.3c,* Northstar CSD would compensate for the onsite impacts to waters of the U.S. and minimize indirect effects to offsite waters of the U.S, ensuring that impacts associated with constructing the connector trail to federally-protected wetlands would be less than significant.

Parking Lot Alternatives 1, 3, and 4 would result in no impacts within jurisdictional wetland areas. No impacts to federally protected wetlands would result from construction of these parking lot alternatives.

Interfere Substantially with Wildlife Movement or Native Wildlife Nursery Sites

As discussed under Impact 4.4, there are no known active or formally designated important wildlife nursery sites within the project area, including within any of the four parking lot alternative areas. Potential impacts to nesting birds are evaluated under the previous discussion of impacts to special-status species above. Parking Lot Alternatives 1, 3, and 4 would result in no impacts within areas that would be expected to function as important wildlife movement corridors, as they are within upland areas that provide sparse vegetation cover and are adjacent to existing development. While the driveway apron and parking area for Parking Lot Alternative 2 is proposed within an area of upland sagebrush scrub adjacent to Schaffer Mill Road that is not important for wildlife movement, the connector trail from Parking Lot Alternative 2 to the main trail crosses a swale that could provide marginal value as a corridor for movement by small mammals. The proposed boardwalk over this swale could potentially create a physical barrier to typical movement patterns and impair the ability of smaller mammals to move within the cover afforded by the swale. *Mitigation Measure 4.4a* requires that crossing structures be constructed to allow common species of small mammals to pass under the structure and avoid the need for wildlife to travel over the trail surface to move along the swale. Implementation of *Mitigation Measure 4.4a* would ensure that impediments to wildlife movement created by the boardwalk over the swale on the connector trail to Parking Lot Alternative 2 would be less than significant.

Conflict with Local Policies or Ordinances Protecting Biological Resources

All of the proposed parking lot alternatives occur within Placer County and are subject to policies contained in the Placer County General Plan and the County's Martis Valley Community Plan. Only Parking Lot Alternative 4 is within the boundary of the Martis Creek Lake Project area and is therefore subject to policies contained in the *1977 Martis Creek Lake Master Plan*, as discussed in **CHAPTER 4 BIOLOGICAL RESOURCES**.

To ensure compliance with applicable policies and regulations, mitigation measures for impacts to biological resources would be implemented as identified in the impact discussions above. This would include implementation of *Mitigation Measures 4.1b, 4.1c, 4.1e* through *4.1g, 4.1i, 4.2b, 4.3a* through *4.3d,* and *4.4a,* which include measures to minimize impacts to special-status species of plants and wildlife, and to avoid, minimize, or compensate for impacts to sensitive habitats, including wetlands. *Mitigation Measures 4.1b, 4.1e, 4.2b, 4.3a, 4.3b,* and *4.4a* are specific to mitigating impacts to wetlands and would only apply to the swale crossing associated with the connector trail serving Alternative Parking Lot 2, since no other alternative parking locations would impact to wetlands. *Mitigation Measure 4.1f* and *4.1g* would apply only to Parking Lot Alternatives 1 and 3, since only these parking lot alternatives would result in impacts within the coniferous forest habitat type.

Specific requirements of mitigation measures identified include pre-construction surveys, consultation with responsible agencies, design measures to reduce habitat impacts, and compliance with terms and conditions of permits required for impacts to sensitive habitats such as wetlands and waters of the U.S. These measures would ensure that direct impacts to wetlands are compensated for at a minimum 1:1 ratio, and that appropriate BMPs are implemented to avoid indirect impacts to waterways and aquatic habitat. Implementation of these measures would ensure that the project complies with Placer County and USACE policies regarding protection of biological resources by reducing the project's impacts to habitat and vegetation to less than significant levels.

Cultural Resources

Adversely Affect Known Historically Significant and/or Unique Archeological Resources

There are no known cultural resources within the locations of Alternative Parking Lots 1, 2, and 3. The location of Alternative Parking Lots 3 and 4 were surveyed by Dr. Lindstrom while the locations for Alternative Parking Lots 1 and 2 were surveyed by Pacific Legacy, Inc. for a separate, unrelated project (the Hopkins Ranch development). The EIR for the Hopkins Ranch development project is available for review from the Placer County Community Development Resources Agency located at 3091 County Center Drive, Auburn CA 95603.

If Alternative Parking Lot 4 is selected for construction, implementation of *Mitigation Measure 5.1b* providing for data recovery from the affected cultural resource site would ensure that impacts would be reduced to a less than significant level.

Adversely Affect Presently Unknown Historic or Archeological Resources

Should any presently unknown cultural resources be encountered during construction, including construction of the parking lot, implementation of *Mitigation Measure 5.2a* would ensure that impacts are reduced to less than significant levels by providing for appropriate management of the found resources, including data recovery.

Adversely Affect Human Remains

There are no known human remains in the project site, including the sites of each parking lot alternative location. As discussed in Impact 5.3 in **CHAPTER 5 CULTURAL RESOURCES**, should any human remains be encountered during construction, compliance with state law would ensure that impacts remain less than significant.

Hydrology and Water Quality

Violate Water Quality Standards or Waste Discharge Requirements, Provide Substantial Additional Sources of Polluted Runoff, or Otherwise Substantially Degrade Water Quality

Construction of a parking lot for the proposed Martis Valley Trail would not introduce any new point sources of pollutants but would generate potential non-point sources of pollution through grading during parking lot construction and maintenance. During any grading, excavation, or other ground disturbing activities, a release of sediment to surface waters could occur. Water quality impacts could also occur from releases of fuels or other fluids from vehicles using the proposed parking lot. Regardless of the location selected, the potential water quality impacts of the new parking lot are similar. Each potential parking lot has a similar layout and size and stormwater management would be similar. *Mitigation Measure 11.1a* requires that the parking lot be constructed using pervious surfaces for all parking stalls and include a vegetated swale and rain garden/detention basin.

In addition, *Mitigation Measures 6.1a* through *6.1c* require that water quality treatment facilities to appropriately detain, treat, and/or filter all water runoff from the project are constructed and maintained. With implementation of *Mitigation Measures 6.1a* through *6.1c* and *Mitigation Measure 11.1a*, the project, including construction and use of the project parking lot, would not violate water quality standards or waste discharge requirements and does not otherwise degrade water quality; therefore, this impact will be less than significant.

Substantially Alter Drainage Patterns; Increase Rate or Amount of Surface Runoff

As required by *Mitigation Measure 11.1a,* all parking stalls within the parking lot (regardless of parking lot location) would be constructed using pervious surfaces while the parking lot would be bordered with infiltration basins (rain gardens) such that the parking lot would not contribute to the overall impervious surface increases of the project. Further, the stormwater management strategy for the proposed trail is to maintain existing conditions and implement Low Impact Development techniques. Construction of any one of the parking lot alternatives would not substantially alter drainage patterns or increase the amount or rate of runoff.

Contribute Runoff Water Exceeding the Capacity of Stormwater Drainage Systems

The Project Hydrology Study included a hydraulic analysis to determine if the project would contribute runoff water that would exceed the capacity of existing and proposed bridges and culverts, based on the frozen event conditions. This analysis found that all existing and proposed bridges and culverts would be sufficiently sized to accommodate pre- and post-project runoff volumes. This analysis included a parking lot for the proposed trail. Construction of any of the parking lot alternatives would have no impact related to the capacity of stormwater drainage systems and structures.

Place Structures Within the 100-Year Flood Hazard Area

None of the four parking lot alternatives are within the 100-year flood hazard zone and would have no impact related to placement of structures within a 100-year flood hazard area.

Mitigation Measure 11.1a: Parking stalls within the Martis Valley Trail parking lot shall be constructed using pervious surfaces. Additionally, the parking lot shall either be designed to provide full infiltration of runoff from the 10-year storm event within 12 hours or include an underdrain system that collects filtered stormwater and releases the runoff downslope as sheet flow at a rate that is a maximum of 90 percent of pre-project conditions. The parking lot shall include a vegetated swale and rain garden which must be sized to provide treatment for most or all of the runoff from 2-year and 10-year events. The parking lot shall also include a detention basin sized to handle larger events such that stormwater runoff is released from the basin at a rate of 90 percent of pre-project conditions. Release from the basin must also be routed through an additional vegetated swale or in a manner that reflects existing sheet flow characteristics.

Transportation and Circulation

The LSC Transportation Consultants, Inc. evaluation of the transportation and circulation impacts from each of the four parking lot alternatives is documented in the *Martis Valley Trail Parking Alternative Access Intersections Analysis* memorandum (LSC 2012, provided in Appendix E). The analysis below summarizes the conclusions of that study.

Substantially Increase Traffic or Conflict with Level of Service Standards

Projected traffic volumes associated with each parking lot alternative is based on the *Martis Valley Trail Use Forecast* memorandum (LSC 2011a). The trail usage forecasts indicate that up to eleven vehicles would be parked at Parking Lot Alternative 1, 2, or 3 and that ten vehicles would be parked at Parking Lot Alternative 4 during the peak trail use hour. For modeling and impact analysis purposes, it is assumed that each vehicle would generate both one inbound and one outbound trip during the peak hour. This scenario is considered to be conservative because the majority of trail users that drive to the trail will occupy a parking space for longer than one hour, and therefore will not all generate both an inbound and an outbound vehicle-trip during the peak hour of SR 267 traffic.

Parking Lot Alternative 1 is proposed adjacent to the Donner-Truckee Veterinary Hospital parking lot and would be accessed from SR 267 through the veterinary parking lot. In this vicinity SR 267 is a two-lane highway posted at 55 miles per hour (mph). The driveway to the veterinary hospital parking lot forms a 4-way intersection with the driveway to an airport storage facility across SR 267. There are no turn lanes or restrictions in turning movements at this location.

Traffic volumes on SR 267 are based on intersection turning movement counts conducted in the summer of 2009 at the intersection of SR 267/Airport Road/Schaffer Mill Road. These counts indicate that there are 750 northbound and 685 southbound vehicles on SR 267 in the summer peak hour. The most recent average daily traffic (ADT) count data provided by Caltrans in 2010 for SR 267 at the Nevada/Placer County line is a peak month ADT of 16,200 and an annualized average daily traffic count of 12,500.

The traffic analysis assumed that 85 percent of vehicle trips using Parking Lot Alternative 1 would travel to/from the north on SR 267 and 15 percent would travel to/from the south on SR 267. Applying these percentages yields nine outbound left-turns, two outbound right-turns, two northbound left-turns from SR 267, and nine southbound right-turns from SR 267 in the peak hour.

The driveway intersection currently operates at a Level of Service (LOS) of E, which is the LOS standard for SR 267. Traffic from the Donner-Truckee Veterinary Hospital approved expansion plan was included in this analysis. Adding the estimated traffic volumes at the existing driveway intersection to the existing traffic volumes on SR 267 (both through traffic and existing turning movements at the driveway intersection) would result in a driveway LOS of F. The added traffic at this driveway intersection exceeds the LOS standard for SR 267. This is a significant impact. However, LSC also conducted a turn lane warrant analysis for this location and concluded that neither a left turn lane nor right turn lane was warranted (LSC 2012). Because turn lanes are not warranted and would not improve LOS at this location, the use of this parking lot location resulting in an intersection LOS of F would be a significant and unavoidable impact of Parking Lot Alternative 1.

Parking Lot Alternative 2 would be accessed from an existing driveway on Schaffer Mill Road approximately 860 feet south of the intersection of SR 267/Airport Road/Schaffer Mill Road. Parking Lot Alternative 3 for the Martis Valley Trail would be located on Schaffer Mill Road approximately 300 feet southwest of its intersection with SR 267. Schaffer Mill Road is a two-lane roadway with a posted speed limit of 45 mph. Due to the close proximity of the location of the driveways for Parking Lot Alternative 2 and 3 on Schaffer Mill Road, the traffic volumes and LOS calculations are the same for both alternatives.

Traffic volumes on Schaffer Mill Road are based on turning movement counts from August 2009 at the intersection of SR 267/Schaffer Mill Road/Truckee Tahoe Airport Road. These counts identify the summer peak hour traffic volumes near the proposed parking lot access as 227 northeastbound and 69 southwestbound vehicles. As there are no access points between the intersection and either of the proposed driveways to Parking Lot Alternatives 2 or 3, the traffic volumes at the intersection are equal to those at the proposed driveways.

The traffic analysis assumes that ten inbound and ten outbound trips will travel through the Schaffer Mill Road/SR 267/ Truckee Tahoe Airport Road intersection and that one inbound and one outbound trip will travel west along Schaffer Mill Road.

The LSC analysis indicates that either of the parking lot driveways onto Schaffer Mill Road would operate at LOS B. In addition, due to the minimal traffic generated by the trailhead in any one hour, the LOS at the SR 267/Schaffer Mill Road/Truckee Tahoe Airport Road intersection would not be affected. Due to the low volume of traffic on Schaffer Mill Road and the low volume of traffic anticipated with the trailhead/parking lots, left and right turn lanes would not be warranted for either Parking Lot Alternative 2 or 3. Impacts related to traffic volume or conflict with LOS standards at Parking Lot Alternatives 2 and 3 are less than significant.

Parking Lot Alternative 4 would construct a new driveway access point on SR 267. Through Martis Valley, SR 267 is two lanes with one travel lane for each direction. The posted speed limit is 55 mph. ADT volume during summer months (July and August) on SR 267 is 14,400. This volume is provided from the Caltrans Traffic Census Station located on SR 267 near the intersection of Brockway Road/Soaring Way. Intersection turning movement counts conducted in the summer of 2009 at the intersection of SR 267/Northstar Drive and SR 267/Airport Road/Schaffer Mill Road indicated that there are 686 northbound and 740 southbound vehicles on SR 267 in the PM peak hour through Martis Valley, as adjusted for peak summer conditions.

The traffic analysis assumed that 85 percent of vehicle trips using the driveway to the parking lot would travel to/from the north on SR 267 and 15 percent would travel to/from the south on SR 267. Applying these percentages yields eight outbound left-turns, two outbound right-turns, two northbound left-turns from SR 267, and eight southbound right-turns from SR 267 in the peak hour.

Adding the estimated traffic volumes at the existing driveway location to the existing traffic volumes on SR 267 would result in a driveway LOS of D. Because the resulting driveway LOS of D would meet the LOS standard of E on SR 267 and would meet Placer County's LOS standard of D within one-half mile of a state highway, this impact is considered to be less than significant.

Turn lane warrant evaluations were conducted by LSC to determine the need for either left or right turn lanes. The need for turn lanes at uncontrolled intersections along Caltrans state highways is governed by the *California Highway Design Manual* (6th Edition, Caltrans, 2006-2007) which specifies the use of the guidelines in *Guidelines for Reconstruction of Intersections* (California Division of Transportation Operations, 1985). Based on the traffic volume, accident data and anticipated turning movements the evaluations concluded that neither right turn lanes nor left turn lanes are warranted.

Substantially Increase Hazards due to a Design Feature or Incompatible Uses

Two types of sight distance criteria are considered when evaluating a driveway location: stopping sight distance and corner sight distance. Stopping sight distance is the minimum distance required by a driver on the main roadway approaching a driveway or intersection to see an object in their travel path and to safely stop. Corner sight distance is the minimum distance required in each direction along the main roadway so that a driver waiting at a cross street or driveway can accurately identify an acceptable gap in traffic. Additionally, the *Caltrans Design Manual* provides that on a private roadway, the minimum stopping sight distance is used for consideration of both the corner and stopping sight distance. The minimum stopping and corner sight distance requirements are a function of roadway design speed.

An analysis of sight distance at the veterinary hospital driveway was conducted as part of the traffic analysis for expansion of the Donner-Truckee Veterinary Hospital. That report concluded that adequate sight distance is provided at the driveway location, therefore there is no safety hazard related to sight distance at the driveway for Parking Lot Alternative 1.

The driveway to Parking Lot Alternative 2 is located approximately 860 feet from the intersection of Schaffer Mill Road/SR 267/Truckee Tahoe Airport Road. Schaffer Mill Road has a design speed of 45 mph. According to the *Caltrans Design Manual*, the minimum corner sight distance for a design speed of 45 mph is 495 feet and the minimum stopping site distance is 360 feet. Schaffer Mill Road is a private roadway, and as noted above, only the stopping sight distance requirement of the *Caltrans Design Manual* needs to be considered. The proposed driveway to Parking Lot Alternative 2 meets the minimum corner sight distance, and based on this standard, no safety hazard related to sight distance at the driveway for Parking Lot Alternative 2.

The sight distance criteria as described above for Schaffer Mill Road is also relevant to Parking Lot Alternative 3. Adequate corner sight distance is provided for drivers exiting at the proposed driveway location looking to the southwest. Sight distance looking to the northeast is restricted by the existing topography and horizontal curvature of the roadway. However, due to the distance to the intersection of Schaffer Mill Road/SR 267/Truckee Tahoe Airport Road (approximately 300 feet) LSC assumes a slower design speed of 35 mph for this intersection analysis. Using a 35 mph design speed, the *Caltrans Design Manual* requires 385 feet of corner sight distance and 250 feet of stopping sight distance. As noted above, for a private roadway such as Schaffer Mill Road, only the stopping sight distance needs to be considered.

As proposed, the driveway to Parking Lot Alternative 3 would comply with the minimum sight distance for a private roadway (250 feet). Modifying the hillside northeast of the driveway, as discussed in *Mitigation Measure 11.1b*, would ensure that the minimum sight distance in that direction is maintained. With implementation of *Mitigation Measure 11.1b* potential traffic safety impacts related to sight distance at Parking Lot Alternative 3 would be less than significant.

The Parking Lot Alternative 4 proposed driveway location is approximately 400 feet to the south of the intersection with Martis Dam Road and on the south side of SR 267.

A speed survey at the near the proposed driveway on SR 267 conducted on June 15, 2011 under dry road conditions identified a median observed speed of 56 mph and an 85th percentile (critical or design speed) of 60 mph. The design speed along of 60 mph requires 580 feet of stopping sight distance and 660 feet of corner sight distance. The Alternative Parking Lot 4 location has more than 1,000 feet of corner sight distance to both the north and south. Therefore, sight distance requirements are satisfied. The area is located in a flat valley with no visual obstructions due to buildings, signs, or topography. Because the traffic that would be entering and exiting the parking lot driveway would have adequate sight distance, Parking Lot Alternative 4 would not result in a substantial increase in hazards due to a design feature or incompatible use and this impact is considered less than significant.

Mitigation Measure 11.1b: Final driveway design and required improvements for access to Parking Lot Alternative 3 shall ensure a minimum of 250 feet of sight distance to the northeast for drivers waiting to make a left-turn movement onto Schaffer Mill Road. These improvements could include removing some of the low hill located along the northwest side of Schaffer Mill Road between the planned driveway location and SR 267.

Visual Resources

Adversely Affect a Scenic Vista

As identified in **CHAPTER 8 VISUAL RESOURCES**, the Martis Creek Lake Project Wildlife Viewing Area is a designated scenic vista. Visual quality impacts affecting a scenic vista are evaluated from views at the Wildlife Viewing Area. Parking Lot Alternatives 1, 2 and 3 are located near the northern terminus of the proposed trail and are not visible from the Wildlife Viewing Area and would have no impact on a scenic vista.

Parking Lot Alternative 4, located is approximately 1,900 feet northwest of the Wildlife Viewing Area, south of SR 267. Views from the Wildlife Viewing Area are primarily to the south, rather than to the northwest. In addition, due to the topography at Alternative Parking Lot 4 which is located higher than viewpoints at the Wildlife Viewing Area, views to the parking lot are obscured. Impacts related to a scenic vista from construction and use of Parking Lot Alternative 4 would be less than significant.

Substantially Damage Scenic Resources

Northstar Drive, SR 267, and Schaffer Mill Road are designated as County Scenic Routes. The impacts to scenic resources are evaluated as viewed from these County-designated scenic routes. None of the four parking lot alternatives are visible from Northstar Drive. As evaluated below, Parking Lot Alternatives 1, 2 and 3 are visible from Schaffer Mill Drive while Parking Lot Alternatives 1, 3 and 4 are visible from SR 267.

The view from Schaffer Mill Road toward the northwest in the vicinity of Parking Lot Alternatives 1, 2 and 3 is characterized by meadow and sagebrush areas in the near view, sparse conifer forest and commercial development and residential beyond. Parking Lot Alternatives 1, 2 and 3 would be visible from northbound Schaffer Mill Road in several places. Parking Lot Alternatives 2 and 3 would be visible from southbound Schaffer Mill Road.

Parking Lot Alternative 1 is adjacent to the existing parking lot at the Donner-Truckee Veterinary Hospital and would appear as an extension of that parking area. This alternative is close to SR 267 but would be partially shielded from view by vegetation, topography, and existing buildings. This alternative is the furthest from Schaffer Mill Road and would be partially shielded from view due to its location in a forested area. A parking lot constructed in this location would be visually consistent with the adjacent commercial uses and would not have a substantial impact on scenic resources considering views from both SR 267 and Schaffer Mill Road.

Parking Lot Alternative 2 is located in an area adjacent to Schaffer Mill Road containing a driveway apron, gate and an unpaved roadway approximately 10 feet in width. This alternative would add a parking lot and trail connection in an open area of sagebrush scrub. Given the current driveway apron and roadway in this location, the parking lot improvements are not considered inconsistent or visually intrusive. The trail connection from the parking lot includes a boardwalk over a seasonal swale and would be most visible as it rises in elevation to meet the proposed trail. It would appear as a linear feature and would not be considered a prominent visual feature of the landscape. Parking Lot Alternative 2 is not expected to have a substantial impact on scenic resources.

Parking Lot Alternative 3 is located near the intersection of SR 267 with Schaffer Mill Road. This parking lot would be visible for vehicles traveling north on Schaffer Mill Road and from SR 267 near the intersection with Schaffer Mill Road. Construction of the parking lot and driveway would require an encroachment permit from Placer County and would require revegetation for all disturbed areas. Views from SR 267 and Schaffer Mill Road in this location are dominated by existing commercial and residential development. This area does not contribute to the scenic corridor designation of either roadway. The proposed trail, trailhead and parking lot would not result in substantial impact to scenic views from SR 267 or Schaffer Mill Road.

Parking Lot Alternative 4 is located south of and adjacent to SR 267. Views from this location include wide expanses of sagebrush and meadow areas with trails on the valley floor and ski runs on forested slopes above the valley, as seen in *Figure 8-2A* (Photo 2) of **CHAPTER 8 VISUAL RESOURCES**. Parking Lot Alternative 4 would be at a similar elevation to SR 267 and the parking lot, vehicles and trail kiosk would be visible to passersby in both directions. Due to the unobstructed nature of the views in the immediate vicinity along SR 267, impacts to scenic resources due to construction of Parking Lot Alternative 4 are considered significant. Should Parking Lot Alternative 4 be selected for construction, *Mitigation Measure 11.1c* requires that natural or earth tone colors be used for the parking lot surface, walkways, trail connection and trail kiosk to reduce the contrast with existing vegetation or soils that characterize the natural sagebrush visual component of the valley as viewed from SR 267. In addition, *Mitigation Measure 11.1d* requires that all disturbed areas outside of the parking lot be revegetated using native vegetation consistent with the sagebrush scrub habitat. Although these measures would reduce impacts from construction of Parking Lot Alternative 4, the current unobstructed views from SR 267 would be affected by the parking lot improvements and vehicles using the parking lot. There are no feasible mitigation measures to fully mitigate damage to scenic resources along SR 267 from construction of this parking. Therefore impacts to scenic resources from construction and use of Alternative Parking Lot 4 would be significant and unavoidable.

Substantially Degrade the Existing Visual Character or Quality of the Site and Its Surroundings

The existing visual character and quality of the natural area of the Martis Valley is observed by occupants of homes along the golf course, golfers, skiers at Northstar, and users of the existing Tompkins Memorial Trail system. Due to the locations of the Parking Lot Alternatives, vegetation, topography and distance from these viewpoints will obscure visibility. Impacts to these viewer groups are expected to be less than significant.

Create a New Source of Substantial Light or Glare Adversely Affecting Day or Nighttime Views in the Area

No lighting is proposed at any of the four parking lot alternative sites. Materials used in construction of the parking lot and associated features, such as pathways, boardwalks and informational kiosks, would have non-reflective materials and surface finishes. Any reflective striping used for pathway markings would not result in substantial glare or adversely affect day or nighttime views in the area. Signage would be designed to avoid glare. Impacts resulting from glare from site improvements or the addition of lighting would be less than significant at each parking lot alternative location.

Parking Lot Alternatives 1 and 3 are located so that glare from vehicles would not affect viewers significantly. Parking Lot Alternative 1 and 3 are located northerly in the southwestern quadrant of the SR 267/Schaffer Mill Road/Truckee Tahoe Airport Road intersection and are partially or fully shaded by tree cover, reducing glare from vehicles.

Parking Lot Alternative 2 is located in an open area of sagebrush scrub. Vehicles parked in this location would be in full view of passersby and there is no shading to reduce glare from vehicles. Given the tree cover southwest and northerly from this location, landscaping with similar native evergreen conifers would not be considered inconsistent for this location. *Mitigation Measure 11.1e* requires that improvement plans for Parking Lot Alternative 2 include planting of native conifers in a manner that reflects the sparsely planted trees in the vicinity of this lot. Implementation of *Mitigation Measure 11.1e* would reduce vehicle glare impacts at Parking Lot Alternative to a less than significant level.

Glare from vehicles parked at Parking Lot Alternative 4 would be visible traveling along SR 267 in both directions. The parking lot is at a similar elevation as the highway and the existing vegetation is not of sufficient height to provide any screening of vehicles. Further while planting could be provided to screen vehicles it would not be in keeping with the sagebrush meadow and open views of the Martis Valley. Impacts from vehicle glare at Parking Lot Alternative 4 are considered significant and unavoidable.

Mitigation Measure 11.1c: Natural or earth tone surfacing shall be used for the parking lot surface, walkways, trail connection and trail kiosk at Parking Lot Alternative 4 Surfacing colors shall be selected to minimize contrast with the natural colors of the vegetation and soils of the valley, as determined appropriate by a written recommendation from a landscape architect. Color and materials for surfacing the trail shall be approved by the Northstar CSD and the U.S. Army Corps of Engineers.

Mitigation Measure 11.1d: A revegetation plan shall be prepared and implemented for all areas disturbed by construction at Parking Lot Alternative 4. The plan shall specify native vegetation and provide monitoring and maintenance of plantings for a period of time appropriate to ensure their survival.

Mitigation Measure 11.1e: A planting plan for Parking Lot Alternative 2 shall be provided that includes native conifers, spaced appropriately to be consistent with native tree cover in the vicinity, as determined appropriate by a written recommendation from a landscape architect. Planting of trees would be required as part of the improvements at the time of construction of this lot.

Recreation

Adversely Affect Use of Existing Recreational Facilities

The four parking lot alternatives are not located near existing recreational facilities and would not create an adverse affect on the use of existing recreational facilities beyond the impacts evaluated in **CHAPTER 9 RECREATION**. The analysis of the adverse affects on use of existing recreational facilities related to the proposed Martis Valley Trail is provided *Impact 9.1*.

Create Conflicts Between Trail User Groups

Development of one of the parking lot alternatives is not expected to create or have an effect on conflicts between trail user groups beyond the impacts evaluated in **CHAPTER 9 RECREATION**. The analysis of conflicts between trail users of the proposed Martis Valley Trail is provided *Impact 9.2*.

Conflict with U.S. Army Corps of Engineers Martis Creek Lake Master Plan

Only one of the four parking lot alternatives is located within the Martis Creek Lake Project and subject to the *1977 Martis Creek Lake Master Plan*. Parking Lot Alternative 4 is within the Martis Creek Lake Project Wildlife Management Area. As discussed in **CHAPTER 9 RECREATION**, the interpretation of the language in the Master Plan and determination of what uses are allowed in the Martis Creek Lake project area is the responsibility of the USACE. The USACE will determine if a paved trail and trail amenities facilitate low density recreational activities, is considered a manmade intrusion, and if mitigation is needed or can be provided.

Under CEQA, inconsistency with a land use plan or plan policies is not considered a physical environmental effect unless that plan is in place to avoid or mitigate an environmental effect. The Martis Creek Lake Master Plan is an operational plan for the project area, with the first priorities of the Martis Creek Lake project being flood control and water supply, but the Master Plan does contain components that are intended to protect wildlife. Specifically, the Master Plan indicates that the Martis Creek Lake Wildlife Management Area was established as mitigation for habitat loss that occurred when Martis Creek Lake was created. Construction of the proposed parking lot would result in additional habitat loss. Implementation of mitigation measures included in **CHAPTER 4 BIOLOGICAL RESOURCES** would reduce impacts related to habitat loss to less than significant levels. Therefore, the proposed parking lot would not conflict with the Master Plan as it relates to mitigation of environmental effects and this impact would be less than significant.

Cumulative Impacts

The analysis of cumulative impacts from implementation of the proposed project presented in **CHAPTER 10 CUMULATIVE IMPACTS** includes consideration of impacts associated with construction and use of a parking lot for the Martis Valley Trail. The project's contribution to cumulative impacts would be the same regardless of which parking lot alternative location is selected.

Environmentally Superior Parking Lot Alternative

An EIR must identify the Environmentally Superior alternative as required by CEQA Guidelines Section 15126.6(e). The analysis above is summarized in *Table 11.2* below. Impacts between the four parking lots are generally similar. This summary demonstrates that Parking Lot Alternative 3 is the Environmentally Superior Alternative, although Parking Lot Alternative 2 also does not have any Significant and Unavoidable impacts. The relative impacts of Parking Lot Alternatives 2 and 3 are similar; however, the impacts of Parking Lot Alternative 3 are slightly less than the impacts of Parking Lot Alternative 2.

Table 11.2
Parking Lot Alternatives Impact Summary

	Alternative 1	Alternative 2	Alternative 3	Alternative 4
Biological Resources	Mitigation required to ensure impacts to special status species and sensitive habitats avoided (site located in sparse coniferous forest habitat)	Mitigation required to ensure impacts to special status species and sensitive habitats avoided (site located in sagebrush scrub habitat) Potential impacts to wetland swale, mitigation would be necessary; riparian habitat could support special status species	Mitigation required to ensure impacts to special status species and sensitive habitats avoided (site located in sparse coniferous forest habitat)	Mitigation required to ensure impacts to special status species and sensitive habitats avoided (site located in sagebrush scrub habitat)
Cultural Resources	No impacts	No impacts	No impacts	Entire parking lot location is within a significant cultural resource site.
Hydrology and Water Quality	Parking lot design consistent with mitigation requirements would avoid increases in runoff and would avoid degradation of water quality.			
Transportation and Circulation	Significant and Unavoidable impacts to LOS at driveway	No impacts	Less than significant with mitigation requiring grading to ensure adequate sight distance	No impacts
Visual Resources	No impacts	Impacts from glare require mitigation	Less than significant	Significant and Unavoidable for impacts to scenic resources as it is visible from SR 267, Significant and Unavoidable for impacts from glare
Recreation	No impacts			
SUMMARY	One SU impact	Potential biological and visual impacts, mitigation would reduce all to LTS	Potential biological and traffic impacts, mitigation would reduce all to LTS	One SU impact

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CHAPTER 12

MITIGATION MONITORING AND REPORTING PROGRAM

No mitigation measures are required for the following resources:	
▪ Agricultural Resources ▪ Mineral Resources ▪ Population and Housing	▪ Public Services ▪ Transportation/Circulation ▪ Utilities / Service Systems

Mitigation Measure	Implementation Responsibility	Monitoring Responsibility	Timing	Performance Evaluation Criteria
BIOLOGICAL RESOURCES				
Mitigation Measure 4.1a: Northstar CSD shall implement the following: A. Avoid substantially modifying the existing hydrology in the vicinity of identified populations of Plumas ivesia to ensure that areas that support Plumas ivesia are not drained or dried or subject to concentrated flows. B. Flag the limits of disturbance before construction begins to ensure that construction equipment and crews do not enter areas where Plumas ivesia will be protected. C. Periodically monitor areas adjacent to the trail where Plumas ivesia occurs for disturbance associated with trail operations. Monitoring efforts shall include consideration of vegetation health and vigor, changes in hydrology and erosion, and evidence of off-trail activities. If disturbance in these areas is observed, Northstar CSD shall consult with a qualified botanist to determine appropriate measures to implement for the protection of non-impacted Plumas ivesia populations adjacent to the trail. Measures could include fencing along the trail shoulder, signage to identify areas of sensitive species and advise trial users to stay on the trail, drainage modifications, and temporary or permanent fencing of areas where disturbance is observed.	Northstar CSD	Northstar CSD and Placer County	Avoidance of hydrologic changes demonstrated on construction plans Flagging completed prior to construction commencement Periodic monitoring to occur throughout life of project	▪ Construction period disturbance to Plumas ivesia matches description in Management Plan ▪ Plumas ivesia population in project area generally remains same as pre-project conditions

Mitigation Measure	Implementation Responsibility	Monitoring Responsibility	Timing	Performance Evaluation Criteria
Mitigation Measure 4.1b: Prior to commencement of any construction activities, including site clearing and/or grading, Northstar CSD shall retain a qualified botanist to conduct floristic rare plant surveys within wetland, riparian, and stream habitats that would be affected by project construction. These surveys shall be carried out during appropriate blooming periods of special-status species with potential to occur onsite. Should any individual special-status plant species be located, the applicant shall retain a qualified botanist to develop and implement a management plan. Appropriate measures could include transplanting, soil/seed salvage and avoidance.	Northstar CSD	Northstar CSD and Placer County	Survey completed prior to approval of Improvement Plans Preparation and implementation of management plan prior to commencement of construction	▪ Populations of any special status plant species in project area generally meet pre-project conditions at end of monitoring period specified in Management Plan
Mitigation Measure 4.1c: To minimize impacts to Lahontan cutthroat trout and its habitat or potential habitat, Northstar CSD shall implement BMPs to avoid adversely affecting water quality during and following construction, as identified below and to be consistent with NPDES and Section 404 permitting requirements. Northstar CSD shall also implement Lahontan cutthroat trout habitat restoration at a ratio no less than 1:1. The actual restoration ratio shall be determined by USFWS through consultation with USACE as part of the Clean Water Act Section 404 permitting process. Restoration of Lahontan cutthroat trout habitat could include bed and bank stabilization measures, revegetation, and in-stream habitat improvement, among other measures. Northstar CSD shall also implement any additional measures required by USFWS as identified through USACE consultation with USFWS as part of the Clean Water Act Section 404 permitting process. BMPs implemented to avoid adversely affecting water quality shall be identified on Improvement Plans and subject to approval by the Placer County Planning Department and Engineering and Surveying Department and USACE. BMPs	Northstar CSD	Northstar CSD, USACE, USFWS, and Lahontan RWQCB	BMPs identified on Improvement Plans, implemented during construction, and maintained throughout project life	▪ No unpermitted take of Lahontan cutthroat trout occurs

Mitigation Measure	Implementation Responsibility	Monitoring Responsibility	Timing	Performance Evaluation Criteria
to minimize impacts to Lahontan cutthroat trout and its habitat or potential habitat shall include the following: A. Implement ***Mitigation Measure 6.1a*** which identifies requirements for design of BMPs. B. Implement ***Mitigation Measure 6.1b*** which requires Northstar CSD to prepare a Stormwater Pollution Prevention Plan (SWPPP) and project Grading or Improvement Plans that include detailed provisions for all construction BMPs. C. Implement ***Mitigation Measure 6.1c*** which requires permanent BMPs to be included in the SWPPP and project Grading or Improvement Plans and identifies minimum requirements for permanent BMPs. D. Implement ***Mitigation Measure 6.1d*** which identifies design standards for trail amenities to manage stormwater.				
Mitigation Measure 4.1d: A biological monitor shall be retained throughout the duration of construction activities in the vicinity of affected aquatic habitat, to ensure that disturbance of Sierra Nevada yellow legged frog and its habitat is minimized or avoided. If any Sierra Nevada yellow legged frog are detected within a construction area, work must be halted and the CDFG shall be contacted immediately to determine appropriate avoidance measures including, but not limited to, moving individuals to appropriate offsite locations or limiting construction operating periods.	Northstar CSD	Northstar CSD	During all construction within 100 feet of riparian habitat	▪ No unpermitted take of SNYLF occurs

Mitigation Measure	Implementation Responsibility	Monitoring Responsibility	Timing	Performance Evaluation Criteria
Mitigation Measure 4.1e: All aquatic habitat and wetland areas disturbed by construction activities shall be restored/revegetated to pre-project conditions or as required by the terms and conditions of permits obtained from the USACE, CDFG, or Lahontan RWQCB.	Northstar CSD	Northstar CSD, USACE, CDFG, and Lahontan RWQCB	Within three years of construction, or as specified by permits	▪ Riparian habitat and wetland areas generally match pre-project conditions other than permitted permanent alterations
Mitigation Measure 4.1f: To avoid disturbance of active nests, trees should be removed outside the typical breeding season. A survey for active raptor nest sites shall be conducted by a qualified biologist prior to construction activities during the typical raptor nesting season (March 1 through August 31). The survey shall be conducted no more than 30 days prior to initiation of proposed construction activities and shall be coordinated with construction activities to ensure that any area that remains inactive for more than 30 days is resurveyed prior to initiating or re-initiating construction work. Survey results shall be submitted to the CDFG. If active raptor nests are found on or immediately adjacent to proposed construction areas, a minimum 300-foot buffer shall be established from active construction areas and consultation with CDFG shall be initiated to determine protective measures. Protective measures could include buffer zones around active nests and subsequent monitoring of the nest until it is determined to be inactive and CDFG concurrence is obtained. No trees with active nests shall be removed until the nest is determined to be inactive.	Northstar CSD	Northstar CSD and CDFG	No more than 30 days prior to construction, and ongoing throughout construction (as required to resume activity in any inactive construction area)	▪ No unpermitted take of nesting raptors and/or raptor nests occurs
***Mitigation Measure 4.1g**:* To avoid potential impacts to willow flycatcher, yellow warbler, and associated habitat, the following measures shall be implemented:	Northstar CSD	Northstar CSD and CDFG	Survey completed prior to work within 500 feet of riparian habitat; riparian	▪ No unpermitted take of willow flycatcher nesting habitat occurs

Mitigation Measure	Implementation Responsibility	Monitoring Responsibility	Timing	Performance Evaluation Criteria
1. Prior to any work within 500 feet of any riparian habitat, a qualified biologist shall conduct a habitat assessment to identify areas of potential willow flycatcher nesting habitat. Work may proceed in areas determined to not provide willow flycatcher nesting habitat. 2. Except as provided under item 4, no heavy equipment shall be used and no vegetation shall be altered within 300 feet of potential willow flycatcher nesting habitat during the critical breeding season, which extends from May 1 to August 31. 3. Disturbance and removal of vegetation within riparian areas shall be minimized to the extent possible by clearly field marking the limits of vegetation removal requirements prior to any site disturbance. Vegetation removal from riparian areas shall be kept to the minimum required to allow for construction of the proposed improvements. CDFG shall be contacted prior to any vegetation removal within riparian areas to determine appropriate impact minimization strategies and compensation measures for impacts to vegetation that could occur. Compensation could include revegetation or habitat restoration at a ratio to impacts determined appropriate by CDFG, but no less than 1:1. 4. If work must occur during the breeding season for willow flycatcher, surveys to determine presence or absence of this species shall be carried out by a qualified biologist according to the protocol provided by A Willow Flycatcher Survey Protocol for California or the survey protocol guidance provided by CDFG at the time surveys are conducted.			habitat protected and willow flycatcher protocols observed throughout construction	during nesting season

Mitigation Measure	Implementation Responsibility	Monitoring Responsibility	Timing	Performance Evaluation Criteria
Results of the survey shall be provided to CDFG. With concurrence of CDFG, work may proceed in suitable habitat areas if surveys determine that no nesting birds occur within 500 feet of the proposed work area. Any work carried out during the breeding season shall be monitored by a biologist qualified to identify willow flycatcher individuals and nests and shall be subject to other measures resulting from consultation with CDFG. If surveys or monitoring indicate presence of nesting willow flycatcher within 500 feet of the project site, work within 300 feet of the nesting area shall cease until it is determined that nests are inactive or young have fledged.				
Mitigation Measure 4.1h: New ground disturbance within areas of riparian vegetation that provide potential habitat for Sierra Nevada mountain beaver and Sierra Nevada snowshoe hare shall be avoided to the extent feasible. If disturbance to riparian vegetation cannot be avoided, a qualified biologist shall be retained to survey the proposed area of disturbance prior to construction. If evidence of occurrence of either of these species is found, a minimum 500 foot non-disturbance buffer shall be established around nest or burrow sites and CDFG shall be contacted to determine appropriate avoidance or impact minimization measures, which could include monitoring, buffer zones, seasonal work restrictions, or other measures.	Northstar CSD	Northstar CSD and CDFG	Riparian habitat surveys conducted prior to approval of Improvement Plans, if necessary, management near nest and burrow sites throughout construction	▪ No unpermitted take of SNMB or SNSH occurs

Mitigation Measure	Implementation Responsibility	Monitoring Responsibility	Timing	Performance Evaluation Criteria
Mitigation Measure 4.1i: Staging areas shall be located in areas that have been previously disturbed, do not include any riparian habitat, do not support Plumas ivesia plants, and do not require any tree removal.	Northstar CSD	Northstar CSD and Placer County	Staging areas identified on Improvement Plans	▪ Disturbance of staging areas has no effect on riparian habitat or Plumas ivesia plants, and requires no tree removal
Mitigation Measure 4.2a: Northstar CSD shall obtain a Streambed Alteration Agreement from CDFG to authorize impacts within the bed and bank of drainages and associated riparian habitat within the trail alignment. Northstar CSD and their contractors shall adhere to all conditions and requirements of the Streambed Alteration Agreement. The Streambed Alteration Agreement shall be acquired prior to any clearing, grading, or excavation work on the project site.	Northstar CSD	Northstar CSD and CDFG	Streambed Alteration Agreement obtained prior to construction and implemented throughout and following construction	▪ Streambed Terms of Alteration Agreement met
Mitigation Measure 4.2b: Staging areas shall be located in areas that have been previously disturbed and do not include any riparian habitat or other sensitive natural community.	Northstar CSD	Northstar CSD	Staging areas identified on Improvement Plans	▪ Disturbance of staging areas has no effect on riparian habitat or other sensitive natural community
Mitigation Measure 4.2c: Northstar CSD shall retain a qualified biologist to update the Biological Resources Assessment for Segments 3E and 4 at the time construction of these segments is proposed.	Northstar CSD	Northstar CSD	Prior to approval of Improvement Plans for Segments 3E or 4	▪ Biological Resources Assessment updated
Mitigation Measure 4.3a: The project applicant shall obtain the appropriate permits from USACE, the Lahontan RWQCB, and CDFG to authorize impacts to waters of the U.S. delineated on the project site. These impacts would	Northstar CSD	Northstar CSD, USACE, Lahontan RWQCB, and	Prior to approval of Improvement Plans	▪ No unpermitted impacts to waters of the U.S. occur

Mitigation Measure	Implementation Responsibility	Monitoring Responsibility	Timing	Performance Evaluation Criteria
require a Section 404 permit from the USACE, a Section 401 Water Quality Certification from the Lahontan RWQCB, and a Streambed Alteration Agreement from CDFG. These permits shall be acquired prior to any clearing, grading, or excavation work on the project site.		CDFG		
Mitigation Measure 4.3b: To compensate for impacts to wetlands Northstar CSD shall carry out replacement, habitat restoration, or purchase of mitigation credits at an approved wetlands mitigation bank. Minimum replacement ratios shall be 1:1 for wetland habitat to ensure compliance USACE and Placer County policies requiring "no net loss" of wetlands. If purchase of credits at an approved wetlands mitigation bank is selected, sufficient credits shall be purchased to compensate for loss of wetland or habitat acreage and value, including temporal loss. Evidence of payment, which describes the amount and type of habitat purchased at the bank site, shall be provided to USACE prior to any ground disturbance associated with the project.	Northstar CSD	Northstar CSD, USACE	As specified in Clean Water Act permits acquired prior to construction, replacement and restoration may be carried out following construction, annual monitoring may be required for replacement or restoration	▪ No net loss of wetlands occurs
Mitigation Measure 4.3c: The project applicant shall incorporate BMPs to control erosion and sedimentation of waterways during and following construction. BMPs shall be identified on Improvement Plans and subject to approval by the Placer County Planning Department and Engineering and Surveying Department and USACE. BMPs to minimize indirect impacts to wetlands shall include the following mitigation measures: A. Implement ***Mitigation Measure 6.1a*** which identifies requirements for design of BMPs. B. Implement ***Mitigation Measure 6.1b*** which requires Northstar CSD to prepare a Stormwater Pollution Prevention Plan (SWPPP) and project Grading or Improvement Plans that include detailed provisions for	Northstar CSD	Northstar CSD, USACE, Lahontan RWQCB, and Placer County	BMPs included on Improvement Plans, BMPs implemented during construction, permanent BMPs maintained throughout project life	▪ Erosion and sedimentation of waterways reduced in compliance with regulatory standards

Mitigation Measure	Implementation Responsibility	Monitoring Responsibility	Timing	Performance Evaluation Criteria
all construction BMPs. C. Implement ***Mitigation Measure 6.1c*** which requires permanent BMPs to be included in the SWPPP and project Grading or Improvement Plans and identifies minimum requirements for permanent BMPs. D. Implement ***Mitigation Measure 6.1d*** which identifies design standards for trail amenities to manage stormwater.				
Mitigation Measure 4.3d: *S*taging areas shall be located in areas that have been previously disturbed and do not include any federally protected wetlands.	Northstar CSD	Northstar CSD	Staging areas identified on Improvement Plans	▪ Disturbance of staging areas has no effect on federally protected wetlands
Mitigation Measure 4.4a: Bridges and culverts constructed across riparian areas shall be designed and constructed to provide ample space for smaller mammals to move within the riparian corridor without having to travel over the trail surface. Design criteria shall be provided by a qualified wildlife biologist and could include spacing of boardwalk supports and free space between the bottom of the boardwalk and bridge decks and the bed and bank of drainages crossed to provide for continuous cover for smaller mammals using such corridors (raccoons, foxes, etc).	Northstar CSD	Northstar CSD	Bridge and culvert design included on Improvement Plans	▪ Bridges and culverts constructed as shown on plans
Mitigation Measure 4.5a: Northstar CSD shall implement *Mitigation Measures 4.1a* through *4.1i, 4.2a through 4.2c, 4.3a* through *4.3d,* and *4.4a*.	Northstar CSD	Northstar CSD	As stated above	As stated above

Mitigation Measure	Implementation Responsibility	Monitoring Responsibility	Timing	Performance Evaluation Criteria
CULTURAL RESOURCES				
Mitigation Measure 5.1a: Capping of archeological resource site shall occur where feasible. Considerations of feasibility may include consideration of slope and trail surface stability, impacts to biological resources, visual resources, and hydrology and water quality, and construction economics. Capping shall be accomplished by placing a layer of chemically stable fill over the identified cultural resource site and constructing the trail and all associated improvements over the top of this fill. Specific plans for capping resources within the Martis Creek Lake Project shall be approved by the USACE.	Northstar CSD	Northstar CSD and USACE	Capping of resources shown on Improvement Plans	▪ Resources are capped where feasible
Mitigation Measure 5.1b: The limits of the area of disturbance in the vicinity of all known archeological resource sites shall be flagged or otherwise demarcated in the field prior to commencement of construction.	Northstar CSD	Northstar CSD	Prior to construction commencement	▪ Boundaries of area of disturbance are flagged and construction equipment and crews do not disturb cultural resources outside those boundaries
Mitigation Measure 5.1c: A Research Design and Testing Plan shall be prepared by a qualified archaeologist in advance of project construction. The Research Design and Testing Plan must be approved by the U.S. Army Corps of Engineers if the excavation will occur within the Martis Creek Lake project area. The Research Design and Testing Plan shall include the following components: A. Summarize background information, field reconnaissance, and site recordation that has	Northstar CSD	Northstar CSD and USACE	Research Design and Testing Plan prepared and implemented prior to project construction within 100 feet of identified resource sites	▪ Data recovery is conducted on any resource site that would be affected by project construction

Mitigation Measure	Implementation Responsibility	Monitoring Responsibility	Timing	Performance Evaluation Criteria
already occurred within the project area; B. Discuss the archeological sensitivity of the region; C. Identify the important questions that could be addressed by the kind of data that is likely to be contained at each affected site and could not be addressed using data from other sources alone; D. Describe the cultural context of each affected site; E. Present a Testing Plan that identifies specific areas for subsurface exploration, identifies specific methods – such as extracting soil cores, surface scraping, trenching, or excavating test pits - for conducting that exploration, identifies security measures to protect resources during implementation of the program, and describes handling and inventorying procedures for any resources and artifacts found during exploration; F. Outline methods for evaluation of affected sites (including assessing the integrity and research potential of each affected site); and G. Provide a Treatment Plan for affected resources that are eligible for listing or qualify as unique archeological resources. The Treatment Plan shall identify specific mitigation measures for each site that ensure resources are avoided where feasible. Where avoidance is not feasible, mitigation may include interpretation and/or data recovery sufficient to provide meaningful public education and extraction of pertinent scientific knowledge. Any data recovery excavation shall include recovery of a statistically-significant sample of the archeological deposit. During the excavation, any features identified shall be drawn and photographed.				

Mitigation Measure	Implementation Responsibility	Monitoring Responsibility	Timing	Performance Evaluation Criteria
Recovered cultural material (artifacts) shall be cleaned and catalogued, and a professional analytical report shall be prepared on the findings. The report shall be filed with appropriate agencies and the NCIC of the CHRIS. The recovered artifact collection and catalogue shall be placed in a permanent curation facility for use by future researchers.				
Mitigation Measure 5.1d: Heritage Resource Inventories shall be completed for potential staging areas located outside boundaries of previous survey areas. Staging areas are prohibited where significant cultural resources are identified.	Northstar CSD	Northstar CSD	Staging areas identified on Improvement Plans	▪ Staging areas are located where no significant cultural resources occur
Mitigation Measure 5.1e: Heritage Resource Inventories shall be completed for Segments 3e and 4 prior to approval of Improvement or Grading Plans for those segments.	Northstar CSD	Northstar CSD	Prior to construction of Segment 3E or 4	▪ Resources within Segment 3E or 4 are identified, impacts are avoided or data recovery is completed
Mitigation Measure 5.2a: If artifacts, exotic rock, unusual amounts of shell or bone, or other buried archeological resources are encountered during earth-disturbance associated with the proposed project, all soil-disturbing work shall be halted within 100 feet of the discovery until a qualified archeologist completes a significance evaluation of the finds pursuant to Section 106 of the NHPA. If the finds are determined to be culturally significant materials (i.e., unique archeological resources or historical resources), subsurface testing shall be conducted. Subsurface testing procedures shall involve shovel testing, augering, or other such techniques designed to identify	Northstar CSD	Northstar CSD	Throughout construction	▪ Impacts to any previously unknown resources are avoided or data recovery is completed

Mitigation Measure	Implementation Responsibility	Monitoring Responsibility	Timing	Performance Evaluation Criteria
and/or characterize subsurface cultural deposits. If a resource is determined to be important under CEQA (i.e., because it is a unique archeological or historical resource or it is eligible for inclusion in either the NRHP or CRHR), a qualified professional archeologist shall be retained to conduct data recovery excavation. If data recovery excavation is required, a qualified archeologist shall prepare a data recovery plan that provides for recovering the scientifically consequential information from and about the resource. The data recovery plan must be prepared prior to commencing any excavation activities within 100 feet of the resource discovery. The data recovery plan must be approved by the U.S. Army Corps of Engineers if the excavation will occur within the Martis Creek Lake project area. The data recovery excavation shall include recovery of a statistically-significant sample of the archeological deposit. During the excavation, any features identified shall be drawn and photographed. Recovered cultural material (artifacts) shall be cleaned and catalogued, and a professional analytical report shall be prepared on the findings. The report shall be filed with appropriate agencies and the NCIC of the CHRIS. The recovered artifact collection and catalogue shall be placed in a permanent curation facility for use by future researchers.				
MM CUL.1 Should any evidence of paleontological resources (e.g. fossils) be encountered during grading or excavation either onsite or offsite as a result of project construction, work shall be suspended within 100 feet of the find, and the Northstar Community Services District shall be immediately notified. At that time, the Northstar Community Services District shall coordinate any necessary investigation of the site with a qualified paleontologist as	Northstar CSD	Northstar CSD	Throughout construction	▪ Impacts to any paleontological resources are avoided or data recovery is completed

Mitigation Measure	Implementation Responsibility	Monitoring Responsibility	Timing	Performance Evaluation Criteria
needed to assess the resource and provide management recommendations, such as avoiding the resource and/or excavating and recording data on the resource. The contractor shall implement any measures deemed necessary by the Northstar Community Services District for the protection of the paleontological resource.				
HYDROLOGY AND WATER QUALITY				
Mitigation Measure 6.1a: Water quality treatment facilities (BMPs) shall be designed according to the guidance of the California Stormwater Quality Association Stormwater Best Management Practice Handbook for New Development/Redevelopment and the Erosion and Sediment Control for Development Areas of the Sierra Foothills and Mountains. In addition, BMPs shall be designed to mitigate (minimize, infiltrate, filter, or treat) stormwater runoff in accordance with "Attachment 4" of Placer County's NPDES Municipal Stormwater Permit (State Water Resources Control Board NPDES General Permit No. CAS000004), pursuant to the NPDES Phase II program.	Northstar CSD	Northstar CSD	BMPs included on Improvement Plans, BMPs implemented during construction, permanent BMPs maintained throughout project life	▪ BMP design meets applicable standards and guidelines
Mitigation Measure 6.1b: Northstar CSD shall prepare a SWPPP and obtain coverage under the SWRCB's NPDES General Permit for Storm Water Discharges Associated with Construction Activities. The project applicant shall provide to Placer County ESD evidence of a state-issued WDID number or filing of a Notice of Intent and fees prior to issuance of a grading permit/approval of a grading or improvement plan. The SWPPP and project Grading or Improvement Plans shall identify specific construction BMPs for all components of the construction project, including equipment and material staging areas. For each BMP, the SWPPP shall identify provisions for design, implementation,	Northstar CSD	Northstar CSD and Lahontan RWQCB	SWPPP prepared and incorporated in Improvement Plans	▪ BMPs implemented as proscribed in SWPPP ▪ Post-construction water quality generally meets pre-project conditions

Mitigation Measure	Implementation Responsibility	Monitoring Responsibility	Timing	Performance Evaluation Criteria
management and monitoring. BMPs are expected to include the following or equally effective measures: A. Fiber wattles, silt fences, and or water bars; B. Sediment basins; C. Mulching of disturbed soil areas; D. Channel linings and drainage inlet protection; E. Staging areas perimeter barriers; F. Temporary stabilized construction entrances; G. Covering exposed materials stockpiles; and H. Leak or spill response plans.				
Mitigation Measure 6.1c: Permanent BMPs shall be identified in the SWPPP and included on project Grading or Improvement Plans which are subject to approval by Placer County. BMPs shall be designed to mitigate (minimize, infiltrate, filter, or treat) stormwater runoff. Flow or volume based post-construction BMPs shall be designed at a minimum in accordance with the Placer County Guidance Document for Volume and Flow-Based Sizing of Permanent Post-Construction Best Management Practices for Stormwater Quality Protection. Post-construction BMPs for the project may include, but are not limited to: rock slope protection, vegetated swales, rain gardens, detention basins, rock energy dissipaters, vegetation of disturbed soil areas. Northstar CSD shall provide monitoring, irrigation where necessary, and remedial actions to ensure that vegetation in vegetated swales, rain gardens, and revegetated disturbed areas becomes established within three years following construction. All BMPs shall be maintained as required to insure effectiveness. Northstar CSD shall maintain records providing proof of on-going	Northstar CSD	Northstar CSD	BMPs included on Improvement Plans, BMPs implemented during construction, permanent BMPs maintained throughout project life	▪ Post construction BMPs are maintained to protect water quality

Mitigation Measure	Implementation Responsibility	Monitoring Responsibility	Timing	Performance Evaluation Criteria
maintenance.				
Mitigation Measure 6.1d: Trail amenities including trailheads, trail junctions, rest areas, picnic areas, and wildlife viewing areas shall be constructed using pervious surfaces. These features shall either be designed to provide full infiltration of runoff from the 10-year storm event within 12 hours or include an underdrain system that collects filtered stormwater and releases the runoff downslope as sheet flow at a rate that is a maximum of 90 percent of pre-project conditions. The covered Native American Interpretive Area trail amenity shall be constructed using pervious surfaces in areas that will receive direct rainfall. Runoff from the roof of this amenity shall be routed to an adjacent rain garden sized to detain and infiltrate rainfall from a 10-year event and that includes an overflow system to route runoff from larger events as sheet flow to the downslope areas at a maximum rate of 90 percent of pre-project rates.	Northstar CSD	Northstar CSD	Construction details for all trail amenities included on Improvement Plans	▪ Trail amenities constructed using permeable pavers ▪ Trail amenities provide drainage as described
VISUAL RESOURCES				
Mitigation Measure 8.1a: Natural or earth tone surfacing shall be used for the portion of Trail Segment 2A extending from the present location of the Wildlife Viewing Area, southwest to the first crossing of Martis Creek. Surfacing colors shall be selected to minimize contrast with the natural colors of the vegetation and soils of the valley, as determined appropriate by a written recommendation from a landscape architect. Color and materials for surfacing the trail shall be approved by the Northstar CSD and the U.S. Army Corps of Engineers.	Northstar CSD	Northstar CSD and USACE	Trail surface color identified on Improvement Plans	Visibility of paved trail surface in specified area reduced

Mitigation Measure	Implementation Responsibility	Monitoring Responsibility	Timing	Performance Evaluation Criteria
Mitigation Measure 8.1b: Stockpiling of materials onsite shall be minimized during construction. Construction staging areas and stockpile storage locations shall be identified on project plans and located within existing disturbed areas or as close to or within the areas of construction as possible, and shall be located to screen views of staging areas from the Wildlife Viewing Area, Highway 267 and Schaffer Mill Road to the extent feasible.	Northstar CSD	Northstar CSD	Staging areas identified on Improvement Plans	▪ Disturbance of and use of staging areas screened from viewpoints specified
Mitigation Measure 8.2a: Natural or earth tone surfacing shall be used for the portion of Trail Segment 1viewed from SR 267. Surfacing colors shall be selected to minimize contrast with the natural colors of the vegetation and soils of the valley, as determined appropriate by a written recommendation from a landscape architect. Color and materials for surfacing the trail shall be approved by the Northstar CSD and the U.S. Army Corps of Engineers.	Northstar CSD	Northstar CSD and USACE	Trail surface color identified on Improvement Plans	▪ Visibility of paved trail surface in specified area reduced
Mitigation Measure 8.2b: The Erosion and Sediment Control Plan prepared as required to obtain a grading permit shall include measures to revegetate areas disturbed by project construction activities.	Northstar CSD	Northstar CSD	Revegetation plans included with Improvement Plans and implemented immediately following construction	▪ Revegetation of disturbed areas occurs
RECREATION				
Mitigation Measure 9.1a: The operating agreement between the USACE and the Northstar CSD shall determine potential USACE operating costs associated with use of the Martis Valley Trail and identify funding sources to meet these costs. These shall include maintenance and operations at the Martis Creek Lake Project Wildlife Viewing Area parking lot, ongoing maintenance of the trail system on	Northstar CSD	Northstar CSD and USACE	Prior to any construction activities within USACE property	▪ USACE operation of Martis Creek Lake Project continues to meet USACE service standards

Mitigation Measure	Implementation Responsibility	Monitoring Responsibility	Timing	Performance Evaluation Criteria
the south side of SR 267, enforcement and monitoring of responsible trail behavior and demand for emergency services.				
Mitigation Measure 9.2a: The operating agreement between the USACE and the Northstar CSD described in *Mitigation Measure 9.1a* shall address enforcement and monitoring of responsible trail behavior, including enforcement of USACE regulations related to dog control.	Northstar CSD	Northstar CSD and USACE	Prior to any construction activities within USACE property	▪ USACE operation of Martis Creek Lake Project continues to meet USACE service standards
PROJECT ALTERNATIVES				
Note – Not all of the following mitigation measures would be implemented. Applicability of these measures depends on the Parking Lot Alternative selected.				
Mitigation Measure 11.1a: Trail parking lots shall be constructed using pervious surfaces. These features shall either be designed to provide full infiltration of runoff from the 10-year storm event within 12 hours or include an underdrain system that collects filtered stormwater and releases the runoff downslope as sheet flow at a rate that is a maximum of 90 percent of pre-project conditions.	Northstar CSD	Northstar CSD	Construction details for parking lot included on Improvement Plans	▪ Parking lot constructed using permeable pavers ▪ Parking lot provides drainage as described
Mitigation Measure 11.1b: Final driveway design and required improvements for access to Parking Lot Alternative 3 shall ensure a minimum of 250 feet of sight distance to the northeast for drivers waiting to make a left-turn movement onto Schaffer Mill Road. These improvements could include removing some of the low hill located along the northwest side of Schaffer Mill Road between the planned driveway location and SR 267.	Northstar CSD	Northstar CSD	Construction details for parking lot demonstrating adequate sight distance included on Improvement Plans	▪ Sight distance at parking lot meets County and Caltrans standards
Mitigation Measure 11.1c: Natural or earth tone surfacing shall be used for the parking lot surface, walkways, trail connection and trail kiosk at Parking Lot Alternative 4.	Northstar CSD	Northstar CSD and USACE	Parking lot surface color identified on	▪ Visibility of parking lot surface in specified area

Mitigation Measure	Implementation Responsibility	Monitoring Responsibility	Timing	Performance Evaluation Criteria
Surfacing colors shall be selected to minimize contrast with the natural colors of the vegetation and soils of the valley, as determined appropriate by a written recommendation from a landscape architect. Color and materials for surfacing the trail shall be approved by the Northstar CSD and the U.S. Army Corps of Engineers.			Improvement Plans	reduced
Mitigation Measure 11.1d: A revegetation plan shall be prepared and implemented for all areas disturbed by construction at Parking Lot Alternative 4. The plan shall specify native vegetation and provide monitoring and maintenance of plantings for a period of time appropriate to ensure their survival.	Northstar CSD	Northstar CSD	Landscaping plan for parking lot included in Improvement Plans and implemented during construction	▪ Natural vegetation provided around perimeter of parking lot at specified location
Mitigation Measure 11.1d: A planting plan for Parking Lot Alternative 2 will include native conifers, spaced appropriately to be consistent with native tree cover in the vicinity, as determined appropriate by a written recommendation from a landscape architect. Planting of trees will be required as part of the improvements at the time of construction of this lot.	Northstar CSD	Northstar CSD	Landscaping plan for parking lot included in Improvement Plans and implemented during construction	▪ Glare from vehicles using parking lot at specified location reduced/filtered
AIR QUALITY				
MM AIR.1: Prior to approval of Grading/Improvement Plans, Northstar CSD shall submit a Construction Emission / Dust Control Plan to the Placer County APCD. Northstar CSD shall provide written evidence, provided by APCD, to Placer County that the plan has been submitted to APCD. It is the responsibility of Northstar CSD to deliver the approved plan to Placer County. Northstar CSD shall not break ground prior to receiving APCD approval of the Construction Emission/Dust Control Plan, and delivering that approval to Placer County	Northstar CSD	Northstar CSD and Placer County APCD	Prior to Improvement Plan approval	▪ Construction emissions, including exhaust and dust, are controlled

Mitigation Measure	Implementation Responsibility	Monitoring Responsibility	Timing	Performance Evaluation Criteria
MM AIR.2 Prior to approval of the Grading Plan, the applicant shall provide a written calculation to the Placer County APCD for approval by the District demonstrating that the heavy-duty (> 50 horsepower) off-road vehicles to be used in the construction project, including owned, leased and subcontractor vehicles, will achieve a project-wide fleet average 20 percent NOX reduction and 45 percent particulate reduction as required by CARB. Acceptable options for reducing emissions may include use of late model engines, low-emission diesel products, alternative fuels, engine retrofit technology, after-treatment products, and/or other options as they become available	Northstar CSD	Northstar CSD and Placer County APCD	Prior to Improvement Plan approval	▪ Construction fleet achieves emission reduction goals
MM AIR.3 In order to control dust, operational watering trucks shall be onsite during construction hours. In addition, dry, mechanical sweeping is prohibited. Watering of a construction site shall be carried out in compliance with all pertinent APCD rules. All disturbed areas and unpaved haul routes shall be watered with adequate frequency to maintain soil moisture (a minimum of twice daily).	Northstar CSD	Northstar CSD	Throughout construction	▪ Dust emissions are controlled
MM AIR.4 Any soil or materials transported onsite or offsite shall be covered or a minimum of two feet of freeboard on all haul trucks shall be maintained.	Northstar CSD	Northstar CSD	Throughout construction	▪ Dust emissions are controlled
MM AIR.5 All soil stockpile areas shall be covered.	Northstar CSD	Northstar CSD	Throughout construction	▪ Dust emissions are controlled
MM AIR.6 Northstar CSD shall ensure that at completion of each construction phase, all graded areas are revegetated or surfaced to minimize soil erosion.	Northstar CSD	Northstar CSD	At completion of each construction phase	▪ Post-construction soil erosion is controlled
MM AIR.7 Northstar CSD shall ensure that the Grading Plan for each construction phase includes the following notes:	Northstar CSD	Northstar CSD and Placer County APCD	Construction notes included on Improvement Plan;	▪ Exhaust emissions and dust are controlled

Mitigation Measure	Implementation Responsibility	Monitoring Responsibility	Timing	Performance Evaluation Criteria
A. The prime contractor shall submit to the District a comprehensive inventory (i.e., make, model, year, emission rating) of all the heavy-duty off-road equipment (50 horsepower or greater) that will be used an aggregate of 40 or more hours for the construction project. If any new equipment is added after submission of the inventory, the prime contractor shall contact APCD prior to the new equipment being utilized. At least three business days prior to the use of subject heavy-duty off-road equipment, the project representative shall provide the District with the anticipated construction timeline including start date, and name and phone number of the property owner, project manager, and onsite foreman. B. Construction equipment exhaust emissions shall not exceed Placer County APCD Rule 202 Visible Emission limitations. Operators of vehicles and equipment found to exceed opacity limits are to be immediately notified by APCD to cease operations and the equipment must be repaired within 72 hours. C. The prime contractor shall suspend all grading operations when wind speeds (including instantaneous gusts) are excessive and dust is impacting adjacent properties. D. The contractor shall apply water or use another method to control dust impacts offsite. Grading vehicles and equipment are expected to remain onsite for the duration of the project. Any vehicle or equipment leaving the site shall be cleaned to prevent dust, silt, mud, and dirt from being released or tracked offsite. E. In order to minimize wind drive dust during grading, the prime contractor shall apply methods such as surface stabilization, establishment of a vegetative cover,			construction notes implemented throughout construction	

Mitigation Measure	Implementation Responsibility	Monitoring Responsibility	Timing	Performance Evaluation Criteria
paving, or another method approved by Placer County. F. During grading, no open burning of removed vegetation shall be allowed unless permitted by Placer County APCD. All removed vegetative material shall be either chipped on site or taken to an appropriate recycling site, or if a site is not available, a licensed disposal site. G. During grading, traffic speeds on all unpaved surfaces shall be limited to 15 miles per hour or less. H. During grading, the contractor shall minimize idling time to a maximum of 5 minutes for all diesel powered equipment. I. During grading, the contractor shall utilize existing power sources (e.g., power poles) or clean fuel (i.e., gasoline, biodiesel, natural gas) generators rather than temporary diesel power generators. J. The prime contractor shall be responsible for keeping adjacent public thoroughfares clean of silt, dirt, mud, and debris, and shall "wet broom" the streets (or use another method to control dust as approved by the individual jurisdiction) if silt, dirt, mud or debris is carried over to adjacent public thoroughfares.				
HAZARDS AND HAZARDOUS MATERIALS				
MM HAZ.1 The following measures shall be implemented prior to and during construction. A. All equipment will be inspected by the contractor for leaks immediately prior to the start of construction, and regularly inspected throughout project construction. B. The Storm Water Pollution Prevention Plan (SWPPP)	Northstar CSD	Northstar CSD	Prior to and throughout construction	▪ Construction equipment is maintained to minimize risk of leaks ▪ Any leaks or spills are immediately

Mitigation Measure	Implementation Responsibility	Monitoring Responsibility	Timing	Performance Evaluation Criteria
shall contain BMPs for spill prevention. C. A spill kit shall be maintained onsite throughout all construction activities. D. The SWPPP and project plans shall identify construction staging areas and designated areas where equipment refueling, lubrication, and maintenance may occur. Areas designated for refueling, lubrication, and maintenance of equipment shall be at least 50 feet from any spring/seep/wetland/marsh areas and 100 feet from creeks and shall be approved by the Northstar Community Services District. E. In the event of any spill or release of any chemical during construction, the contractor shall immediately notify the Northstar Community Services District.				reported and addressed
MM HAZ.2 Prior to commencement of site disturbance for each construction phase, the Project Contractor shall prepare a Fire Safety Plan for construction, which shall include construction best management practices for fire prevention. The plan shall be reviewed and approved by the Northstar Community Services District and the Northstar Fire Department. The plan shall include emergency contact numbers for CAL FIRE and the Northstar Fire Department. The plan shall address appropriate hours of operation, fire safe equipment use guidelines, onsite fire suppression equipment requirements, and identify appropriate vehicle parking areas away from flammable materials. The Fire Safety Plan shall be implemented during construction and shall be available onsite at all times during construction.	Northstar CSD	Northstar CSD	Prior to commencement of each construction phase	▪ Fire Safety Plan that reflects best practices as determined by local fire protection personnel is prepared and implemented

Martis Valley Trail
Draft Mitigation Monitoring & Reporting Program

Mitigation Measure	Implementation Responsibility	Monitoring Responsibility	Timing	Performance Evaluation Criteria
LAND USE				
MM LUP.1 The Northstar Community Services District shall enter into an agreement with the U.S. Army Corps of Engineers to allow construction, use, and maintenance of a segment of the Martis Valley Trail within the Martis Creek Lake Recreation Area.	Northstar CSD	Northstar CSD and USACE	Prior to any construction activities within USACE property	▪ Trail use through USACE property is authorized by USACE
NOISE				
MM NOISE-1 Construction contractors shall comply with the following measures: 1. Construction activities shall be limited to between the hours of seven a.m. and six p.m. Monday through Friday, and between the hours of eight a.m. and six p.m. on Saturday. Noise-generating construction activities during the days and hours specified are exempt from noise standards by Section 9.36.030 of the Placer County Code. 2. All construction vehicles, heavy equipment, and stationary noise sources (such as diesel generators) shall be equipped with mufflers. 3. Equipment warm-up areas, water tanks, and equipment storage areas shall be located as far as practical from existing residences and in no cases closer than 50 feet to any existing residence.	Northstar CSD	Northstar CSD	Throughout all construction activities	▪ Compliance with Placer County Code

List of Acronyms:

APCD	Air Pollution Control District
BMPs	Best Management Practices
CARB	California Air Resources Board
CDFG	California Department of Fish and Game
CEQA	California Environmental Quality Act
CHRIS	California Historic Resources Information System
CRHR	California Register of Historic Resources
CSD	Community Services District
ESD	Engineering and Surveying Division
NCIC	North Central Information Center
NHPA	National Historic Preservation Act
NOX	Oxides of Nitrogen
NPDES	National Pollutant Discharge Elimination System
NRHP	National Register of Historic Places
RWQCB	Regional Water Quality Control Board
SR	State Route
SWPPP	Stormwater Pollution Prevention Plan
SWRCB	State Water Resources Control Board
USACE	US Army Corps of Engineers
USFWS	US Fish and Wildlife Service
WDID	Waste Discharge Identification

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CHAPTER 13

REPORT PREPARERS AND REFERENCES

CHAPTER 13 EIR PREPARERS & REFERENCES

13.1 LEAD AGENCY – NORTHSTAR COMMUNITY SERVICES DISTRICT

Northstar Community Services District
908 Northstar Drive
Northstar, CA 96161
(530) 561-0747
Contact: Mike Staudenmayer

13.2 PROJECT APPLICANT AND APPLICANT'S CONSULTANTS

Northstar Community Services District
908 Northstar Drive
Northstar, CA 96161
Contact: Mike Staudenmayer

Auerbach Engineering Corporation
P.O. Box 5399
Tahoe City, CA 96145
Contact: Walter Auerbach

LSC Transportation Consultants
2690 Lake Forest Road, Suite C
P.O. Box 5875
Tahoe City, CA 96145
Contact: Jason Briedis

Civil Engineering Solutions, Inc.
590 E Street
Lincoln, CA 95648
Contact: Tom Plummer

Holdrege & Kull
792 Searls Avenue
Nevada City, CA 95959
Contact: Pamela Raynak

13.3 PRIMARY EIR CONSULTANTS

North Fork Associates
1167 High Street
Auburn, CA 95603
Principal-in-Charge: Cathleen Spence-Wells
Project Manager: Katherine Waugh

13.4 SUBCONSULTANTS

Susan Lindstrom, Consulting Archeologist
P.O. Box 3324
Truckee CA 96160
Project Manager: Susan Lindstrom, PhD

Salix Consulting, Inc
12240 Herdal Drive, Suite 14
Auburn CA 95603
Project Manager: Jeff Glazner

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Personal Communications

Bucar, Becky, Town of Truckee March 27, 2012

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Cotter, Mike and Andy Starostka, United States Fish and Wildlife Service, October 14, 2011.

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Hershey, Terry, U.S. Army Corps of Engineers, January 4, 2012.

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Staudenmayer, Mike, General Manager, Northstar Community Services District, October 18, 2011.

Thomas, Kevin, California Department of Fish and Game, December 22, 2011.

Urie, Susan, U.S. Forest Service, April 19, 2012.

APPENDIX A

NOTICE OF PREPARATION,
INITIAL STUDY,
NOP COMMENTS,
INITIAL STUDY SUPPLEMENT

APPENDIX A1

Notice of Preparation
and
Initial Study

ENVIRONMENTAL IMPACT REPORT

NOTICE OF PREPARATION

Date:	December 17, 2010
To:	State Clearinghouse Responsible Agencies Trustee Agencies Interested Parties
Subject:	Notice of Preparation of a Draft Environmental Impact Report for the proposed Martis Valley Regional Trail
NOP Comment Period:	Written comments are due no later than January 17, 2011 by 5:00 p.m.
Project Location:	The proposed trail is located in the Martis Valley in eastern Placer County. The trail is proposed to begin at the Nevada/Placer County line near the intersection of Shaffer Mill Road and State Route 267, then meander on the west side of the state highway for approximately 1.75 miles, turning south at the Wildlife Viewing Area then crossing Martis Creek and climbing out of the valley to Northstar Village and continuing eastward through the Northstar at Tahoe resort to the ridgeline defining the Lake Tahoe Basin, terminating near Sawmill Flat at a paved Forest Service road atop the ridge near a road intersection known locally as the "Four Corners."
Lead Agency and Contact Person:	Northstar Community Services District Mike Staudenmayer, General Manager 908 Northstar Drive Northstar, CA 96161 (530) 562-0747

1.0 INTRODUCTION

The Northstar Community Services District (CSD) has determined that the proposed Martis Valley Regional Trail project could significantly affect the environment. In accordance with the California Environmental Quality Act (CEQA), this document provides notice to the public and other agencies that may have jurisdiction over some portion of the project that a Draft EIR will be prepared to evaluate the environmental impacts of the proposed project. As discussed in Section 3.0, the Draft EIR will be focused on the topics of Biological Resources, Cultural Resources, and Hydrology and Water Quality. A detailed Initial Study is provided with this Notice of Preparation.

2.0 PROJECT DESCRIPTION

The Martis Valley Regional Trail project proposes to construct a multiple-use paved trail extending ±9.5 miles from the southern limits of the Town of Truckee at the Nevada/Placer County line eastward to the ridgeline defining the Lake Tahoe Basin, terminating near Sawmill Flat at a paved Forest Service road atop the ridge near a road intersection known locally as "Four Corners." The trail would provide a regional connection between existing trails in the Town of Truckee and trails in the Lake Tahoe Basin. The trail would be constructed in five segments.

The width of the trail would generally be ten feet, with two-foot unpaved shoulders on either side. The trail would accommodate pedestrians, bicyclists, and other non-motorized transportation, and would be constructed to meet the standards of the Americans with Disabilities Act (ADA). The trail grade would provide for maximum accessibility in accordance with ADA requirements.

2.1 Project Location

The proposed trail alignment extends from the southeastern boundary of the Town of Truckee to the ridge separating Martis Valley from the Lake Tahoe Basin. The proposed trail is located south of State Route 267 and crosses through the Northstar at Tahoe community. The project area is shown on Figures 1 and 2 of the attached Initial Study.

2.2 Project Objectives

The project applicant has identified the following objectives for the proposed trail:

- Provide a convenient, safe and accessible non-motorized connection between the Town of Truckee and the North Shore of Lake Tahoe.
- Expand the community, recreational, and transportation opportunities available in Martis Valley.
- Expand and complement existing and planned regional trails; facilitate connections to adjacent residential areas as well as existing and planned trail systems and parking and transit centers throughout the area.
- Provide safe passage for all users, avoiding interface with automobiles to the greatest extent possible.

- Provide a trail that is accessible to the widest variety of potential users during all seasons of the year.
- Ensure respect and protection for scenic, natural, and cultural resources in the area during trail construction and use.
- Highlight the natural, cultural and social context of the region through interpretive opportunities.
- Provide an alternative to automobile transportation, creating a continuous route between regional commercial centers.

2.3 Project Setting

The proposed trail alignment is located on the eastern side of the Sierra Nevada Mountains, north of Lake Tahoe and southeast of the Town of Truckee. The topography is gently rolling to generally flat within Martis Valley, and steep outside of the valley through Northstar and towards the Tahoe Basin. Adjacent land uses include the Northstar Resort (including Northstar-at-Tahoe golf course, Northstar Village, residential areas of Northstar, and the Northstar-at-Tahoe ski area), Lahontan Golf Club, Truckee-Tahoe Airport, Martis Creek Lake, and undeveloped areas of Tahoe National Forest.

The proposed trail alignment crosses through four distinct habitat types in an area that supports several drainages, including Martis Creek, and known cultural resource sites. The climate in the area is characterized by mild, dry summers and cold, wet winters. Annual temperatures range from -28 degrees F to 101 degrees F.

2.4 Project Components

The project proposes to construct ±9.5 miles of trail in the following segments, which are shown on Figure 3 of the attached Initial Study:

Segment 1: Nevada/Placer County line, just North of Schaffer Mill Road, to the Martis Creek Wildlife Viewing Area (±1.8 miles, 9,244 linear feet). This segment would establish the trailhead at the County line and would connect the trail to the Town of Truckee trail system. This segment would cross Schaffer Mill Road with a pedestrian signal system integrated into the existing intersection signal controls.

Segment 2A: Martis Creek Wildlife Viewing Area southwest to junction with Segment 2B (±1.6 miles, 8,614 linear feet). This segment would cross Martis Valley on existing dirt roads and trails. Known resources in this segment consist of cultural sites, wetlands, floodplain associated with Martis Creek, and potentially special status species.

Segment 2B: Martis Creek Lake Recreation Area / Northstar at Tahoe Resort property boundary south to Northstar Village (±1.9 miles, 10,486 linear feet). This segment would ascend through a conifer forest to its termination near the existing bus loop at Northstar Village.

Segment 3E: Northstar Village east to junction with Segment 4 (±0.8 miles, 4,398 linear feet). This segment would extend easterly from the Village at Northstar to an elevation of approximately 6,500 feet on a forested ridgeline where it would junction with Segment 4.

Segment 4: Terminus of Segment 3E to Four Corners (±3.1 miles, 16,451 linear feet). This segment would connect the trail to regional trails in the Lake Tahoe Basin. Segment 4 travels through heavily forested slopes previously disturbed by logging activities.

The trail would include interpretative signage to educate trail users regarding the historic, cultural, and natural context of the project region. Construction of the trail would include grading and soil excavation, vegetation removal, building retaining walls, bridges, and other structures, and paving the trail surface. Both hand and mechanical construction techniques would be used to accomplish trail construction. All cut vegetation would be chipped and broadcast, or lopped and scattered, within the project area. Equipment used in site preparation, trail construction, revegetation, and boardwalk installation will include SWECO trail dozers (small bulldozer), rubber-tired backhoes, motorized wheelbarrows, hand-operated compactors, hand-held power augers, small front-end loader, small tracker, hand-held power tools and hand tools (e.g., Pulaskis, Mcleods, shovels, hammers, saws). Creek crossings would occur on most trail segments. Best Management Practices and a storm water pollution prevention plan (SWPPP) would be implemented to minimize potential impacts from soil transportation, erosion, and siltation during trail construction. The Northstar CSD would be responsible for long-term maintenance of the trail. Maintenance activities including sweeping, crack sealing, surface restoration, vegetation control, and removal of slough would be performed by Northstar CSD staff or volunteers, and maintenance would occur annually or as needed.

3.0 PROBABLE ENVIRONMENTAL EFFECTS AND SCOPE OF THE EIR

A detailed Initial Study has been prepared to identify the potentially significant impacts of the Martis Valley Regional Trail project. The Initial Study is provided with this Notice of Preparation. The Initial Study finds that some impacts are potentially significant and will be addressed in an EIR. The Initial Study also finds that impacts in most resource areas will remain less than significant, and those issues will not be addressed further in the EIR. The Initial Study identifies mitigation measures necessary to ensure that impacts in some resource areas remain less than significant.

The following paragraphs discuss the results of preliminary impact identification and anticipated analyses that will be included in the EIR. The EIR will include project-level review of Segments 1, 2A, and 2B, and program-level review of Segments 3E and 4. The EIR will be prepared in accordance with the CEQA Statues and CEQA Guidelines. The EIR will identify feasible mitigation measures to reduce or avoid impacts, will consider project alternatives, and will evaluate the project's potential to contribute to cumulative impacts in the region.

Potential Impacts to be Evaluated in the EIR

Biological Resources. The proposed trail alignment crosses through four distinct habitat types, including coniferous forest, sagebrush scrub, wet meadow, and riparian. Construction of the proposed trail could result in significant impacts to special-status species and sensitive habitats (including wetlands). The EIR will evaluate the potential impacts of the trail on natural habitats and wildlife and vegetation species known to exist in the area.

Cultural Resources. The proposed trail alignment crosses through the Martis Valley, which is known to support historic and archeological resources. The area is located within territory commonly attributed to the Washoe people. The area was also heavily affected by historic activities, including emigrant travel into California and logging. Field assessments in the project area have identified several historic period isolates and prehistoric sites. Construction of the proposed trail could result in significant impacts to cultural resources in the Martis Valley. These potential impacts will be addressed in the EIR.

Hydrology and Water Quality. The proposed trail alignment would cross several drainages, including bridge or boardwalk crossings of Martis Creek and a tributary to Martis Creek within the Martis Creek Lake Recreation Area, and would require grading and other construction work adjacent to and within delineated wetland areas. Due to the sensitivity of work conducted within these areas, the potential for significant impacts to water quality will be addressed in the EIR.

Topics Focused Out of the EIR

Based on the analysis in the Initial Study, which is attached to this Notice of Preparation, the EIR will not address the following topics:

Aesthetics. Portions of the trail would be visible from surrounding properties and from State Route 267. Construction of the trail could affect scenic vistas and scenic resources in the area. The Initial Study identifies mitigation measures to ensure that impacts to aesthetics in the area remain less than significant.

Agriculture and Forest Resources. The project site and adjacent properties do not currently support any agricultural activities. The trail alignment passes through some properties that are designated for forestry and timber production uses. Recreational uses are permitted in these areas subject to approval of a Minor Use Permit by Placer County. The project would not result in any impacts to agriculture and forestry resources.

Air Quality. Construction of the trail would generate air pollutant emissions. Those emissions are expected to remain below the thresholds of significance established by the Placer County Air Pollution Control District. The Initial Study identifies mitigation measures to ensure that impacts to air quality remain less than significant.

Geology and Soils. Although the project site is not located within any designated earthquake zones, the area could be subject to seismic activity. However, use of the trail is not expected to expose individuals to substantial seismic-related risks. Soil erosion during construction would be minimized by the use of Best Management Practices required under grading permits issued for each construction phase and under the requirements of the National Pollutant Discharge Elimination System. The project is not expected to result in any significant impacts related to geology and soils.

Greenhouse Gas Emissions. Emissions of greenhouse gases associated with construction of the proposed trail are expected to remain below thresholds recently established by the Bay Area Air Quality Management District, and suggested for use by the Placer County Air Pollution Control District, and thus would remain less than significant.

Hazards and Hazardous Materials. The project site is geographically removed from natural hazards, and no known releases of hazardous materials have occurred within the proposed trail alignment. The trail alignment is in the vicinity of the Truckee Tahoe Airport, but the proposed trail use is consistent with the land use compatibility zones for that airport. The Initial Study identifies mitigation measures to ensure that the use, storage, and transport of hazardous materials during trail construction do not result in significant impacts. The Initial Study also identifies a mitigation measure to ensure that construction activities do not result in increased fire risks in the region.

Land Use and Planning. The proposed trail would not divide an established community. The proposed trail would be consistent with applicable land use plans and policies for the area. No habitat conservation or natural community conservation plans have been adopted for the project area.

Mineral Resources. The project site and adjacent properties are not known to support any mineral removal activities. The project would not result in any impacts to mineral resources.

Noise. Trail construction would result in temporary increases in noise levels but would not change the permanent ambient noise conditions in the area. The Initial Study identifies mitigation measures to ensure that construction noises do not result in significant impacts.

Population and Housing. The proposed trail is not expected to generate population growth in the region. The project would not generate the need for new housing. The project would not demolish existing housing or displace existing residents.

Public Services. The proposed trail is not expected to generate population growth in the region. The project would not generate the need for new or expanded public services.

Recreation. The proposed trail is not expected to generate population growth in the region. The project would not generate the need for new or expanded recreation facilities. The physical impacts of the proposed trail, which is a recreation facility, are evaluated throughout the Initial Study. The potentially significant impacts of the project will be addressed in the EIR.

Transportation/Traffic. The proposed trail is not expected to generate substantial new vehicle trips in the project area, alter the mix of vehicle traffic on existing roadways, or conflict with transportation plans in the region.

Utilities and Service Systems. The proposed trail is not expected to generate population growth in the region. The project would not generate the need for new or expanded utilities and services.

4.0 PROJECT APPROVALS

Several permits would be required prior to construction of the proposed project. The responsible agencies and types of permits are discussed below.

Trail Authorization. The Northstar CSD Board of Directors must authorize construction and maintenance of the trail.

Corps MOU*:* The proposed Martis Valley Regional Trail would cross lands owned and managed by the U.S. Army Corps of Engineers (Corps). For Northstar CSD to construct and operate a trail through Corps' lands, the CSD and Corps would need to establish an MOU identifying the responsibilities of each party regarding access and trail maintenance.

Clean Water Act Section 404: The Corps regulates the placement of fill or dredged material that affects waters of the United States, which include streams and wetlands. The Corps regulates these activities under authority granted through Section 404 of the Clean Water Act. The project site includes wetland resources under the jurisdiction of the Corps that may be impacted by trail crossings. Any discharge of dredged or fill materials to wetlands would require permitting pursuant to Section 401 of the federal Clean Water Act.

Water Quality Certification: Because approval and implementation of the proposed project has the potential to affect wetlands or other waters of the U.S., the Lahontan RWQCB would need to provide water quality certification of the project in compliance with Section 401 of the Clean Water Act. In providing water quality certification, the RWQCB would review the Corps' permit conditions of approval and may require the project to implement additional water quality protection measures.

Federal Endangered Species Act Section 7 Consultation: When a project may affect federally-listed endangered species and requires Corps' approval, the Corps will consult with the U.S. Fish and Wildlife Service to ensure that appropriate mitigation measures are incorporated in the project to avoid impacts to federally-listed endangered species.

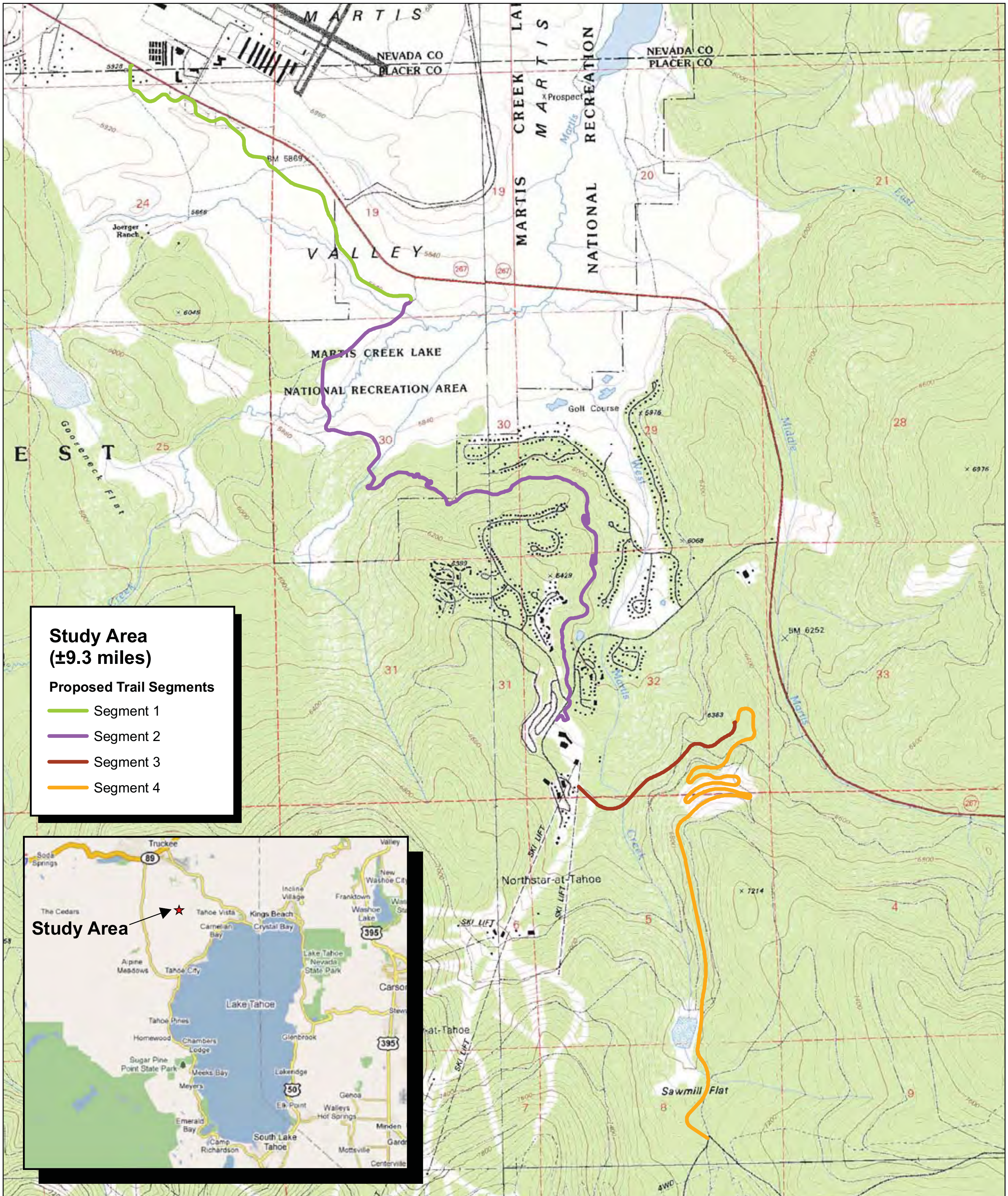
National Historic Preservation Act Section 106 Consultation: When a project requires Corps' approval, the Corps must ensure that the project will not substantially affect historic or archeological resources. The Corps will consult with the State Historic Preservation Officer to ensure that appropriate mitigation measures are incorporated in the project to avoid such impacts.

Streambed Alteration Agreement: The California Department of Fish and Game must approve activities that may alter an area within a streambed or stream zone pursuant to Section 1600 et seq of the California Fish and Game Code.

Minor Use Permit: The trail crosses land within unincorporated Placer County, subject to the Martis Valley Community Plan. Based on the land use and zoning designations of this land, the Martis Valley Community Plan requires that Placer County issue a Minor Use Permit to allow establishment of recreational land uses in this area.

MARTIS VALLEY REGIONAL TRAIL
INITIAL STUDY
December 2010

PROJECT TITLE:	Martis Valley Regional Trail
LEAD AGENCY:	Northstar Community Services District 908 Northstar Drive Northstar, CA 96161
CONTACT PERSON:	Mike Staudenmayer, General Manager (530) 562-0747
PROJECT LOCATION:	The proposed trail is located in the Martis Valley in eastern Placer County. The trail is proposed to begin at the Nevada/Placer County line near the intersection of Shaffer Mill Road and State Route 267, then meander on the west side of the state highway for approximately 1.75 miles, turning south at the Wildlife Viewing Area then crossing Martis Creek and climbing out of the valley to Northstar Village and continuing eastward through the Northstar at Tahoe resort to the ridgeline defining the Lake Tahoe Basin, terminating near Sawmill Flat at a paved Forest Service road atop the ridge near a road intersection known locally as the "Four Corners." The proposed trail alignment is shown on USGS maps in Figure 1 and an aerial photograph of the project area is shown in Figure 2.
APPLICANT:	Northstar Community Services District 908 Northstar Drive Northstar, CA 96161
GENERAL PLAN:	See Table 1
ZONING:	See Table 1
EXISTING LAND USE:	Land uses in the vicinity of the trail alignment include residential and commercial uses at the eastern end of the Town of Truckee, existing trails on the U.S. Army Corps of Engineers (Corps) property, two golf courses, an airport, residential uses throughout the Northstar at Tahoe property, commercial uses in Northstar Village, and Northstar at Tahoe recreation uses. Uses in the higher elevations, above the Village at Northstar, primarily consist of recreation and resource management (logging).



N

0 750 1,500 3,000

Scale in Feet

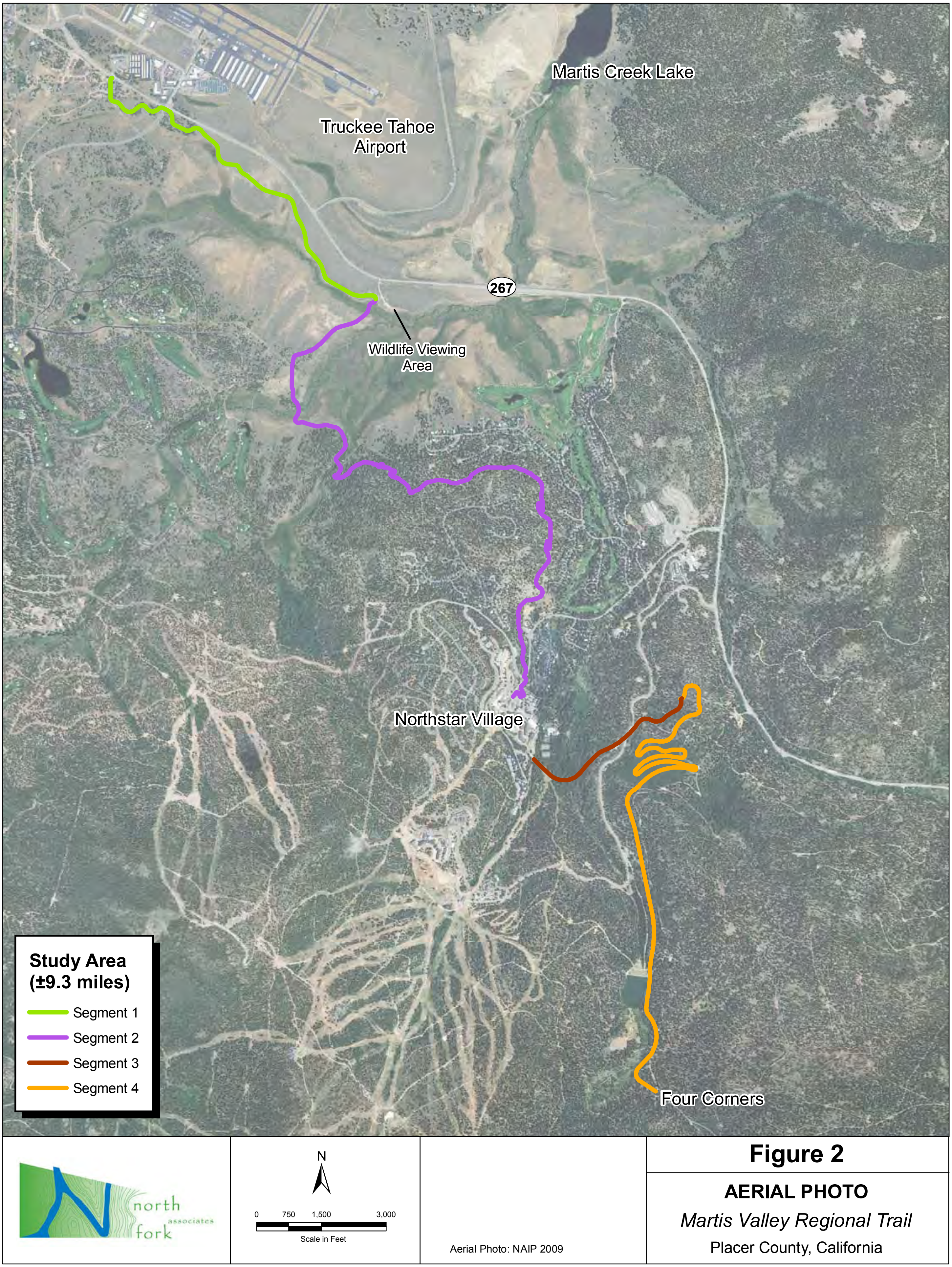
USGS Base Map:
Truckee & Martis Peak, CA
7.5 minute topographic quadrangle
Sections:
5,8,13,19,24,29,30,32
Township: 16N,17N
Range: 16E,17E

Figure 1

SITE & VICINITY MAP

Martis Valley Regional Trail

Placer County, California



north fork associates

Aerial Photo: NAIP 2009

Figure 2

AERIAL PHOTO

Martis Valley Regional Trail

Placer County, California

Project Background

Local agencies and advocacy groups have supported a regional multi-use trail system to connect the communities of Truckee, Northstar, Kings Beach, and Tahoe City. Segments of trail are currently being planned along the Truckee River between Squaw Valley and Truckee, and between Tahoe City and Kings Beach. In addition, the Town of Truckee is in the process of implementing their Trails Master Plan, one element of which will connect their downtown core to the Placer County line near the Truckee-Tahoe Airport. The proposed Martis Valley Trail would provide another key connection in this regional system, linking the Town of Truckee to Northstar and Northstar to trails that access Kings Beach and Tahoe City.

When completed, the overall trail system will not only connect the communities mentioned, but will provide access to many existing recreational trail networks throughout the eastern portions of Placer and Nevada counties.

Study Area – Environmental Setting

The proposed trail alignment is located on the eastern side of the Sierra Nevada Mountains, north of Lake Tahoe and southeast of the Town of Truckee. The topography is gently rolling to generally flat within Martis Valley, and steep outside of the valley through Northstar and towards the Tahoe Basin. Adjacent land uses include the Northstar Resort (including Northstar-at-Tahoe golf course, Northstar Village, residential areas of Northstar, and the Northstar-at-Tahoe ski area), Lahontan Golf Club, Truckee-Tahoe Airport, Martis Creek Lake, and undeveloped areas of Tahoe National Forest.

The proposed trail alignment crosses through four distinct habitat types in an area that supports several drainages, including Martis Creek, and known cultural resource sites. The climate in the area is characterized by mild, dry summers and cold, wet winters. Annual temperatures range from -28 degrees F to 101 degrees F.

PROJECT DESCRIPTION

The existing trail along Martis Creek through the Martis Creek Wildlife Area is one of the most popular trails in the Truckee/North Tahoe area. The heavy use of this trail has led to water quality impacts as erosion of the trail and streambanks lead to sedimentation of the creek, and impacts to wildlife from the presence of humans and dogs in the area (Truckee River Watershed Council). The Watershed Council and Corps are involved in ongoing restoration activities including "rerouting some portions of the existing trails away from stream banks, meadows and wetlands, restructuring and rebuilding portions of trails, and stabilizing stream banks through extensive revegetation" to reduce sedimentation and enhance natural habitat (Truckee River Watershed Council).

The proposed project is a multiple-use paved trail extending ±9.5 miles from the southern limits of the Town of Truckee at the Nevada/Placer County line eastward to the ridgeline defining the Lake Tahoe Basin, terminating near Sawmill Flat at a paved Forest Service road atop the ridge near a road intersection known locally as "Four Corners." The trail would provide a regional connection between existing trails in the Town of Truckee and trails in the Lake Tahoe Basin. The trail would accommodate pedestrians, bicyclists, and other non-motorized transportation, and would be constructed to meet the standards of the Americans with Disabilities Act (ADA). The trail grade would provide for maximum accessibility in accordance with ADA requirements. The width of the trail would generally be ten feet, with two-foot unpaved shoulders on either side.

Trail Segments

The proposed Martis Valley Trail has been divided into five segments, as described below, from north to south. Phase 1 of the project includes construction of Segment 1 of the trail. Phase 2 includes construction of Segments 2A and 2B of the proposed trail. Segments 3E and 4 would be constructed during future construction phases as funding becomes available.

Segment 1: Nevada/Placer County line, just North of Schaffer Mill Road, to the Martis Creek Wildlife Viewing Area (±1.8 miles, 9,244 linear feet)

The trailhead would be located at the County line, and would allow a connection with the Town of Truckee trail system. The trail would head south and east. The crossing of Schaffer Mill Road would be accomplished with a pedestrian signal system integrated into the existing intersection signal controls. The trail would meander adjacent and roughly parallel to the highway but with the design intent to remain well-separated from the highway corridor for aesthetic and safety reasons. This segment of trail would be constructed following topographic and other natural features, as there are no existing trails to follow in this area.

Segment 2A: Martis Creek Wildlife Viewing Area southwest to junction with Segment 2B (±1.6 miles, 8,614 linear feet)

This segment would head southwest across Martis Valley on existing dirt roads and trails. The trail would turn south near a historic quarry site, following an old access road through the quarry site. A bridge crossing of Martis Creek would be required nearby an old concrete diversion structure. On the south side of Martis Creek, the trail would again follow in the alignment of existing dirt roads and trails to the south and east. Segment 2A would terminate where it meets Segment 2B at the property boundary between the Martis Creek Lake Recreation Area and Northstar Resort. Known resources in this segment consist of cultural sites, wetlands, floodplain associated with Martis Creek, and potentially special status species.

Segment 2B: Martis Creek Lake Recreation Area / Northstar at Tahoe Resort property boundary south to Northstar Village (±1.9 miles, 10,486 linear feet)

This segment would junction with Segment 2A at the property boundary between the Northstar Resort and Martis Creek Lake Recreation Area and ascend through a conifer forest east and then south to its termination near the existing bus loop at Northstar Village.

Segment 3E: Northstar Village east to junction with Segment 4 (±0.8 miles, 4,398 linear feet)

This segment would include one at-grade crossing of Highlands View Road and a crossing of West Martis Creek. The southern end of this segment would also cross areas currently in use as downhill ski trails. The trail would extend easterly from the Village at Northstar to an elevation of approximately 6,500 feet on a forested ridgeline where it would junction with Segment 4. It should be noted that this segment is designated *3E* rather than *3* as a result of segment designations used during project planning.

Segment 4: Terminus of Segment 3E to Four Corners (±3.1 miles, 16,451 linear feet)

Segment 4 would head generally south from its junction with Segment 3E and ascend the forested slope via a series of switchbacks following existing dirt roads to the extent possible. The southern terminus of Segment 4 would be its junction with a paved Forest Service road just south of Sawmill Flat. This junction is known locally as the "Four Corners" area. The paved road is known locally as the "Fibreboard Freeway," and extends to the west and the east for several miles along the ridgeline defining the Lake Tahoe Basin. Segment 4 travels through heavily forested slopes previously disturbed by logging activities.

The approximate alignment of the trail is shown on Figure 3. The general alignment was developed to meet the primary objectives of providing a regional connection between trails in the Town of Truckee, the Village at Northstar, and trails in the Lake Tahoe basin.

The Northstar CSD used standard procedures for identifying the trail alignment. CSD staff and consulting engineers delineated the alignment by traveling the length of the trail on foot to identify the most suitable route. GPS units were used to map the trail alignment as well as potential constraints, including rock outcrops, wet areas and drainages, and trees. Biologists also walked the entire length of the trail to conduct a Wetland Delineation, Biological Resources Assessment, and rare plant mapping. Topographic surveys of the alignment have been completed, and available data regarding cultural resource sites was reviewed. In addition, visibility and noise exposure related to SR 267 was also considered in developing the proposed alignment. To provide accessibility, wherever feasible, the trail surface has a grade of less than five percent. Minor adjustments may be made to the final proposed trail alignment to avoid sensitive resources, make use of natural features, and incorporate grade reversals.

At this time, the Northstar CSD is proposing to construct the first two segments, connecting the Town of Truckee with the Village at Northstar. The remaining two segments would be constructed as funding becomes available. The first segment travels over relatively flat terrain within Martis Valley, generally parallel to SR 267. The second segment travels southward through Martis Valley, moving away from SR 267, and begins to climb steeper terrain within the Northstar area. This segment crosses Martis Creek and one tributary to Martis Creek. To the extent possible, the proposed trail alignment would follow existing topographic contours to minimize grades, discourage erosion from water velocity on steep profiles, and protect natural resources. Portions of both of these segments follow existing unpaved roads. This would also minimize impacts to natural resources during trail construction.

Photo 1 – View from Highway 267 / Wildlife Viewing Area parking lot looking southwest to existing gravel road along the proposed trail alignment in this area.

Photo 2 – View from Highway 267 southwest to Northstar at Tahoe golf course. Ski runs on Lookout Mountain, homes at the edge of the golf course, and power poles are visible. No existing trails are visible within conifer forest area.

Photo 3 – View southeast from shoulder of Highway 267 toward sagebrush in area proposed for new trail.

Photo 4 – View northeast from Schaffer Mill Road to area proposed for new trail. Trail alignment would run along forested knoll.

north fork associates

Photo Date: September 20, 2009

Figure 3

Site Photos

Martis Valley Regional Trail

Placer County, California

The trail would cross through the parcels identified in Table 1, below, which also identifies the zoning and land use designation applied to each parcel. Definitions of each designation are provided at the end of the table.

Table 1
Zoning and Land Use Designations for Parcels Crossed by Trail Alignment

APN	Size (Ac.)	Zoning	Land Use Designation
110-030-012-000	12.8711	FOR-B-X 160 AC MIN	FOREST 40-640 AC MIN
110-010-014-000	14.1922	O, W	WATER, OS
110-010-013-000	18.5447	O, W	WATER
110-081-015-000	176.9873	O, TPZ	FOREST 40-640 AC MIN
107-030-021-000	0.3752	RS-B-20 PD=6	MDR 5-10 DU/AC
080-270-006-000	0.2479	RM-B-43-Ds	MDR 5-10 DU/AC
110-050-054-000	226.5826	TPZ	FOREST 40-640 AC MIN
110-081-014-000	45.7632	FOR-B-X 160 AC MIN, TPZ, O	FOREST 40-640 AC MIN, OS, HDR 10-15 DU/AC
110-030-022-000	70.2936	TPZ, O	FOREST 40-640 AC MIN, OS
110-081-028-000	22.3347	RESIDENTIAL	FOREST 40-640 AC MIN, LDR 1-5 DU/AC
110-010-030-000	102.2126	O	OS
110-050-026-000	34.4523	TPZ	PLACER CO. GP
110-081-011-000	6.5943	RM PD=15	HDR 10-15 DU/AC
080-270-058-000	0.6690	O	OS
110-081-009-000	1.4819	RS PD=3	MDR 5-10 DU/AC
110-081-008-000	3.8007	O	OS
110-081-010-000	6.0042	RM PD=15, O, FOR-B-X 160 AC MIN	FOREST 40-640 AC MIN
110-081-007-000	0.9345	RS PD=3	MDR 5-10 DU/AC
110-081-026-000	1.7638	FOR-B-X 160 AC MIN	FOREST 40-640 AC MIN
110-081-027-000	29.6133	FOR-B-X 160 AC MIN	FOREST 40-640 AC MIN
110-081-006-000	4.2706	FOR-B-X 160 AC MIN	FOREST 40-640 AC MIN
110-081-004-000	11.5637	RS PD=3, O, FOR-B-X 160 AC MIN	MDR 5-10 DU/AC, OS, FOREST 40-640 AC MIN
110-030-001-000	472.6349	W, O	OS, WATER
080-270-057-000	4.4735	O	OS
110-081-001-000	3.1949	RES-Ds	TOURIST/RESORT COMMERCIAL

Table 1
Zoning and Land Use Designations for Parcels Crossed by Trail Alignment

APN	Size (Ac.)	Zoning	Land Use Designation
110-030-069-000	229.7506	RES-UP-Ds, FOR-B-X 160 AC MIN, RS-B-43, O	OS, FOREST 40-640 AC MIN, LDR 1-5 DU/AC, TOURIST/RESORT COMMERCIAL
110-010-009-000	114.3029	W, O	OS, WATER
080-270-057-000	1.4927	O	OS
080-270-025-000	242.2512	O, OP-Ds	OS, OFFICE PROFESSIONAL, LDR 1-5 DU/AC, MDR 5-10 DU/AC
110-100-001-000	2.4881	RS PD=3	MDR 5-10 DU/AC
110-081-021-000	41.0396	FOR-B-X 160 AC MIN, RES-Ds PD=15	FOREST 40-640 AC MIN, TOURIST/RESORT COMMERCIAL
110-010-020-000	6.2119	O	OS
110-010-019-510	0.7947	O	OS
110-010-016-000	3.8288	O	OS
110-050-007-000	11.2419	TPZ	FOREST 40-640 AC MIN
110-081-016-000	8.8138	TPZ	FOREST 40-640 AC MIN
110-030-067-000	156.5722	FOR-B-X 160 AC MIN, RS	LDR 1-5 DU/AC, FOREST 40-640 AC MIN
110-400-002-000	17.5816	RM-Ds PD=5.8, RES-Ds PD=15	MDR 5-10 DU/AC, TOURIST/RESORT COMMERCIAL
110-050-058-000	117.1763	FOR, RM-B-X-Ds 20 AC MIN PD=5.8, FOR-B-X 160 AC MIN	MDR 5-10 DU/AC, FOREST 40-640 AC MIN
110-050-006-000	437.9576	TPZ	FOREST 40-640 AC MIN
110-081-017-000	1.8409	FOR-B-X 160 AC MIN	FOREST 40-640 AC MIN
110-400-005-000	28.3528	FOR-B-X 160 AC MIN, RES-UP-Ds, RM-B-X-Ds 20 AC MIN PD=5.8	FOREST 40-640 AC MIN, TOURIST/RESORT COMMERCIAL, MDR 5-10 DU/AC
110-250-010-000	1.9241	RES-Ds PD=15	TOURIST/RESORT COMMERCIAL
110-250-003-000	0.2663	RES-Ds PD=15	TOURIST/RESORT COMMERCIAL

Zoning Designation Acronym Definitions:	Land Use Designation Acronym Definitions:
FOR = Forestry	OS = Open Space
	FOREST 40-640 AC MIN = Forestry, minimum

<table>
<tr><th colspan="4">Table 1
Zoning and Land Use Designations for
Parcels Crossed by Trail Alignment</th></tr>
<tr><th>APN</th><th>Size (Ac.)</th><th>Zoning</th><th>Land Use Designation</th></tr>
<tr><td colspan="3">B-X = Building Site Minimum
O = Open Space
W = Water
TPZ = Timber Production Zone
RS = Residential Single-Family
RM = Residential Multi-Family
RES = Residential
PD = Planned Development
Ds = Design Review
UP = Use Permit Required
OP = Office Professional</td><td>parcel sizes between 40 and 640 acres
LDR = Low Density Residential
MDR = Medium Density Residential
DU/AC = Dwelling Units per Acre</td></tr>
</table>

Trail Construction Techniques

Both hand and mechanical construction techniques would be used to build the proposed trail and to build ancillary features such as retaining walls, creek fords, scenic bulb outs, and bridges.

Vegetation removal adjacent to the paved trail section and shoulders would be minimized to the extent possible; however, additional vegetation removal would be required in areas where vegetation would limit safe lines of sight for trail users. The trail corridor would be cleared of vegetation to a height of 10 feet to accommodate bicycle use, and would require trees to be removed from within the alignment. To the extent possible, larger trees adjacent to the trail alignment would be retained. During trail clearing, limbs would be cut flush with the tree trunk. All cut vegetation would be chipped and broadcast, or lopped and scattered, within the project area.

It is estimated that construction of Phase 2 (Segments 2A and 2B) would occur between September and November 2011. Construction of Phase 1 is planned for May to November of 2012. Except for the specific areas under construction, public areas around the site would remain open during construction, where possible, subject to public health and safety considerations. Restricted areas would be secured or fenced to deter unauthorized entry. Equipment used in trail construction, road removal, revegetation, and boardwalk installation will include the following: SWECO trail dozer (small bulldozer), rubber-tired backhoes, motorized wheelbarrows, hand operated compactors, hand-held power augers, small front-end loader, small tracker, hand-held power tools and hand tools (e.g. Pulaskis, Mcleods, shovels, hammers, saws). Staging areas for this project would be located within areas that are proposed to be disturbed by trails construction, existing disturbed areas, or paved areas as may be available. Work would generally be performed between the hours of 7:00 a.m. and 6:00 p.m., Monday through Saturday.

The tread width of the proposed trail alignment (i.e., the actual surface on which trail users actively place feet and wheels) would generally be ten feet, but may vary as needed based on geologic and safety considerations. Shoulders on each side of the trail would generally be two feet wide. Full-bench construction techniques would be used, meaning that soil generated by excavation would not be considered part of the tread width. The trail tread would be excavated using a SWECO trail dozer, mini excavator, hand construction, and/or other machinery capable of conforming to the dimensional requirements of the trail. Dips and undulations in the design would follow the natural drainage patterns to facilitate effective surface flow of water off the trail tread.

Creek Crossing and Drainage Features

No creek crossings would occur within Segment 1. Segment 2A would cross Martis Creek and two stream tributaries to Martis Creek. Bridges or raised boardwalks would be used for each crossing within Segment 2A. Based on the preliminary alignments for Segments 3E and 4, it is expected that each of these segments would include one crossing of West Martis Creek and may include crossings of unnamed drainageways. The Segment 4 crossing of West Martis Creek would occur south of Sawmill Flat. The trail in this area would use the existing roadway alignment and the existing creek crossing.

Best Management Practices for Prevention of Erosion and Siltation

Northstar CSD will implement a storm water pollution prevention plan (SWPPP) to minimize potential impacts from soil transportation, erosion, and siltation during trail construction. The SWPPP will be prepared in accordance with Lahontan Regional Water Quality Control Board (RWQCB) procedures. The SWPPP will provide the plans and specifications for best management practices intended to prevent and control erosion and siltation to the extent feasible.

Interpretative Program

As the trail will pass through an area rich in cultural, biological and scenic resources, opportunities will be available for the inclusion of interpretive panels and displays, combined with seating at overlooks and rest areas. These will be developed through the design process working closely with property owners, the Corps, the Washoe Tribe, and local historians and residents. Interpretive design features could include self-guided informational signage to inform area visitors of natural, cultural, and physical features encountered along the proposed trail alignment. Final design elements of the interpretive program have not been determined.

Public Access

Primary access to the northern section of the trail would be from existing trails within the Town of Truckee, residential and commercial areas in Truckee and Northstar, and the existing parking lot for the Martis Creek Wildlife Viewing Area. Access to the southern segments of the trail would be from trails and roadways in the Village at Northstar and from the existing paved road known as the Fibreboard Freeway. No improvements to these existing access points are proposed.

Signs, Fences, and Gates; Control of Access to Private Property

Final signage design has not been determined, but signage would be in accordance with Caltrans Highway Design Manual Section 1000 and would likely incorporate a local design theme.

The trail is proposed to accommodate pedestrians, bicyclists, and other non-motorized transportation. The trail would intersect Schaffer Mill Road at SR 267 and would intersect Northstar Drive near the Northstar Village. Walk-throughs or stiles would be used at these locations to prohibit motorized use of the trail. Emergency vehicle access to the trail system would be accommodated by removable bollards.

The first segment of the trail would cross through private property in some locations. Placer County and the Northstar CSD have obtained access easements from the property owners allowing the trail use. Access to the private property from the trail would be prohibited by fencing along both sides of the trail. Fencing would be of an open design (such as split-rail) to allow for wildlife movement.

Construction Schedule

As noted above, the Northstar CSD currently proposes to construct Segments 1 and 2. Construction is expected to occur in 2011 and 2012. Phase 1 construction (Segment 2B) would begin in September of 2011 and continue until the end of the construction season in October. Phase 2 construction (Segment 1 and 2A) would begin in May of 2012 and extend through the end of October. Due to the short construction season in the area, construction may occur throughout the week (including weekends) and for extended work days (longer than seven or eight hours each day). Construction periods and activities may be limited in biologically and culturally sensitive areas as dictated by the results of surveys and mitigation measures identified by the EIR.

Segments 3E and 4 would be constructed at a future date, when funding for these segments becomes available. Construction periods for these segments would be similar to the construction periods described for Segments 1 and 2.

Long-Term Maintenance and Management

The Northstar CSD would be responsible for long-term maintenance of the trail. Maintenance activities including sweeping, crack sealing, surface restoration, vegetation control, and removal of slough would be performed by Northstar CSD staff or volunteers, and maintenance would occur annually or as needed. Additional maintenance may be required as a result of weather-related events (e.g., removal of downed trees and slide removal), routine wear from trail use, and acts of vandalism. Depending on the bridge materials used (i.e., wood, steel, or fiberglass) the bridges would require routine maintenance about every eight to ten years.

Disturbed grading areas would be revegetated where cut-slopes are required. Rock rip/rap areas would have pockets of vegetation to provide a more natural appearance to these bank stabilization features.

PROJECT OBJECTIVES

Objectives represent the overarching goals and purpose of a proposed project. The Northstar CSD has developed the following objectives for the proposed Martis Valley Regional Trail project.

- Provide a convenient, safe and accessible non-motorized connection between the Town of Truckee and the North Shore of Lake Tahoe.

- Expand the community, recreational, and transportation opportunities available in Martis Valley.
- Expand and complement existing and planned regional trails; facilitate connections to adjacent residential areas as well as existing and planned trail systems and parking and transit centers throughout the area.
- Provide safe passage for all users, avoiding interface with automobiles to the greatest extent possible.
- Provide a trail that is accessible to the widest variety of potential users during all seasons of the year.
- Ensure respect and protection for scenic, natural, and cultural resources in the area during trail construction and use.
- Highlight the natural, cultural and social context of the region through interpretive opportunities.
- Provide an alternative to automobile transportation, creating a continuous route between regional commercial centers.

ENTITLEMENTS AND REQUIRED APPROVALS

Table 2 lists the entitlements, permits, and approvals required from the Northstar CSD and from other Responsible Agencies for the proposed project. Each entitlement and approval is described following the table.

Table 2
Required Approvals/Permits for Martis Valley Trail

Required Permit	Responsible Agency
Trail Authorization	Northstar CSD
Memorandum of Understanding (MOU) regarding trail alignment through Corps' property	U.S. Army Corps of Engineers
Clean Water Act Section 404 Permit	U.S. Army Corps of Engineers
Water Quality Certification	Lahontan Regional Water Quality Control Board
Federal Endangered Species Act Section 7 Consultation	U.S. Fish and Wildlife Service
National Historic Preservation Act Section 106 Consultation	State Historic Preservation Officer
Streambed Alteration Agreement	California Department of Fish and Game
Minor Use Permit	Placer County

Trail Authorization. The Northstar CSD Board of Directors must authorize construction and maintenance of the trail.

Corps MOU: The proposed Martis Valley Regional Trail would cross lands owned and managed by the Corps. For Northstar CSD to construct and operate a trail through Corps' lands, the CSD and Corps would need to establish an MOU identifying the responsibilities of each party regarding access and trail maintenance.

Clean Water Act Section 404: The Corps regulates the placement of fill or dredged material that affects waters of the United States, which include streams and wetlands. The Corps regulates these activities under authority granted through Section 404 of the Clean Water Act. The project site includes wetland resources under the jurisdiction of the Corps that may be impacted by trail crossings. Any discharge of dredged or fill materials to wetlands would require permitting pursuant to Section 401 of the federal Clean Water Act.

Water Quality Certification: Because approval and implementation of the proposed project has the potential to affect wetlands or other waters of the U.S., the Lahontan RWQCB would need to provide water quality certification of the project in compliance with Section 401 of the Clean Water Act. In providing water quality certification, the RWQCB would review the Corps' permit conditions of approval and may require the project to implement additional water quality protection measures.

Federal Endangered Species Act Section 7 Consultation: When a project may affect federally-listed endangered species and requires Corps' approval, the Corps will consult with the U.S. Fish and Wildlife Service to ensure that appropriate mitigation measures are incorporated in the project to avoid impacts to federally-listed endangered species.

National Historic Preservation Act Section 106 Consultation: When a project requires Corps' approval, the Corps must ensure that the project will not substantially affect historic or archeological resources. The Corps will consult with the State Historic Preservation Officer to ensure that appropriate mitigation measures are incorporated in the project to avoid such impacts.

Streambed Alteration Agreement: The California Department of Fish and Game must approve activities that may alter an area within a streambed or stream zone pursuant to Section 1600 et seq of the California Fish and Game Code.

Minor Use Permit: The trail crosses land within unincorporated Placer County, subject to the Martis Valley Community Plan. Based on the land use and zoning designations of this land, the Martis Valley Community Plan requires that Placer County issue a Minor Use Permit to allow establishment of recreational land uses in this area.

ENVIRONMENTAL FACTORS POTENTIALLY AFFECTED:

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a "Potentially Significant Impact" as indicated by the checklist on the following pages.

☐	Aesthetics	☐	Agriculture and Forestry Resources	☐	Air Quality
☒	Biological Resources	☒	Cultural Resources	☐	Geology/Soils
☐	Greenhouse Gas Emissions	☐	Hazards& Hazardous Materials	☒	Hydrology/Water Quality
☐	Land Use/Planning	☐	Mineral Resources	☐	Noise
☐	Population / Housing	☐	Public Services	☐	Recreation
☐	Transportation/Traffic	☐	Utilities / Service Systems	☐	Mandatory Findings of Significance
				☐	None with Mitigation

DETERMINATION: (To be completed by the Lead Agency)

On the basis of this initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

☐ I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☒ I find that the proposed project MAY have a "potentially significant impact" or "potentially significant unless mitigated" impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment, because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR or NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Signature [signature] Date 12/16/10

Printed Name Mike Staudenmayer For: Northstar Community Services District

EVALUATION OF ENVIRONMENTAL IMPACTS:

I. AESTHETICS – Would the project:	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Have a substantial adverse effect on a scenic vista?	☐	☒	☐	☐
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☒	☐	☐
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☒	☐
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☒	☐

A visual impact analysis was prepared by North Fork Associates to describe the existing visual characteristics of the project area and evaluate visual changes that would be caused by the proposed trail (NFA 2009). The analysis evaluated physical changes that would occur, considering both natural and constructed features, and considered the project in the context of planning guidance documents applicable to the project area, including the *Martis Valley Community Plan* (MVCP), *Placer County General Plan*, and the 1977 *Martis Creek Lake Master Plan*. Policy 4.C.1 of the MVCP designates SR 267, Schaffer Mill Road, and Northstar Drive as scenic routes and designates the Wildlife Viewing Area as a Scenic Overlook.

Important natural features identified by the analysis include the flat expanse of Martis Valley and the coniferous forest, sagebrush scrub, wet meadow, and riparian vegetation communities that occupy the valley and surrounding slopes. Constructed features that typify the area include SR 267, office/commercial development in the vicinity of Truckee-Tahoe Airport Road and Soaring Way, the Truckee-Tahoe Airport, recreational facilities and trails associated with Martis Creek Lake and Martis Creek Wildlife Viewing Area (portions of the Tomkins Memorial Trail system), Lahontan Golf Club and residential development, and the Northstar Community (including Northstar at Tahoe golf course, residential development, and public facilities).

a. Section VII "Recreation and Trails" of the MVCP identifies the Wildlife Viewing Area parking lot as a Scenic Overlook. Section I.E "Major Plan Area Findings" of the MVCP identifies the valley as moderately to highly scenic, but states that recreational and other development, if carefully sited, can be accommodated within the valley without significant negative impacts on the visual quality of the valley. Section I.E specifically states that "Any development within the open meadow and sagebrush flats of the Martis Valley visible from Highway 267, must be considered very carefully... Construction of roads and trails within the open valley or even recreational uses could result in substantial visual impacts and such facilities, although permitted, should be carefully sited."

   The 1977 *Martis Creek Lake Master Plan* prepared by the U.S. Army Corps of Engineers identifies portions of the Martis Valley north and south of SR 267 as a wildlife management area and includes resource use objectives for the area. Resource use objectives include preserving the aesthetics of the area for the recreating public.

Primary scenic qualities of the valley cited in the Master Plan include open grassy meadows along Martis Creek and its tributaries, sagebrush covered alluvial terraces, and densely forested hillsides, as well as distant views of "often snow-covered granite peaks."

From the Wildlife Viewing Area scenic overlook, an existing double-track gravel-surfaced trail is clearly visible leading southwest across a meadow area and continuing onto a bench of sagebrush scrub. The trail remains visible until gaining slightly in elevation on a sparsely forested knoll, as shown in Figure 4 Site Photographs. The trail in this location appears as a small dirt and gravel road and is wide enough for motor vehicle access. The light color of the bare soil and gravel surface of the trail contrasts with the appearance of the natural meadow and sagebrush vegetation in the valley and is a visually prominent constructed feature in the landscape. Other single-track portions of the Tompkins Memorial Trail in the valley are visible from SR 267 and the Wildlife Viewing Area.

The proposed trail would follow the alignment of the existing gravel track leading southwest from the Wildlife Viewing Area until the proposed alignment departs from the existing path on the forested knoll, where it would turn south and descend along a deteriorated paved roadway through the former borrow pit area to a proposed new crossing of Martis Creek. The proposed new crossing of Martis Creek and the proposed new trail alignment leading to the crossing area would be screened from view by vegetation and topography and would not be visible from the Wildlife Viewing Area. Segments 3E and 4 would also be screened by vegetation, topography and existing development in the Village at Northstar and would not be visible from the Wildlife Viewing Area.

The primary viewshed from the Wildlife Viewing Area overlook is generally to the southwest, south, and southeast and is characterized by views of the natural valley features of meadow, riparian, conifer, and sagebrush vegetation. From the Wildlife Viewing Area, existing constructed features at the eastern edge of the valley, including the Northstar at Tahoe golf course, homes at the valley edge, the sewer lift station, and powerpoles are in the distance and do not represent prominent landscape features. Recreational use of the valley, in the form of existing trails, is evident in the view from the Wildlife Viewing Area. The proposed trail would replace the existing gravel and soil surfaced path visible from the overlook with a path surfaced with asphalt pavement. The asphalt pavement would have a greater visual contrast with vegetation in the valley. Therefore, the project would increase the visibility of the trail as viewed from the Wildlife Viewing Area and would potentially degrade the scenic quality of the area. Long distance views west to Castle Peak and the Sierra Crest would not be affected by the proposed trail.

To minimize the impact of the constructed trail feature, ***Mitigation Measure AES.1*** requires that natural or earth tone colors be used for the trail surface to reduce the contrast with existing vegetation or soils that characterize the natural meadow and sagebrush visual component of the valley as viewed from the overlook. This would ensure that the contrast in pavement and the addition of this constructed feature would result in a less than significant impact in the view of Martis Valley enjoyed from the Wildlife Viewing Area scenic overlook.

Photo 1 – Looking west across the valley floor from existing Tomkins Memorial Trail approximately 500 feet north of Basque Drive. View is to forested knoll and riparian vegetation in area of proposed new crossing of Martis Creek.

Photo 2 – Example of dense conifer forest along TMT in Northstar Community.

Photo 3 – Looking southeast from existing Tomkins Memorial Trail to area proposed for new crossing of tributary to Martis Creek.

Photo 4 – Looking northeast to area of riparian and meadow area in vicinity of proposed new crossing of Martis Creek. Existing use trail crossing is visible in this photo.

north fork associates

Photo Date: September 20, 2009

Figure 4

Site Photos

Martis Valley Regional Trail

Placer County, California

Construction Phase

Construction phase trail-building activities would temporarily place vehicles and construction equipment, construction materials stockpiles, and construction fencing within the scenic viewsheds identified and discussed above. The presence of construction equipment, materials, and fencing would present a limited, temporary adverse visual impact to the existing view available from the Scenic Overlook and from Highway 267. ***Mitigation Measure AES.2*** requires that construction material staging areas be identified on project plans and placed within existing disturbed areas located, to the extent possible, to screen views of staging areas from the Wildlife Viewing Area and Highway 267. Implementation of ***Mitigation Measure AES.2*** would ensure that temporary construction period effects to scenic viewsheds remain less than significant.

b. The project would result in no impacts to any resources adjacent to or within the viewshed of a state scenic highway. None of the roadways in the vicinity of the proposed trail are designated as state scenic highways. However, Policy 4.C.1 of the MVCP designates SR 267, Schaffer Mill Road, and Northstar Drive as scenic routes.

As shown in Figure 4, the view of the project area for passersby on SR 267 includes development in the vicinity of the airport, Martis Creek Dam to the north, wide expanses of sagebrush and meadow areas with trails on the valley floor and ski runs on forested slopes above the valley, and a golf course and homes at the eastern edge of the valley. Existing portions of the Tompkins Memorial Trail recreational trail system are visible to motorists traveling SR 267, particularly westbound lanes. These trail segments ranging from approximately 3 to 12 feet in width and are located between the entrance to the Wildlife Viewing Area and the sewer lift station building on the south side of SR 267 at the eastern edge of the valley floor. These trails generally appear as light areas of bare soil contrasting with slightly darker surrounding vegetation. The primary view along the SR 267 corridor through Martis Valley is characterized by the prominent natural features of the meadow and sagebrush areas, as well as by development consistent with passive and active recreational pursuits of a resort community.

From SR 267, the proposed trail alignment and surface of the trail along the segment from Schaffer Mill Road to the existing Wildlife Viewing Area would be sporadically visible where the alignment would run parallel to the highway through low sagebrush. Presently, no trail exists within these areas. The proposed trail would also be visible from the highway as it heads southwest from the Wildlife Viewing Area along the alignment of the existing trail, as discussed in *a* above. Trail Segments 3E and 4 would be screened from view from SR 267 by topography and vegetation. These segments pass through heavily forested areas and, as shown on Figure 3, a ridgeline separates most of Segment 4 from SR 267.

The view from Schaffer Mill Road in the vicinity of the proposed trail alignment is generally characterized by meadow and sagebrush areas to the east and southeast, commercial development and residential to the north and northwest, and sparse conifer forest to the northeast. The trail alignment would be visible from northbound

Schaffer Mill Road in several places both west and east of the proposed trail crossing of Schaffer Mill Road at the SR 267 / Schaffer Mill / Truckee-Tahoe Airport Road intersection.

The proposed trail would potentially be most visible as it travels within the stand of trees just east of the intersection and along the sagebrush scrub adjacent to SR 267, shown in Figure 4. In this location, Schaffer Mill Road is at a lower elevation than the proposed trail. Therefore, views of the trail surface would be nearly entirely obscured by surrounding vegetation. In areas where the trail would be visible, it would appear as a linear feature, as it would be viewed in profile, and would not be considered a prominent visual feature of the landscape. The portion of the trail west of the intersection would be lower in elevation than the road, and thus slightly more of the trail surface may be visible from Schaffer Mill Road in this area. However, the view north and northwest from Schaffer Mill Road is dominated by existing commercial and residential development. This area does not contribute to the scenic corridor designation of Schaffer Mill Road. The proposed trail would result in no substantial impact to scenic views from Schaffer Mill Road.

Views from Northstar Drive in the vicinity of the trail alignment are limited by topography and dense conifer forest and are generally characterized by resort and community facilities and short to mid-range views of conifer forest. Development on Big Springs Drive, the Northstar CSD offices, and Northstar Fire Station are all located near the proposed trail alignment. An existing portion of the Tompkins Memorial Trail follows an alignment similar to the proposed alignment in the vicinity of Northstar Drive. Views from Northstar Drive to the existing trail are nearly entirely screened by vegetation and topography; views to the proposed trail would be similarly screened. Impacts of the proposed trail to views from Northstar Drive would be less than significant.

The proposed multi-use trail would be visually consistent with existing resort community and recreational development, including golf courses, resort signage, existing trails, and airport development along the scenic corridors of SR 267, Schaffer Mill Road, and Northstar Drive. However, as discussed in *a* above, use of standard asphalt paving for the trail (rather than the gravel and dirt surfaces used for existing trails) could visually degrade the natural visual landscape component represented by the open meadow and sagebrush area on the valley floor, particularly the view from SR 267.

Mitigation Measure AES.3 requires that natural or earth tone colors be used for the trail surface to reduce the contrast with existing vegetation or soils that characterize the natural sagebrush visual component of the valley as viewed from SR 267, and requires implementation of the Design Review process by Placer County. This would ensure that the proposed paved trail would result in less than significant impacts associated with degrading the view of the valley from SR 267.

During construction periods, fencing, vehicles, materials stockpiles, and other construction related equipment and disturbance, would result in temporary adverse effects to the views enjoyed from Highway 267, Schaffer Mill Road, and the Wildlife Viewing Area. While temporary effects would be less than significant, ***Mitigation Measure AES.3*** requires that construction materials stockpiles and staging areas be located to minimize visibility of these areas from the Wildlife Viewing Area and Highway 267. ***Mitigation Measure AES.4*** further requires that the required Erosion and Sediment Control Plan include revegetation of disturbed areas. These measures would ensure that temporary construction disturbance is minimized to the extent feasible.

c. The proposed trail alignment crosses through four distinct habitat types, including coniferous forest, sagebrush scrub, wet meadow, and riparian. The floor of Martis Valley is characterized by wide and relatively flat meadows associated with Martis Creek and its tributaries. Riparian vegetation, primarily willows, occurs as a distinct feature along the meandering courses of Martis Creek and its tributaries and contrasts in color and relief with adjacent meadow vegetation. Sagebrush scrub vegetation is generally adjacent to and at a slightly higher elevation than meadow vegetation, occurring on flat to gently rolling topography in the vicinity of SR 267. Dense conifer forest occupies higher elevations, dominating the slopes east and south of the valley and the terrain in the vicinity of the Village at Northstar. When under snow cover, the valley is characterized by flat expanses of snow distinctly contrasting with the darker conifer forest on the slopes east and south of the valley floor.

Constructed features in the valley are associated with the Truckee-Tahoe Airport, office/commercial land uses in the vicinity of Truckee-Tahoe Airport Road and Soaring Way, recreational and facilities development associated with Martis Creek Lake and Martis Creek Wildlife Viewing Area, Lahontan Golf Club and residential development, and the Northstar Community (including Northstar at Tahoe golf course, residential development, and public facilities).

SR 267, a heavily traveled two lane highway connecting Interstate 80 to SR 28 in the Lake Tahoe Basin, bisects the valley floor on a slightly elevated west-east alignment and is a prominent constructed landscape feature through the valley. SR 267 also represents the primary viewpoint from which Martis Valley is viewed, as it provides a slightly elevated vantage point to many motorists crossing the valley daily. SR 267 is designated by Placer County as a scenic route.

At the north end of the proposed trail alignment in the vicinity of the Schaffer Mill Road / Truckee-Tahoe Airport Road / SR 267 intersection, dominant constructed landscape features include office/commercial development on the north side of SR 267 where airplane hangars and rows of self-storage buildings are visually prominent. Ski runs in the Lookout Mountain portion of the Northstar ski area are visually prominent as a modified natural feature as linear swaths where trees have been removed. These linear swaths generally appear as an "N" shape when viewed from the valley or SR 267 to the north and are more distinct in winter as snow cover contrasts with the darker conifer forest. While existing unpaved multi-use trails exist on the slopes south of Martis Valley, including in the areas of proposed Segments 3E and 4, they are screened by dense forest and are not visible from the valley floor or SR 267.

In the vicinity of the parking area for the Martis Creek Wildlife Viewing Area, portions of the unpaved multi-use Tompkins Memorial Trail are visible on the south side of SR 267, particularly the section leading southwest from the parking area through a bench of sagebrush scrub habitat, as discussed in *a,* above. Portions of the existing Tompkins Memorial Trail in the vicinity of the crossing of West Martis Creek and running along Middle Martis Creek are also visible from the highway. Due to the speed of travel on SR 267, views of the existing trails are limited in duration. Snow cover obscures these portions of trail during much of winter and into spring. Martis Creek Dam is a visually prominent feature of the landscape north of SR 267, appearing as a level and elevated embankment when not under snow cover. At its present low pool elevation, Martis Creek Lake is not a prominent feature as viewed from SR 267.

When not under snow cover, the north end of the Northstar at Tahoe golf course is a prominent landscape feature at the east side of the valley, as the bright green of the course contrasts with the color of natural vegetation in the valley. Homes situated on the south and east edge of the golf course are visible from the valley and SR 267, but are somewhat screened by mature conifers and are not considered a primary visual component of the landscape. Other constructed landscape features visible in the valley include power poles at the east end of the valley floor, fencing, and a sewer lift station building south of SR 267, just north of the Northstar at Tahoe golf course.

Within the Northstar Community, the constructed landscape is characterized by residential development visually screened by dense conifer forest. Near Big Springs Drive, the Northstar CSD office is visible south and east of the proposed trail alignment and is visually characterized by a parking lot, cleared area, and several smaller buildings. The existing unpaved multi-use trail within the Northstar Community is largely obscured by conifer forest and shrubby vegetation and is not a prominent landscape feature in the vicinity of the Northstar Community or as viewed from Northstar Drive. The existing unpaved multi-use trail is likely visible from several condominium units at the end of Gold Bend Road in the Northstar Community, although vegetation screening would limit the prominence of this feature. In winter the trail surface is covered by snow and is not visible, although use for cross-country skiing or snowshoe recreation may be evident as tracks in the snow.

The project would construct a paved trail ten feet wide with two-foot unpaved shoulders on each side through Martis Valley and to the Northstar Village. As discussed in *a* and *b* above, the visual character of the valley includes commercial, residential, and passive and active recreational development, in addition to natural landscape features. As discussed above, sensitive views of the valley include those available from SR 267 and the Wildlife Viewing Area. From these viewpoints the proposed trail would be most visually prominent along its alignment through the open meadow and sagebrush areas leading southwest away from the Wildlife Viewing Area. The existing visual character and quality of the natural area of the Martis Valley is also observed by occupants of homes along the golf course, golfers, skiers at Northstar, and users of the existing Tompkins Memorial Trail system. Visual impacts to these viewer groups are discussed in the following paragraphs.

As shown in Figure 4 Site Photographs, views west and northwest to the area of the proposed trail alignment are distant from areas on the east side of the valley floor, including residences, the golf course, and portions of the Tomkins Memorial Trail on the east side of the valley. The primary constructed features visible from within the trail system and areas on the east side of the valley floor are the road surface leading off of SR 267 to the Wildlife Viewing Area and the raised alignment of SR 267, although the surface of SR 267 is not visible. Existing trails within the valley are partially to fully screened by topography and vegetation from most viewing areas within and adjacent to the valley. The area of the proposed new crossing of Martis Creek along Segment 2 is obscured by topography and dense vegetation and would not be visually prominent from any primary viewpoints. The proposed new crossing of Martis Creek would place the proposed trail in a location that would screen it from views of and from Lahontan golf course (the existing Tompkins Memorial Trail alignment allows for views directly to and from the trail to a fairway on the golf course).

The proposed new crossing of the perennial stream that is tributary to Martis Creek along Segment 2 would also be well-screened by vegetation and would not be visible except in the immediate vicinity of the crossing. Hillside portions of existing trails are entirely obscured by conifer forest and are not visible from the valley. While some trees would be removed and small retaining walls would be built to construct the trail, it is unlikely that portions of the trail on forested slopes would be visible from the valley floor. The proposed trail would be consistent with existing visual elements associated with recreational and resort uses in and around the valley and would result in less than significant impacts to the existing visual character or quality of the area presently experienced by viewers in and adjacent to the valley.

As shown in Figure 4, views to the existing portions of the Tompkins Memorial Trail within the Northstar Community are nearly entirely obscured by conifers or shrubby vegetation in most places. The proposed alignment would follow a similar alignment to the existing Tompkins Memorial Trail and would travel through dense conifer forest. Similar to the existing trail, the proposed trail would be mostly obscured by understory vegetation and conifer forest. The proposed trail would be visually consistent with other recreational and resort development within the Northstar Community. The proposed trail would result in no substantial impacts to the existing visual character or quality of the area presently experienced by viewers in and around the Northstar Community.

d. No lighting is proposed as part of the trail project. The proposed trail would be constructed using non-reflective materials and finishes for the surface of the pathway and retaining wall surfaces. Any reflective striping used for pathway markings would not result in substantial glare or adversely affect day or nighttime views in the area. Signage would be designed to be consistent with existing signs used for the Tompkins Memorial Trail and would be subject to the County's Design Review process and approval by the Corps of Engineers for portions of the trail on federal lands. Impacts resulting from glare would be less than significant.

Mitigation Measures

Mitigation Measure AES.1: Natural or earth tone surfacing shall be used for the portion of Trail Segment 2 extending from the present location of the Wildlife Viewing Area, southwest to the first crossing of Martis Creek. Surfacing colors shall be selected to minimize contrast with the natural colors of the vegetation and soils of the valley, as determined appropriate by a written recommendation from a landscape architect. Color and materials for surfacing the trail shall be approved by the Northstar CSD and the U.S. Army Corps of Engineers, as well as by the Placer County Design Review Committee.

Mitigation Measure AES.2: Stockpiling of materials onsite shall be minimized during construction. Construction staging areas and stockpile storage locations shall be identified on project plans and located within existing disturbed areas or as close to or within the areas of construction as possible, and shall be located to screen views of staging areas from the Wildlife Viewing Area and Highway 267 to the extent feasible.

Mitigation Measure AES.3: Colored surfacing, as described in Mitigation Measure AES.1 shall be used for Trail Segment 1. Northstar CSD must obtain a use permit from Placer County for the trail. Northstar CSD must also obtain approval for the proposed trail design, fencing, signage, surface colors, and materials from the Placer County Design Review Committee.

Mitigation Measure AES.4: The Erosion and Sediment Control Plan prepared as required to obtain a grading permit shall include measures to revegetate areas disturbed by project construction activities.

II. AGRICULTURE AND FOREST RESOURCES –	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
Would the project:				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☒	☐
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒

a. & b. There is no prime or unique farmland, farmlands of statewide importance, or Williamson Act properties within the proposed trail alignment. Construction and use of the trail will not result in conversion of farmland to non-agricultural use.

c. & d. Portions of Segments 3E and 4 of the proposed trail alignment cross lands zoned by Placer County as TPZ (Timberland Production Zone) and FOR (Forestry). Both zoning designations are intended to facilitate primary land uses related to the growing and harvesting of timber and other forest products, together with public and commercial recreational uses. Rural recreational uses are permitted on these lands subject to issuance of a Minor Use Permit by Placer County. The project would obtain a Minor Use Permit as required for the proposed trail by applicable zoning and would not require a rezone. The proposed trail would result in no significant conflicts with timber production, loss of forestland, or conversion of forestland to non-forest use.

e. The trail is proposed in an area that supports existing public trails. The proposed project would not result in conversion of farmland or forest land to non-agriculture or non-forest uses.

Mitigation Measures

No mitigation measures are necessary.

III. AIR QUALITY – *Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations.* Would the project:	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☒	☐	☐
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☒	☐	☐
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	☒	☐	☐
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☒	☐	☐
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☒	☐

The project site is located in the Mountain Counties Air Basin, and is under the jurisdiction of the Placer County Air Pollution Control District (APCD). Air quality in the project vicinity is generally good. The region is in non-attainment for State and federal ozone standards, and the State particulate matter (PM10) standard, but is unclassified or is in attainment for all other state and federal air quality standards. The Placer County APCD is the agency responsible for guiding the region to compliance with ozone standards, focusing on reducing emissions of ROG and NO_X, as these pollutants are the precursors to ozone; and reducing dust emissions to bring the area into attainment for particulate matter standards.

Potential sensitive receptors in the vicinity of the proposed project include residential uses in the project vicinity. Placer County APCD Rule 228 applies to construction activities and requires that no visible dust emissions carry to offsite areas and requires implementation of minimum dust control measures specified in Section 400. Section 400 dust control requirements are typically included on project plans and specifications to ensure implementation. No ultramafic soils, or soils with potential to contain asbestos, are mapped near the project site (NRCS, 2009).

a. - c. To assess the project's potential to obstruct or interfere with air quality attainment goals and potential to contribute to violations of air quality standards, air pollutant emissions associated with construction and operation of the proposed project were modeled using the URBEMIS modeling program (Version 9.2.4). Phase 1 of the proposed project is scheduled for late 2012 and would construct Segment 1 of the proposed trail, which consists of 9,308 linear feet (±1.76 miles) of paved trail. Phase 2 of the proposed project is scheduled for 2011 and would construct Segment 2A and Segment 2B of the proposed trail, consisting of 19,100 linear feet (±3.5 miles) of trail. Segments 3E and 4 would be constructed as funding is obtained, and no anticipated construction dates for these phases have been established. Segment 3E includes 4,398 linear feet (0.83 miles) and Segment 4 includes 16,451 linear feet (3.1 miles). As these lengths are less than the lengths for Segments 1 and 2, air pollutant emissions from construction of Segments 3E and 4 are expected to be the same or less than the emissions from construction of Segments 1 and 2.

Modeling of the construction emissions for Segments 1 and 2 assumed a disturbance width along the corridor of 20 feet and a total paved width of ten feet. Since the proposed trail width is 14 feet, including 2-foot unpaved shoulders on each side, assuming a disturbance with of 20 feet provides a conservative estimate of project emissions. Paving was assumed to be asphalt for the entire length of Phase 1 and 2. Modeling assumed that grading would disturb up to one acre per day, or the equivalent of 0.4 mile of trail. Table 1 provides a summary of the results of modeling for unmitigated air pollutant emissions.

Table 1
Unmitigated Air Pollutant Emissions (pounds per day)

Emission Season and Source	Air Contaminant					
	ROG	NOX	CO	SO2	PM10	PM2.5
Phase 1 - 2011 Construction (maximum)	2.92	22.05	13.19	0.00	21.08	5.17
Phase 2 - 2012 Construction (maximum)	2.89	23.55	13.40	0.00	21.18	5.26

The Placer County APCD uses the air pollutant emission thresholds established in the New Source Review Rule to evaluate stationary and area source emissions. These thresholds, listed in Table 2, serve as air quality standards in the evaluation of air quality impacts associated with proposed development projects. If a project's emissions exceed these thresholds, then the project's impacts are potentially significant and implementation of mitigation measures is required.

Since the proposed trail project is expected to reduce vehicle trips over the existing condition, as it would be expected to replace some vehicle trips with bicycle trips, no emissions are expected to result from use of the trail. Operation of the trail would have less than significant impacts related to obstructing implementation of the applicable air quality plan, violating air quality standards, and contributing to cumulatively significant increases in air pollutants.

Table 2
Placer County APCD Thresholds (pounds per day)

Air Contaminant	Thresholds for Implementation of Mitigation Measures	Significance Thresholds
ROG	10	82
NOX	10	82
CO	550	550
SO2	10	82
PM $_{(10,\ 2.5)}$	82	82

The project's construction emissions would exceed the APCD Thresholds for Implementation of Mitigation Measures for NOX during construction in both 2011 and 2012. The project's construction air pollutant emissions would result primarily from diesel-powered grading and paving equipment, trucks hauling building supplies, worker vehicle exhaust, and surfacing activities. With implementation of *Mitigation Measures AIR.1* through *AIR.3*, impacts related to construction activities would be reduced to a less than significant level. Mitigation measures provided for construction period impacts are consistent with measures recommended by Placer County APCD to ensure that project construction emissions would not obstruct implementation of the applicable air quality plan, result in violations of air quality standards, or contribute to cumulatively significant increases in air pollutants. As noted above, construction activities would be required to comply with Placer County APCD Rule 228, which requires that no visible dust emissions carry to offsite areas and requires implementation of minimum dust control measures specified in Rule 228 Section 400. While estimates of project emissions indicate that project construction emissions would not exceed Placer County APCD's Thresholds for Implementation of Mitigation Measures for PM_{10}, compliance with Rule 228 as required by *Mitigation Measure AIR.1*, would reduce dust particulate emissions from the site during construction.

d. Sensitive receptors for air pollutant emissions include residential areas and health care facilities. Residents of the Town of Truckee near the western terminus of the proposed trail and residents within the Village at Northstar proximate to Segment 2A would be exposed to air pollutant emissions during construction of the trail.

As discussed above, operation of the proposed trail would not contribute to non-attainment status for any State or federal criteria pollutants. Construction activities of the proposed project would generate air pollutant emissions that exceed the APCD Thresholds for Implementation of Mitigation Measures. *Mitigation Measures AIR.1* through *AIR.3* include measures recommended by Placer County APCD to reduce construction phase air pollutant emissions to a less-than-significant level. Since construction emissions would be temporary, would be reduced with implementation of *Mitigation Measures AIR.1* through *AIR.3*, and would be subject to APCD rules applicable to control of fugitive dust and visible emissions, impacts related to exposure of sensitive receptors to emissions from construction activities would be less than significant.

e. The proposed trail project does not include any components that would generate objectionable odors. Construction activities associated with the proposed project, such as paving and striping, and diesel equipment operation could temporarily generate objectionable odors detectable in the immediate vicinity of project work. Since odor-generating construction activities would be temporary, and would only be detectable in the immediate vicinity of the work area, impacts from temporary project-related odors would be less than significant.

Mitigation Measures

Mitigation Measure AIR.1: Prior to approval of Grading/Improvement Plans, Northstar CSD shall submit a Construction Emission / Dust Control Plan to the Placer County APCD. Northstar CSD shall provide written evidence, provided by APCD, to Placer County that the plan has been submitted to APCD. It is the responsibility of Northstar CSD to deliver the approved plan to Placer County. Northstar CSD shall not break ground prior to receiving APCD approval of the Construction Emission/Dust Control Plan, and delivering that approval to Placer County

Mitigation Measure AIR.2: Prior to approval of the Grading Plan, the applicant shall provide a written calculation to the Placer County APCD for approval by the District demonstrating that the heavy-duty (> 50 horsepower) off-road vehicles to be used in the construction project, including owned, leased and subcontractor vehicles, will achieve a project-wide fleet average 20 percent NOX reduction and 45 percent particulate reduction as required by CARB. Acceptable options for reducing emissions may include use of late model engines, low-emission diesel products, alternative fuels, engine retrofit technology, after-treatment products, and/or other options as they become available.

Mitigation Measure AIR.3: In order to control dust, operational watering trucks shall be onsite during construction hours. In addition, dry, mechanical sweeping is prohibited. Watering of a construction site shall be carried out in compliance with all pertinent APCD rules. All disturbed areas and unpaved haul routes shall be watered with adequate frequency to maintain soil moisture (a minimum of twice daily).

Mitigation Measure AIR.4: Any soil or materials transported onsite or offsite shall be covered or a minimum of two feet of freeboard on all haul trucks shall be maintained.

Mitigation Measure AIR.5: All soil stockpile areas shall be covered.

Mitigation Measure AIR.6: Northstar CSD shall ensure that at completion of each construction phase, all graded areas are revegetated or surfaced to minimize soil erosion.

Mitigation Measure AIR.7: Northstar CSD shall ensure that the Grading Plan for each construction phase includes the following notes:

a. The prime contractor shall submit to the District a comprehensive inventory (i.e., make, model, year, emission rating) of all the heavy-duty off-road equipment (50 horsepower or greater) that will be used an aggregate of 40 or more hours for the construction project. If any new equipment is added after submission of the inventory, the prime contractor shall contact APCD prior to the new equipment being utilized. At least three business days prior to the use of subject heavy-duty off-road equipment, the project representative shall provide the District with the anticipated construction timeline including start date, and name and phone number of the property owner, project manager, and onsite foreman.

b. Construction equipment exhaust emissions shall not exceed Placer County APCD Rule 202 Visible Emission limitations. Operators of vehicles and equipment found to exceed opacity limits are to be immediately notified by APCD to cease operations and the equipment must be repaired within 72 hours.

c. The prime contractor shall suspend all grading operations when wind speeds (including instantaneous gusts) are excessive and dust is impacting adjacent properties.

d. The contractor shall apply water or use another method to control dust impacts offsite. Grading vehicles and equipment are expected to remain onsite for the duration of the project. Any vehicle or equipment leaving the site shall be cleaned to prevent dust, silt, mud, and dirt from being released or tracked offsite.

e. In order to minimize wind drive dust during grading, the prime contractor shall apply methods such as surface stabilization, establishment of a vegetative cover, paving, or another method approved by Placer County.

f. During grading, no open burning of removed vegetation shall be allowed unless permitted by Placer County APCD. All removed vegetative material shall be either chipped on site or taken to an appropriate recycling site, or if a site is not available, a licensed disposal site.

g. During grading, traffic speeds on all unpaved surfaces shall be limited to 15 miles per hour or less.

h. During grading, the contractor shall minimize idling time to a maximum of 5 minutes for all diesel powered equipment.

i. During grading, the contractor shall utilize existing power sources (e.g., power poles) or clean fuel (i.e., gasoline, biodiesel, natural gas) generators rather than temporary diesel power generators.

j. The prime contractor shall be responsible for keeping adjacent public thoroughfares clean of silt, dirt, mud, and debris, and shall "wet broom" the streets (or use another method to control dust as approved by the individual jurisdiction) if silt, dirt, mud or debris is carried over to adjacent public thoroughfares.

IV. BIOLOGICAL RESOURCES – Would the project:	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☒	☐	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Game or U.S. Fish and Wildlife Service?	☒	☐	☐	☐
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☒	☐	☐	☐
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☒	☐	☐	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☒	☐	☐	☐
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

a. – e. The proposed trail alignment crosses through four distinct habitat types, including coniferous forest, sagebrush scrub, wet meadow, and riparian. Construction of the proposed trail could result in significant impacts to special-status species and sensitive habitats (including wetlands). Items a through e will be addressed in the EIR.

f. The trail corridor is not located within an area with an adopted Habitat Conservation Plan, Natural Community Conservation Plan or other habitat conservation plan and therefore no conflict with adopted plans is expected.

Mitigation Measures

Mitigation measures for impacts to biological resources will be identified in the EIR.

V. CULTURAL RESOURCES – Would the project:	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	☒	☐	☐	☐
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☒	☐	☐	☐
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☒	☐	☐
d) Disturb any human remains, including those interred outside of formal cemeteries?	☒	☐	☐	☐

a., b., & d. The proposed trail alignment crosses through the Martis Valley, which is known to support historic and archeological resources. The area is located within territory commonly attributed to the Washoe people. The area was also heavily affected by historic activities, including emigrant travel into California and logging. Field assessments in the project area have identified several historic period isolates and prehistoric sites. Construction of the proposed trail could result in significant impacts to cultural resources in the Martis Valley. Items a through d will be addressed in the EIR.

c. No paleontological resources or unique geologic features are known from within the project area. However, subsurface paleontological resources or unique geologic features could be discovered during excavation conducted for the proposed project. *Mitigation Measure CUL.1* would ensure that impacts to such resources discovered during excavation activities would be less than significant.

Mitigation Measures

Mitigation Measure CUL.1: Should any evidence of paleontological resources (e.g. fossils) be encountered during grading or excavation either onsite or offsite as a result of project construction, work shall be suspended within 100 feet of the find, and the Northstar Community Services District shall be immediately notified. At that time, the Northstar Community Services District shall coordinate any necessary investigation of the site with a qualified paleontologist as needed to assess the resource and provide management recommendations, such as avoiding the resource and/or excavating and recording data on the resource. The contractor shall implement any measures deemed necessary by the Northstar Community Services District for the protection of the paleontological resource.

Additional Measures: Additional mitigation measures applicable to items *a, b,* and *d* will be identified in the EIR.

VI. GEOLOGY AND SOILS – Would the project:	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☒	☐
ii) Strong seismic ground shaking?	☐	☐	☒	☐
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
iv) Landslides?	☐	☐	☒	☐
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☒	☐
d) Be located on expansive soil, as defined in Table18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☒	☐
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	☒

According to the geologic map, the site is underlain by Alluvium (lake, playa, and terrace deposits), Quaternary volcanic flow rocks, and Tertiary volcanic flow rocks (California Department of Conservation 1987). Sixteen soil units have been mapped within a 50-foot corridor surrounding the proposed trail alignment (USDA, NRCS 2007). Soil types identified within the study corridor include the following:

- AQB Aquolls and Borolls, 0 to 5 percent slopes
- EUB Euer-Martis variant complex, 2 to 15 percent slopes
- EUE Euer-Martis variant complex, 5 to 30 percent slopes

- FTE Fugawee-Tahoma complex, 2 to 30 percent slopes
- FUC Kyburz-Trojan-Sierraville complex, 2 to 9 percent slopes
- JSE Jorge-Cryumbrepts, wet-Tahoma complex, 2 to 30 percent slopes
- JTE Jorge-Tahoma complex, 2 to 30 percent slopes
- JTF Jorge very stony sandy loam, 30 to 50 percent slopes
- JUG Jorge-Rubble land complex, 30 to 75 percent slopes
- JWF Jorge-Waca-Tahoma complex, 30 to 50 percent slopes
- MEB Martis-Euer variant complex, 2 to 5 percent slopes
- PX Pits, borrow
- STG Rubble land-Jorge complex, 30 to 75 percent slopes
- UME Umpa stony sandy loam, 2 to 30 percent slopes
- UMF Umpa stony sandy loam, 30 to 50 percent slopes
- UOE Umpa-Rock outcrop complex, 2 to 30 percent slopes

Characteristics of these soil types are varied. Most of these soil types are well-drained, while the Aquolls soils are often saturated for much of the year. Base material and permeability varies among the soil types.

a. The project site is not located within an Alquist-Priolo Earthquake Fault Zone as designated by the California Geological Survey (CGS 2000). However, the trail project could be subject to seismic events generated on faults located in the project region including the Mohawk Valley Fault, the southern section of which lies approximately 25 miles to the northwest, and the Dog Valley Fault approximately 20 miles north of the project area. Other faults in the area include the North Tahoe fault and East Tahoe fault zone in Lake Tahoe, and the Mount Rose fault zone approximately 25 miles southeast of the site. Seismic events have occurred in the area in 1966, 1998, and 2004 (Town of Truckee 2006; USGS 2010). Retaining walls and other structures included in trail construction must comply with applicable construction standards and building codes, which would ensure that design, site preparation, and construction of the proposed trail is appropriate for local seismic and geologic/soil conditions as determined by geotechnical sampling and analysis of conditions in the project area. This would ensure that risks associated with seismic-related activity such as rupture of a fault, strong ground shaking, and ground failure, or associated with potential landslide would be less than significant. The proposed trail would result in less than significant risks to loss of life or property due to seismic events or landslides.

b. Ground disturbance that occurs during construction of each trail segment could result in a temporary increase in erosion. Grading Permits issued by Placer County to authorize construction activities would require that Best Management Practices (BMPs) for erosion control be implemented in accordance with Placer County Resource Conservation District's *Erosion and Sediment Control Guidelines for Developing Areas of the Sierra Foothills and Mountains*. Additionally, construction activities would be subject to the requirements of the National Pollutant Discharge Elimination System (NPDES) because construction of each segment would require disturbance of an area of at least one acre. (The shortest segment is Segment 3E which is 4,398 linear feet. With a disturbance width of approximately 20 feet, the construction area for this segment would be approximately two acres). Obtaining an NPDES permit requires implementation of a Stormwater Pollution Prevention Plan (SWPPP), which must be approved by the local Regional Water Quality Control Board. The SWPPP must include BMPs for slope stabilization, dust control, and temporary and permanent erosion control devices. Implementation of required erosion control measures and BMPs would ensure that impacts from erosion and sedimentation would remain less than significant.

c. & d. The proposed trail alignment would be constructed through several different mapped soil types, including those identified above.

As discussed in *a,* above, the project would be constructed in compliance with local and State construction standards and building codes, which would ensure that design, site preparation, and construction of the proposed trail is appropriate for local seismic and geologic/soil conditions determined through geotechnical sampling and analysis of conditions in the project area. Compliance with applicable building codes and standards would ensure that the proposed trail project results in no unstable soil or geologic conditions and would not create substantial risks to life or property as a result of expansive soil conditions. Impacts associated with unstable soils or geologic conditions, including expansive soils, would be less than significant.

e. The proposed trail does not include any restrooms or septic systems.

Mitigation Measures

No mitigation measures are necessary.

VII. GREENHOUSE GAS EMISSIONS – Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐
b) Conflict with any applicable plan, policy, or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☐	☒

Significant changes in global climate patterns are associated with global warming, an increase in the average temperature of the atmosphere near the Earth's surface. This has been attributed to accumulation of greenhouse gases (GHGs) in the atmosphere. The most prevalent GHG is carbon dioxide; other GHGs include methane, ozone, water vapor, nitrous oxide, and chlorofluorocarbons. GHGs trap heat in the atmosphere, which in turn heats the surface of the Earth. While the greenhouse effect is a naturally occurring process that aids in maintaining the

Earth's climate, human activities, such as burning fossil fuels and clearing forests, generate additional GHG emissions which contribute to the greenhouse effect and result in increased average global temperatures. Global surface temperatures have increased 0.8°C (1.4°F) in the past century, and 0.6°C (1.1°F) in the past three decades. Temperatures are expected to continue to increase as a result of increasing concentrations of GHGs. The increased temperatures are anticipated to lead to modifications in the timing, amount, and form (rain vs. snow) of precipitation; changes in the timing and amount of runoff from storm events and from snowmelt; deterioration of water quality; and elevated sea levels. In turn, these changes could be associated with increased flooding and other weather-related events, increased salinity levels in coastal groundwater basins, changes in water supply availability, and changes in cropping patterns.

In order to reduce GHG emissions and associated climate changes, the State of California adopted the California Global Warming Solutions Act of 2006, widely known as AB 32. This act requires that statewide GHG emissions be reduced to 1990 levels by the year 2020, and requires the California Air Resources Board to adopt rules and regulations that will ensure this reduction target is met. The state has adopted other policies and regulations related to achieving reductions in GHG emissions, such as the Low Carbon Fuel Standard, a bill intended to reduce GHG emissions from motor vehicles, bills related to Land Use Planning, and energy conservation standards.

a. ***Construction GHG Emissions***

GHG emissions during construction of the proposed project would primarily be generated by worker vehicle trips to the site and by emissions from operation of gas and diesel-powered construction equipment. The URBEMIS computer modeling program estimates that construction of the proposed project would generate a maximum of 2,340 pounds per day of carbon dioxide. The URBEMIS modeling also estimates that Phase 2 construction would generate a total of 186 tons of CO_2 emissions during 2011 and that Phase 1 construction would generate a total of 60 tons of CO_2 emissions in 2012. As discussed in Section III Air Quality above, construction dates for Segments 3E and 4 have not been established. Segment 3E is shorter than Segment 1, and Segment 4 is shorter than Segment 2. Greenhouse gas emissions from construction of Segments 3E and 4 are expected to be the same or less than the emissions from construction of Segments 1 and 2. It is expected that the trail project would generate less than 200 tons of greenhouse has emissions in each year during which construction occurs, and a grand total of less than 500 tons of greenhouse gas emissions.

The Placer County APCD has not adopted a threshold of significance for GHG emissions. This analysis applies the GHG emissions threshold adopted by the Bay Area Air Quality Management District (AQMD), which states that GHG emissions of less than 1,100 metric tons would have a less than significant contribution to global climate change. Because the GHG emissions for each construction phase and the cumulative total GHG emissions for all four phases would remain below the Bay Area AQMD threshold, the project would have a less than significant impact.

Operational GHG Emissions

Use of the proposed trail is not expected to generate new GHG emissions.

b. No land use or regulatory agency within the project area has adopted any plans, policies, or regulations with the intent of reducing greenhouse gas emissions. The proposed project would facilitate bicycling between Truckee and Northstar when weather and snow cover conditions allow, and is not expected to generate new motor vehicle trips. The proposed project would therefore have no impact related to inconsistency with State or local plans, policies, or regulations for the reduction of GHG emissions.

Mitigation Measures

No mitigation measures are necessary.

VIII. HAZARDS AND HAZARDOUS MATERIALS – Would the project:	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☐	☒
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☒	☐	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☒	☐
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
h) Expose people or structures to a significant risk of loss, injury, or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☒	☐

a. – c. The proposed project would construct a trail through Martis Valley to Northstar Village and continuing eastward through the Northstar at Tahoe resort to the ridgeline defining the Lake Tahoe Basin, terminating near Sawmill Flat at a paved Forest Service road atop the ridge near a road intersection known locally as the "Four Corners." No schools exist within one-quarter mile of the trail corridor.

Use and maintenance of the proposed trail would not result in the routine transport, use, or disposal of hazardous materials.

Construction activities would include the use of hazardous materials such as paint, hydraulic fluids, fuels, oils, or other materials associated with the operation and maintenance of vehicles and equipment. These materials are generally contained within vessels engineered for safe storage. Large quantities of these materials would not be stored at or transported to the construction site. However, spills, upsets, or other construction-related accidents could result in release of fuel or other hazardous substances into the environment. *Mitigation Measure HAZ.1* identifies measures to avoid spills and reduce the potential for adverse impacts should a spill occur. Implementation of *Mitigation Measure HAZ.1* would reduce risks associated with a release of hazardous materials during construction to a less than significant level.

d. A search of available environmental records conducted by Environmental FirstSearch in September 2009 found no listed hazardous materials sites within the proposed trail alignment. A search of available State databases of hazardous materials sites also found that there are no listed sites within the proposed trail alignment (DTSC, 2010; SWRCB, 2008). The nearest site identified by the records searches conducted is a leaking underground storage tank (LUST) cleanup site associated with the Northstar at Tahoe Gas Station, approximately 400 feet south of the trail alignment along Northstar Drive. The proposed project would result in no impacts related to disturbance of any listed hazardous materials site.

e. & f. Segments of the proposed trail alignment are within land use compatibility zones B1, C, D, and E of the Truckee Tahoe Airport (FALUC, 2004). Zone B1 is the most restrictive of the compatibility zones traversed by the proposed alignment (Zone A is more restrictive but the trail alignment would not traverse any of Zone A). Zone B1 compatibility standards include restrictions on highly noise sensitive land uses (e.g. outdoor theaters), height of structures, residential development densities, and uses that would result in high people-per-acre user densities. Trails are not identified as a prohibited use in any of the compatibility zones traversed by the proposed trail alignment and the proposed trail would not result in high user densities. No private airstrip is within two miles of the project site. Impacts associated with risks related to proximity to a public or private airport would be less than significant.

g. The proposed project could result in temporary traffic delays on Northstar Road for trail construction adjacent to the roadway or to construct trail / roadway intersections, but would result in no long-term change in traffic circulation or vehicular access routes in the project area and would not affect or impair implementation of any adopted emergency response plan or evacuation plan. Construction adjacent to Northstar Road could result in temporary delays of short duration to through traffic during work adjacent to the roadway section, but through access for all vehicles, including emergency vehicles, would be maintained at all times during project construction. The construction contractor would be required to obtain an Encroachment Permit from the County prior to any work within the County right-of-way. The encroachment permit would require that appropriate traffic control be provided to manage circulation in the vicinity of work within the roadway and would require that emergency responders be notified in advance of any lane closures. Temporary traffic controls, including construction delays, lane closures, or temporary rerouting of traffic lanes around construction areas on Northstar Drive would result in a less than significant impact associated with impairment of the implementation of emergency response and evacuation plans.

h. The proposed project, when complete, would introduce no new source of fire ignition that would subject people or structures to an elevated risk from wildfire. Construction activities associated with the project would temporarily introduce potential sources of fire ignition associated with equipment operation and other construction site activities, temporarily increasing the risk of wildfire during construction. However, construction crews would be required to adhere to California Building Code and Fire Code standards for fire prevention during construction activities, which require that fire prevention practices be followed and that basic fire suppression equipment is maintained onsite at all times. Additionally, *Mitigation Measure HAZ.2* requires preparation and implementation of a Fire Safety Plan to further reduce risk of fire. Through compliance with applicable fire safety codes and implementation of *Mitigation Measure HAZ.2,* risks associated with wildfire would be less than significant.

Mitigation Measures

***Mitigation Measure HAZ.1**:* The following measures shall be implemented prior to and during construction.

- All equipment will be inspected by the contractor for leaks immediately prior to the start of construction, and regularly inspected throughout project construction.
- The Storm Water Pollution Prevention Plan (SWPPP) shall contain BMPs for spill prevention.
- A spill kit shall be maintained onsite throughout all construction activities.
- The SWPPP and project plans shall identify construction staging areas and designated areas where equipment refueling, lubrication, and maintenance may occur. Areas designated for refueling, lubrication, and maintenance of equipment shall be at least 50 feet from any spring/seep/wetland/marsh areas and 100 feet from creeks and shall be approved by the Northstar Community Services District.
- In the event of any spill or release of any chemical during construction, the contractor shall immediately notify the Northstar Community Services District.

***Mitigation Measure HAZ.2**:* Prior to commencement of site disturbance for each construction phase, the Project Contractor shall prepare a Fire Safety Plan for construction, which shall include construction best management practices for fire prevention. The plan shall be reviewed and approved by the Northstar Community Services District and the Northstar Fire Department. The plan shall include emergency contact numbers for CAL FIRE and the Northstar Fire Department. The plan shall address appropriate hours of operation, fire safe equipment use guidelines, onsite fire suppression equipment requirements, and identify appropriate vehicle parking areas away from flammable materials. The Fire Safety Plan shall be implemented during construction and shall be available onsite at all times during construction.

IX. HYDROLOGY AND WATER QUALITY – Would the project:	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Violate any water quality standards or waste discharge requirements?	☒	☐	☐	☐
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☐	☒
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	☒	☐	☐	☐
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	☒	☐	☐	☐
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☒	☐	☐	☐
f) Otherwise substantially degrade water quality?	☒	☐	☐	☐
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☒	☐
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☒	☐
j) Inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☒

The primary hydrologic feature in the project area is Martis Creek. This creek and several tributary drainages flow through Martis Valley. The Martis Creek Basin covers 26,204 acres (Truckee River Watershed Council). On the north side of SR 267, Martis Creek drains into the dammed Martis Creek Lake. Martis Creek continues below the dam and drains into Truckee River south of Interstate 80. The Truckee River empties into Pyramid Lake in the Great Basin in Nevada. Other hydrological features in the area include wetland swales, wetland meadows, and ephemeral and intermittent streams. Martis Creek Lake was constructed by the U.S. Army Corps of Engineers to provide flood protection to downstream areas. However, the Corps has identified structural deficiencies in the dam that require the lake be kept at a minimum pool.

a., c. - f. The proposed trail alignment would cross several drainages, including bridge or boardwalk crossings of Martis Creek and a tributary to Martis Creek within the Martis Creek Lake Recreation Area, and would require grading and other construction work adjacent to and within delineated wetland areas. Due to the sensitivity of work conducted within these areas and the potential for significant impacts to water quality, Items *a* and *c* through *f* will be addressed in the EIR.

b. The proposed project would generate no new demand for groundwater, proposes no groundwater extraction operations, is not anticipated to result in depletion of groundwater supplies available in the area, lowering of the groundwater table, or a deficit in aquifer volume. The project would result in no impacts associated with reducing groundwater supplies. The addition of impervious surfaces proposed as part of the project would not interfere substantially with natural groundwater recharge.

g. & h. The gross pool elevation of Martis Creek Lake is 5,838 feet, which was intended as a flood control impoundment but is not serving that function as a result of structural deficiencies of the dam. Due to these deficiencies, there is currently a reservoir pool restriction elevation of 5,780 feet for normal conditions. A portion of the Segment 2A alignment south of the Wildlife Viewing Area is within the gross pool of Martis Creek Lake but above the pool restriction elevation. Other portions of Segment 2A in the vicinity of the crossing of Martis Creek would be within Flood Zone A, the 100-year floodplain associated with Martis Creek, while other portions of the trail near drainages could be subject to seasonal flooding. The proposed trail project includes no residential structures. Bridges or boardwalk structures constructed within Flood Zone A or within the gross pool of Martis Creek Lake would not represent a significant barrier to flood flows that would substantially impede or redirect flows. Impacts associated with placing proposed bridges or boardwalks in the floodplain would be less than significant.

i. A portion of the Segment 2A alignment south of the Wildlife Viewing Area is within the gross pool of Martis Creek Lake and other portions of Segment 2A in the vicinity of its crossing of Martis Creek are within the 100-year floodplain. As a result of deficiencies identified in Martis Creek Lake Dam, the Corps is not currently filling the lake to gross pool. The Corps currently has no plans to repair the dam, although studies are ongoing. If repairs to the dam are made in the future, portions of the proposed trail could be inundated during runoff periods when the lake is filled for flood control purposes. It is anticipated that periodic inundation of bridges or boardwalks and paved segments of trail as a result of potential future water impoundment or seasonal flooding would not result in substantial damage to these structures, but would increase maintenance requirements. Filling of the lake to gross pool would proceed slowly and would not expose trail users to flooding risks. Similarly, only short segments of the trail are within the 100-year floodplain, and risks to trail users from flood would be minimal since there would be ample opportunity for users to remain outside the flood zone. In the current condition, both formal and informal trails occur within the 100-year floodplain in the Martis Valley. The proposed project would result in less than significant risks to structures and persons associated with flooding.

j. The project site is physically removed from potential risks related to inundation from seiche, tsunami, or mudflow.

Mitigation Measures

Mitigation measures for impacts to hydrology will be identified in the EIR.

X. LAND USE AND PLANNING –– Would the project:	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Physically divide an established community?	☐	☐	☐	☒
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☒	☐	☐
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☒

a. The proposed trail project would not divide an established community. The trail would connect the Town of Truckee with the Village at Northstar and to the trail system within the Tahoe Basin. The trail alignment follows a portion of the Tompkins Memorial Trail and is adjacent to other formal and informal trail corridors.

b. Trail construction is not in conflict with the MVCP, development and operation plans for Northstar at Tahoe, or the Placer County Zoning Ordinance. A minor use permit issued by Placer County will be required for the proposed trail. Policies in the MVCP include provisions requiring that new development be designed to fit and blend with the natural terrain, maintain the character and visual quality of the area, minimize grading, minimize visibility of graded areas, minimize erosion from trails and paths, and use natural landforms and vegetation for screening. Design Guidelines for recreational uses within the Northstar at Tahoe Community call for trail construction to include "minimal grading or disturbance of the natural terrain." These Design Guidelines state that recreational development may include various improvements "compatible with the natural setting and a year-round resort community." The trail does not conflict with Placer County land use guidance documents and will be required to comply with existing land use regulations and design guidelines.

A portion of the trail is proposed on land operated by the U.S. Army Corps of Engineers at the Martis Creek Lake Recreation Area. Land use within the Recreation Area is governed by the 1977 *Martis Creek Lake Master Plan*. The Master Plan identifies the area south of SR 267 as a wildlife management area "for the protection and improvement of wildlife habitat" and assigns the "Operations: wildlife management" land use zone to the area. The Master Plan states that these lands are "continuously available for low density recreation activities," while "intensive recreation would cause habitat loss." The plan contemplates a "nature interpretive" trail system within the area, but does not specifically identify allowable uses or activities. The plan includes resource use objectives for the plan area. The plan states that these objectives "reflect the policy of the Corps of Engineers to provide the public with safe, healthful, and varied opportunities for outdoor recreation and to protect, enhance, and manage all project resources." The proposed trail through the Corps property would be subject to an agreement between the Corps and the NCSD. With an executed agreement to allow the trail use through the Recreation Area, no impacts associated with inconsistency with applicable land use plans would result from the proposed project. Corps' authorization for construction and operation of a trail on Corps' property would be subject to the environmental review requirements of the National Environmental Policy Act (NEPA).

c. There are no habitat conservation plans or natural community conservation plans in effect in the project area.

Mitigation Measures

***Mitigation Measure LUP.1**:* The Northstar Community Services District shall enter into an agreement with the U.S. Army Corps of Engineers to allow construction, use, and maintenance of a segment of the Martis Valley Regional Trail within the Martis Creek Lake Recreation Area.

XI. MINERAL RESOURCES – Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan, or other land use plan?	☐	☐	☐	☒

a. & b. No mineral extraction operations occur within the proposed alignment. The project area is not located in an area of known mineral resources and is not designated by the Placer County General Plan or MVCP as a mineral resource recovery site. The project would result in no impact associated with the loss of availability of mineral resources.

Mitigation Measures

No mitigation measures are necessary.

XII. NOISE

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Expose persons to or generate noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☒	☐
b) Expose persons to or generate excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐
c) Create a substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☒	☐
d) Create a substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☒	☐	☐
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☒	☐
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

a. – d. The proposed project would construct a Class I ADA-accessible trail through Martis Valley to Northstar Village and continuing eastward through the Northstar at Tahoe resort to the ridgeline defining the Lake Tahoe Basin, terminating near Sawmill Flat at a paved Forest Service road atop the ridge near a road intersection known locally as the "Four Corners." The proposed project does not include any components that would generate substantial noise in the operational phase. Use and maintenance of the trail would not generate substantial increases (temporary or permanent) in ambient noise levels in the vicinity and would not generate ground-borne vibration.

Use of construction equipment and construction activities would result in a temporary increase in noise levels in the vicinity and could generate noise that could temporarily exceed noise level limits specified in Article 9.36 of the Placer County Code. However, noises generated by construction activities occurring on days and hours specified by Placer County Code are exempt from noise level standards established by Article 9.36. The noises generated during construction would likely be noticeable from some residences in the area, particularly homes in residential areas accessed from Northstar Drive, and could disturb nearby residents. *Mitigation Measure NOISE-1* requires that construction activities be conducted only during days and hours when construction activities are exempt from noise standards, which would limit construction activities to periods during daylight hours when construction noise would result in the least potential for disturbance to residents in the area. Since construction activities would be limited to hours during which construction noise is exempt from noise standards contained in the Placer County Code, and during daytime hours when the least disturbance would result from noise, impacts from construction noise would be less than significant.

Substantial ground-borne vibration typically occurs as a result of blasting or pile-driving activities, which would not be required for the proposed trail project. Grading and paving activities associated with the proposed project would generate minor ground-borne vibration intermittently during trail construction. Since low-level vibration would occur only temporarily and intermittently during construction, vibration impacts would be less than significant.

e. Segments of the proposed trail alignment are within land use compatibility zones B1, C, D, and E of the Truckee Tahoe Airport (FALUC 2004). Zone B1 is the most restrictive of the compatibility zones traversed by the proposed alignment and the zone in which noise levels related to airport use would be highest. A short segment of the trail south of Schaffer Mill Road would pass through Zone B1 and would be within the 60 – 65 CNEL (Community Noise Equivalent Level) noise contour identified by the airport land use compatibility plan (FALUC 2004). The Airport Land Use Compatibility Plan does not specifically identify the acceptability of trail uses within the 60-65 CNEL noise contour, but does identify other outdoor uses that are considered similar, such as golf course, water recreation, and parks. These uses are considered Normally Acceptable within the 60-65 CNEL contour, indicating that noise could be considered a slight interference with outdoor activities (FALUC 2004). Since only a short segment of the trail would pass through the 60-65 CNEL contour, and uses similar to trail use are considered subject to only slight interference due to noise, and Zone B1 compatibility standards include no restrictions trail uses, impacts associated with aircraft noise would be less than significant.

f. No private airstrip is within two miles of the project site. Impacts associated with excessive noise exposure related to proximity to a private airport would be less than significant.

Mitigation Measures

***Mitigation Measure NOISE-1*:** Construction contractors shall comply with the following measures:

- Construction activities shall be limited to between the hours of seven a.m. and six p.m. Monday through Friday, and between the hours of eight a.m. and six p.m. on Saturday. Noise-generating construction activities during the days and hours specified are exempt from noise standards by Section 9.36.030 of the Placer County Code.
- All construction vehicles, heavy equipment, and stationary noise sources (such as diesel generators) shall be equipped with mufflers.
- Equipment warm-up areas, water tanks, and equipment storage areas shall be located as far as practical from existing residences and in no cases closer than 50 to any existing residence.

XIII. POPULATION AND HOUSING – Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☐	☒
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

a. The project proposes to construct a Class 1 ADA Accessible trail through Martis Valley to Northstar Village and continuing eastward through the Northstar at Tahoe resort to the ridgeline defining the Lake Tahoe Basin, terminating near Sawmill Flat at a paved Forest Service road atop the ridge near a road intersection known locally as the "Four Corners." The trail is proposed in a region that supports a variety of active and passive recreation facilities. Construction of the proposed trail would not generate population growth in the area.

b. & c. The project would not demolish any existing housing and would not displace any people from existing housing.

Mitigation Measures

No mitigation measures are necessary.

XIII. PUBLIC SERVICES – Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
Fire protection?	☐	☐	☐	☒
Police protection?	☐	☐	☐	☒
Schools	☐	☐	☐	☒
Parks	☐	☐	☐	☒
Other public facilities?	☐	☐	☐	☒

a. The project proposes to construct a Class 1 ADA Accessible trail through Martis Valley to Northstar Village and continuing eastward through the Northstar at Tahoe resort to the ridgeline defining the Lake Tahoe Basin, terminating near Sawmill Flat at a paved Forest Service road atop the ridge near a road intersection known locally as the "Four Corners." The trail would connect to other trails in the region. The project would not directly increase the residential population of the project region and is not expected to induce residential growth that would increase need for services. The proposed trail would require annual maintenance consisting of pavement sealing and re-striping; maintenance, repair, and/or replacement of signs, benches, and other trail-side amenities; snow removal; pavement sweeping; and litter removal. These maintenance requirements would not result in the need to construct new facilities to provide appropriate maintenance to the trail and could be accommodated with existing facilities. All maintenance would be the responsibility of the Northstar CSD. No impacts would result from construction of new facilities to accommodate increased demands for services as a result of the proposed trail.

Mitigation Measures

No mitigation measures are necessary.

XV. RECREATION – Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☒	☐
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might, have an adverse physical effect on the environment?	☒	☐	☐	☐

a. The proposed project does not include any housing, and is not expected to increase the residential population of the region, and would therefore be anticipated to result in less than significant impacts associated with increased use of existing parks and recreational facilities.

b. The project would construct a recreational trail facility through the Martis Valley to Northstar Village and continuing eastward through the Northstar at Tahoe resort to the ridgeline defining the Lake Tahoe Basin, terminating near Sawmill Flat at a paved Forest Service road atop the ridge near a road intersection known locally as the "Four Corners." The proposed project could result in potentially significant impacts as identified throughout this Initial Study. Potentially significant impacts of construction and operation of the trail, as identified in this Initial Study, will be further evaluated in the EIR that will be prepared for the project.

Mitigation Measures

No mitigation measures are necessary.

XVI. TRANSPORTATION/TRAFFIC – Would the project:	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	☐	☐	☐	☒
b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	☐	☐	☐	☒
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☒
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒
e) Result in inadequate emergency access?	☐	☐	☒	☐
f) Conflict with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	☐	☐	☐	☒

a. – b. The proposed trail project is expected to contribute limited new vehicle trips to area roadways for the purpose of accessing the trail. Trail usage is expected to include residents and visitors biking directly to the trail from home/lodging; residents and visitors walking directly to the trail from home/lodging; and residents and visitors driving to the trail to bike or walk. An analysis of trail use by each of these user groups was prepared by LSC Transportation Consultants, based on models and methodologies used to forecast trail use in the Tahoe region. The analysis found that individuals driving to the trail would generate a maximum of 172 one-way vehicle trips (or 86 round trips) on a peak summer day. The proposed project is not anticipated to result in any reduction in Level of Service on area roadways or intersections.

The proposed trail project would provide a link to trails identified by the Town of Truckee *Trails & Bikeways Master Plan* (Town of Truckee 2007), and would provide bicycle trail connectivity consistent with the *Placer County Regional Bikeway Plan* and the *Draft 2010 Lake Tahoe Bicycle and Pedestrian Plan*. In addition, there is a potential that the trail would result in some reduction in vehicle trips on Highway 267, since bicycle trips between Truckee and Northstar may replace some motor vehicle trips in the existing condition.

The proposed trail would result in no impacts associated with conflicts with applicable planning or regulatory measures for the performance of the circulation system in the project region.

c. The proposed trail would have no influence on air traffic patterns. The Truckee Tahoe Airport Land Use Compatibility Plan sets no restrictions on trail uses within Land Use Compatibility Zones through which the proposed trail would pass. No changes in air traffic patterns would result from the proposed project.

d. The proposed trail would have no affect on roadway hazards associated with roadway design features or user compatibility. Roadway/trail intersections require Placer County approval and would be constructed in accordance with Placer County design standards to ensure safety standards are met for roadway crossings. The proposed trail would be designed and constructed to meet ADA accessibility standards.

e. The proposed trail would allow for access by emergency vehicles through removable bollards at roadway/trail intersections. Emergency vehicle access through work areas during construction is addressed in Section VIII of this Initial Study. Impacts associated with emergency access would be less than significant.

f. The proposed project would provide new pedestrian and bicycle facilities in the area. It would not conflict with policies, plans, or programs related to public transit or bicycle and pedestrian facilities, as discussed in *a* above.

Mitigation Measures

No mitigation measures are necessary.

XVII. UTILITIES AND SERVICE SYSTEMS

Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☒
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
c) Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
d) Have sufficient water supplies available to serve the	☐	☐	☐	☒

XVII. UTILITIES AND SERVICE SYSTEMS Would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
project from existing entitlements and resources, or are new or expanded entitlements needed?				
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☐	☒
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☐	☒

a. - g. The proposed project would construct a Class 1 ADA accessible trail through Martis Valley to Northstar Village and continuing eastward through the Northstar at Tahoe resort to the ridgeline defining the Lake Tahoe Basin, terminating near Sawmill Flat at a paved Forest Service road atop the ridge near a road intersection known locally as the "Four Corners." No new utility or service systems would be required or installed as part of the project. The proposed trail would not increase the residential population in the region and would therefore not contribute to an increase in the demand for utilities or service systems. The project is expected to have no impact related to provision of utilities and service in the project region.

Mitigation Measures

No mitigation measures are necessary.

XVIII. MANDATORY FINDINGS OF SIGNIFICANCE –	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☒	☐	☐	☐
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current	☒	☐	☐	☐

XVIII. MANDATORY FINDINGS OF SIGNIFICANCE –	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
projects, and the effects of probable future projects)?				
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☒	☐	☐	☐

The analysis provided in this Initial Study identifies potentially significant impacts in *Section IV. Biological Resources, Section V. Cultural Resources*, and *Section IX. Hydrology and Water Quality*. A focused EIR will be prepared to evaluate impacts to Biological Resources, Cultural Resources, and Hydrology and Water Quality; in addition to the CEQA-required analysis, including cumulative impacts and project alternatives. The focused EIR will contain a program-level analysis of all proposed trail segments (from one-forth mile north of the intersection of Schaffer Mill Road/Airport Road and State Route 267 to Brockway Summit), and a project-level analysis of Segments 1 and 2 – the portion of the trail extending from one-forth mile north of Schaffer Mill Road to Northstar Village which is currently proposed for construction. The program-level analysis will be prepared consistent with the requirements of CEQA Guidelines Section (§) 15168, while the project-level analysis will be prepared in compliance with requirements set forth in CEQA Guidelines §15161. Mitigation measures identified in this Initial Study will be incorporated into the final Mitigation Monitoring Program prepared for the project following completion of the EIR.

PREPARERS

North Fork Associates prepared this Initial Study on behalf of the Northstar Community Services District.

REFERENCES

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APPENDIX A2

Comments on Notice of Preparation

Notice of Preparation
Comment Letters

List of Commentors

Mailed and Emailed Comments

1. U.S. Army Corps of Engineers
2. California Department of Forestry and Fire Protection
3. California Native American Heritage Commission
4. Placer County Health and Human Services Department
5. Placer County Community Development Resource Agency, Engineering and Surveying Division
6. Placer County Flood Control and Water Conservation District
7. Truckee Trails Foundation
8. Cohen, Barb
9. DeNero, Henry
10. Gaston, John
11. Gauld, Alan
12. George, Linda
13. Goerke, Bill
14. Hart, Ben
15. Henn, Howard and Deborah
16. Huckins, Todd and Carol
17. Hyatt, Ellie
18. Kahlich, Mike
19. Kalisch, Mike
20. Kaneda, Brigitte
21. Layh, Gina
22. Lindsay, Carol
23. Lindsay, Paco
24. Lomanto, Patty
25. Lowes, Shirley and Simon
26. Mann, Janet
27. McCullough, Garrett
28. McCullough, Rachel
29. Merritt, Bob
30. Nathan, Mark
31. Park, Richard
32. Robertson, Candy and Peter
33. Roghers, Helga
34. Schmuck, Charles
35. Sherer, Alex and Christine
36. Stoll, Nathan

37. Taddo Jones, Sara
38. Terry, Andrew
39. Towns, Peggy
40. Van Berkem, J. Thomas
41. Werbel, Peter
42. Williams, Karen
43. Williams, Kim
44. Woodhead, Suzanne

Written Comments Received at Scoping Meeting

45. Broback, Debby
46. Cable, Candace
47. Chaplin, Linda
48. Colson, Diane and Ed
49. Crimmens, Teresa
50. Dalton, Colleen
51. Davis, Ulla
52. Fink, Bob
53. Forno, Marilyn
54. Freested, Karyn
55. Gisko, Nancy
56. Howes, Judy
57. Huckins, Todd and Carol
58. Hyatt, Ellie
59. Ives, Nancy
60. Kantz, Otis
61. Kielhofer, Kari
62. Lang, Markus
63. Larson, Lynne
64. LeFrancois, Michael
65. Pearson, Danny
66. Penfield, Ann
67. Stephens, Geoff
68. Terry, Andrew
69. Towns, Peggy
70. Treabass, Ron
71. Williams, Kim
72. Williams, Robert

DEPARTMENT OF THE ARMY
U.S. ARMY CORPS OF ENGINEERS, SACRAMENTO DISTRICT
1325 J STREET
SACRAMENTO CA 95814-2922

REPLY TO
ATTENTION OF

January 21th, 2011

Construction-Operations Division

Mr. Mike Staudenmayer
Northstar Community Services District
908 Northstar Drive
Northstar, CA 96161

Dear Mr. Staudenmayer:

This letter is in response to the Northstar Community Services District (NCSD) Notice of Preparation (NOP) of a Draft Environmental Impact Report (EIR) and Initial Study (IS) for the proposed Martis Valley Regional Trail (MVRT), dated December 17, 2010 and December 16, 2010 respectively. A portion of the proposed MVRT is located within Martis Creek Lake and Dam Project, which is owned and managed by the U.S. Army Corps of Engineers (USACE), Sacramento District. Martis Creek Lake and Dam was authorized in 1962 and later constructed for flood control and future water supply. We thank you for the opportunity to provide the following comments:

The NOP states that "[t]he Corps currently has no plans to repair the dam, although studies are ongoing." This sentence is incorrect. Martis Creek Lake and Dam is currently in the planning phases of the Dam Safety Modification Project (DSMP). USACE staff estimates that the Draft Environmental Impact Statement (EIS) for the DSMP will be available to the public in Fall 2011. The outcome of the DSMP may alter, eliminate, and/or modify, any and/or all existing or proposed recreational activities at Martis Creek Lake and Dam. The DSMP may also need to utilize existing USACE property for borrow locations, haul roads, staging areas, etc., which will be unknown until the studies are complete. Activities, including the proposed MVRT at Martis Creek Lake and Dam, cannot conflict with projects related to dam safety modifications or flood control operations.

The IS states that "...construction of Phase 2 (Segments 2A and 2B) would occur between September and November 2011," while in another location it states, "Phase 2 construction (Segment 1 and 2A) would begin in May 2012 and extend through the end of October." Completion of the USACE review process as described below may delay the proposed construction dates for the MVRT. We also believe these timeframes could conflict with our estimated completion dates for the DSMP Record of Decision (Summer 2012) and proposed construction in 2014. In addition, the proposed MVRT schedule conflicts with our peak recreation season and may have a direct impact on our visitation and our visitors ability to enjoy their recreational experience at Martis Creek Lake and Dam unless dates and/or timeframes can be adjusted to avoid and/or minimize impacts.

The IS indicates that the MVRT would have "No Impact" to Parks with respect to "acceptable service ratios, response times or other performance objectives for any of the public services," and goes on to state that the MVRT would provide, "...a trail that is accessible to the widest variety of potential users during all seasons of the year." We do not agree with these statements because the linkage of the proposed MVRT would create additional recreational opportunities for the public, thereby creating increased visitation, increased needs for additional staffing, increased routine operations and maintenance costs on surrounding infrastructure, and increased needs to ensure public safety and emergency response as well as subsequent enforcement of Title 36, CFR, Section 327. Currently, there is only one permanent Park Ranger who works seasonally at Martis Creek Lake and Dam.

The IS also states, "no impacts associated with inconsistency with applicable land use plans would result from the proposed project." We do not agree. The proposed MVRT is in direct conflict with the Martis Creek Lake Master Plan, which allows for a small interpretive trail in the Wildlife Management Area (WMA). The WMA was set aside as mitigation for habitat loss due to the construction of the flood control project. The WMA is available for low-density recreation activities only and is to be used for extensive recreation uses as opposed to intensive uses. The activities on these lands (extensive use) are to be spread out and with minimal impact to the lands. Recreational/interpretive hiking trails are compatible with low-density use; however, roads, transportation corridors, and paved trails are not. Given the master plan only allows for low-density recreational activities in the WMA, the north side of HWY 267 would be more compatible with this type of trail as it is zoned for high-density recreation. High-density recreation is considered an intensive use.

Proposed MVRT alignments within the NOP and IS suggests utilizing "pre-existing or established roads and trails" within Martis Creek Lake and Dam. While some roads and trails exist, they were not originally created for public access or recreation, but rather for access to/from locations during initial construction of the Martis Creek Dam Project.

The NOP and IS state "Final signage design has not been determined, but signage would be in accordance with Caltrans Highway Design Manual Section 1000." Should portions of the MVRT occur on USACE property, all signs placed on USACE property must comply with USACE sign standards, graphics manuals, and Martis Creek Lake and Dam Sign Plan.

Furthermore, MVRT shall also comply with the National Environmental Policy Act (NEPA), and all other applicable state, federal, and local laws and regulations including, but not limited to: USACE Engineering Circulars / Regulations / Publications, USACE Martis Creek Lake Master Plan, USACE Graphics Manuals and Sign Standards, National Historic Preservation Act, as amended, the Fish and Wildlife Coordination Act, the Endangered Species Act, Clean Water Act, Clean Air Act, Executive Order 11990: Protection of Wetlands, Executive

Order 11988: Flood Plain Management. All necessary permits and approvals must be in place prior to granting any real estate easements and/or a Memorandum of Understanding.

If proposing to discharge dredged or fill material into waters of the United States, a Department of the Army (DA) permit under Section 404 of the Clean Water Act is required following EPA's Section 404(b)(1) Guidelines and USACE Regulatory Process. Practicable alternatives must be analyzed (both onsite and offsite) during the planning and investigation phase of this project and the preferred alternative chosen must be the Least Environmentally Damaging Practicable Alternative (LEDPA). In order to determine whether a (DA) permit may be needed, we strongly recommended that NCSD contact the USACE Sacramento District, Regulatory Division to schedule a pre-application meeting as soon as possible.

We value your cooperation and look forward to our continued discussions regarding the MVRT. We understand and support the community's desire for creating a regional trail linkage and will continue to explore the full scope, impacts, and long-term effects of this project in our decision making processes.

If you have any additional questions, please contact Ms. Terry Hershey at (916) 557-5279 or Mr. Jonathan Friedman at (916) 557-5281. To set up a pre-application meeting with our Regulatory Division, please contact Mr. Will Ness at 916-557-5268.

Sincerely,

Michael D. Mahoney P.E.
Chief, Construction-Operations Division

DEPARTMENT OF FORESTRY AND FIRE PROTECTION
13760 Lincoln Way
AUBURN, CA 95603
(530) 889-0111
Website: www.fire.ca.gov

January 7, 2011

TO: Northstar Community Services District
Mike Staudenmayer, General Manager
908 Northstar DR
Northstar, CA 96161

RE: Martis Valley Regional Trail Project
SCH#: 2010122057

Prior to construction, this project may require a Timber Harvest Plan and a Timberland Conversion.

California Code of Regulations, per section 1103, and Public Resources Code 4581 requires a Timberland Conversion Permit and/or Timber Harvest Plan be filed with the California Department of Forestry and Fire Protection if the project involves the removal of a crop of trees of commercial species (regardless of size of trees or if trees are commercially harvested).

The Timberland Conversion Permit shall address the following:

a. The decrease in timber base in the county as a result of the project.
b. The cover type, including commercial species, density, age, and size composition affected by the project.
c. The ground slopes and aspects of the area affected by the project.
d. The soil types affected by the project.
e. Any significant problems that may affect the conversion.

If you require further clarification, please contact Forester Jeff Dowling at (530) 587-8926.

Sincerely,

Brad Harris
Unit Chief

Jeff Dowling
Truckee Area Forester

NATIVE AMERICAN HERITAGE COMMISSION
915 CAPITOL MALL, ROOM 364
SACRAMENTO, CA 95814
(916) 653-4082
(916) 657-5390 - Fax

December 28, 2010

Mike Staudenmayer
Northstar Community Services District
908 Northstar Drive
Truckee, CA 96161

RE: SCH# 2010122057 Martis Valley Regional Trail; Placer County.

Dear Mr. Staudnemayer:

The Native American Heritage Commission (NAHC) has reviewed the Notice of Preparation (NOP) referenced above. The California Environmental Quality Act (CEQA) states that any project that causes a substantial adverse change in the significance of an historical resource, which includes archeological resources, is a significant effect requiring the preparation of an EIR (CEQA Guidelines 15064(b)). To comply with this provision the lead agency is required to assess whether the project will have an adverse impact on historical resources within the area of project effect (APE), and if so to mitigate that effect. To adequately assess and mitigate project-related impacts to archaeological resources, the NAHC recommends the following actions:

✓ Contact the appropriate regional archaeological Information Center for a record search. The record search will determine:
  - If a part or all of the area of project effect (APE) has been previously surveyed for cultural resources.
  - If any known cultural resources have already been recorded on or adjacent to the APE.
  - If the probability is low, moderate, or high that cultural resources are located in the APE.
  - If a survey is required to determine whether previously unrecorded cultural resources are present.

✓ If an archaeological inventory survey is required, the final stage is the preparation of a professional report detailing the findings and recommendations of the records search and field survey.
  - The final report containing site forms, site significance, and mitigation measurers should be submitted immediately to the planning department. All information regarding site locations, Native American human remains, and associated funerary objects should be in a separate confidential addendum, and not be made available for public disclosure.
  - The final written report should be submitted within 3 months after work has been completed to the appropriate regional archaeological Information Center.

✓ Contact the Native American Heritage Commission for:
  - A Sacred Lands File Check. . **USGS 7.5 minute quadrangle name, township, range and section required.**
  - A list of appropriate Native American contacts for consultation concerning the project site and to assist in the mitigation measures. **Native American Contacts List attached.**

✓ Lack of surface evidence of archeological resources does not preclude their subsurface existence.
  - Lead agencies should include in their mitigation plan provisions for the identification and evaluation of accidentally discovered archeological resources, per California Environmental Quality Act (CEQA) §15064.5(f). In areas of identified archaeological sensitivity, a certified archaeologist and a culturally affiliated Native American, with knowledge in cultural resources, should monitor all ground-disturbing activities.
  - Lead agencies should include in their mitigation plan provisions for the disposition of recovered artifacts, in consultation with culturally affiliated Native Americans.
  - Lead agencies should include provisions for discovery of Native American human remains in their mitigation plan. Health and Safety Code §7050.5, CEQA §15064.5(e), and Public Resources Code §5097.98 mandates the process to be followed in the event of an accidental discovery of any human remains in a location other than a dedicated cemetery.

Sincerely,

Katy Sanchez

Katy Sanchez
Program Analyst
(916) 653-4040

cc: State Clearinghouse

Native American Contact List
Placer County
December 28, 2010

Rose Enos
15310 Bancroft Road — Maidu
Auburn , CA 95603 — Washoe
(530) 878-2378

Washoe Tribe of Nevada and California
Waldo Walker, Chairperson
919 Highway 395 South — Washoe
Gardnerville , NV 89410
waldo.walker@washoetribe.
775-265-4191
775-265-6240 Fax

Washoe Tribe of Nevada and California THPO
Darrel Cruz, Cultural Resources Coordinator
919 Highway 395 South — Washoe
Gardnerville , NV 89410
darrel.cruz@washoetribe.
(775) 265-4191 ext 1212
(775) 546-3421 - cell
(775) 265-2254 FAX

April Wallace Moore
19630 Placer Hills Road — Nisenan - So Maidu
Colfax , CA 95713 — Konkow
530-637-4279 — Washoe

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of the statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resources Code and Section 5097.98 of the Public Resources Code.

This list is only applicable for contacting local Native Americans with regard to cultural resources for the proposed SCH# 2010122057 Martis Valley Regional Trail; Placer County.

Placer County
Health and Human Services Department

Richard J. Burton, M.D., M.P.H.
Health Officer and Director

Jill Pahl, R.E.H.S.
Director, Environmental Health

MEMORANDUM

TO: **Maywan Krach, Community Development Technician**

FROM: **Paul Holloway**
Land Use and Water Resources Section

DATE: **January 11, 2011**

SUBJECT: **Martis Valley Regional Trail, Notice of Preparation**

Environmental Health Services (EHS) has reviewed the Notice of Preparation for the abovementioned initial study and has the following comments:

1. If at any time during the course of executing the proposed project, evidence of soil and/or groundwater contamination with hazardous material is encountered; the applicant shall immediately stop the project and contact Environmental Health Services Hazardous Materials Section. The project shall remain stopped until there is resolution of the contamination problem to the satisfaction of Environmental Health Services and to Lahontan Regional Water Quality Control Board. A note to this effect shall be added to the Improvement Plans where applicable.

2. The discharge of fuels, oils, or other petroleum products, chemicals, detergents, cleaners, or similar chemicals to the surface of the ground or to drainage ways on, or adjacent to, the site is prohibited.

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Community Development and Resource Agency Building, 3091 County Center Drive, Suite 180, Auburn, CA 95603
530.745-2300 ● www.placer.ca.gov ● fax 530.745-2370

COUNTY OF PLACER
Community Development Resource Agency

ENGINEERING & SURVEYING

MEMORANDUM

DATE: JANUARY 14, 2011

TO: MAYWAN KRACH, COMMUNITY DEVELOPMENT TECHNICIAN

FROM: SARAH K. GILLMORE, ENGINEERING AND SURVEYING DEPARTMENT

SUBJECT: MARTIS VALLEY REGIONAL TRAIL; NORTHSTAR COMMUNITY SERVICES DISTRICT; NOTICE OF PREPARATION

The proposed project includes the construction of a trail in the Martis Valley area beginning near the intersection of Shaffer Mill Road and State Route 267 and terminating near Sawmill Flat. These improvements are located in the vicinity of Martis Valley in eastern unincorporated Placer County.

The Engineering and Surveying Department (ESD) has completed our review of the above referenced notice and offer the following comments for inclusion in the Environmental Impact Report to be prepared for the project.

1. Please provide a typical trail design and cross section with dimensions in the environmental document.
2. An Encroachment Permit shall be obtained by the applicant or authorized agent from Caltrans and DPW for all work within the State and County ROW.
3. Where will the users of the trail park their vehicles? Is a parking/staging and circulation area proposed? If so, this should be included in the project description and the impacts of these improvements should be analyzed in the environmental document.
4. If access to the trail requires pedestrians to cross road(s) from the parking or staging area, it should be included in the project description and discussed in the environmental document. The environmental document should analyze the safety impacts and propose mitigations for all pedestrian crossings.
5. The NOP mentions that a Grading Permit from Placer County will be pursued. Please change this to reference to Grading Plans instead, as this is more appropriate to the size and nature of this project.

PLACER COUNTY
FLOOD CONTROL AND WATER CONSERVATION DISTRICT

Ken Grehm, Executive Director
Brian Keating, District Engineer
Andrew Darrow, Development Coordinator

January 12, 2011

Maywan Krach
Placer County
Community Development Resource Agency
3091 County Center Drive
Auburn, CA 95603

RE: Martis Valley Regional Trail / NOP of an Environmental Impact Report

Maywan:

Regarding the preparation of an EIR for the subject project we have the following comments.

The proposed trail system with stream crossings has the potential to alter 100-year floodplain limits. Future EIRs must specifically quantify the incremental effects of this impact and propose mitigation measures if necessary.

Please call me at (530) 745-7541 if you have any questions regarding these comments.

Andrew Darrow, P.E.
Development Coordinator

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Truckee Trails
FOUNDATION

Northstar Community Services District
Mike Staudenmayer, General Manager
908 Northstar Drive
Northstar, CA 96161

January 21, 2011

Dear Mr. Staudenmayer,

The Truckee Trails Foundation is pleased for the opportunity to provide input on the scope of the Environmental Impact Report (EIR) for the proposed Martis Valley Regional Trail. A multi-use trail through Martis Valley, if built with important environmental and cultural considerations made, will help further our mission to create a community more connected by trails, with enhanced opportunities for alternative (non-motorized) transportation. As trail advocates in our community, we request that the following questions be addressed as part of the Martis Valley Regional Trail EIR scope :

- What will be the environmental impact on water quality, vegetation, and wildlife for a paved trail versus a dirt trail?
- What are the potential long-term drainage and erosion management considerations with the various trail alternatives, including paved versus non-paved surfaces?
- What will be the impact on archaeological sites for each trail alternative, and the proposed mitigation measures?
- What will be the extent of accessibility of each trail alternative, paved and dirt?
- What (if any) impact might a paved trail have on non-paved trails, for each trail alternative?
- What is the expected level of trail usage on a paved versus unpaved trails, for each trail alternative?
- Who will be the expected trail users (cyclists, pedestrians, etc.) and primary age ranges for paved versus unpaved trails, for each trail alternative? Will any trail users be potentially excluded from use in either of the proposed trail alternatives, including pavement and dirt?
- What are the anticipated safety issues that trail users might face, and how will these be mitigated?
- What are plans for trail signage regarding safety, directions, and natural/cultural interpretation?
- What are the projected greenhouse gas impacts of the project (versus no project)?
- What are the anticipated annual maintenance requirements for a paved trail versus dirt trail, and how will this maintenance be conducted?
- Are maintenance activities anticipated to mitigate potential environmental effects of the trail, and if so, how?

Post Office Box 1751 Truckee, CA 96160
info@truckeetrails.org

- What effect (if any) will each trail alternative have on future Martis Creek and/or wetland restoration activities?
- How will the trail take into account potential future land use or sale of Army Corps Land?
- How does the proposed trail complement or duplicate existing trails in the valley, including (but not limited to) Waddle Ranch, Martis Wildlife Area trails, Martis Dam Road and/or Town of Truckee's Trails Master Plan?

Sincerely yours,

Allison Pedley
Executive Director
Truckee Trails Foundation

Kaitlin Costa

From: Cathy Spence-Wells
Sent: Friday, January 14, 2011 10:33 AM
To: Kaitlin Costa
Subject: FW: Martis Valley Trail

From: Mike Staudenmayer [mailto:mikes@northstarcsd.org]
Sent: Tuesday, January 11, 2011 8:45 AM
To: Cathy Spence-Wells
Cc: lauren@streamlineimpact.com; Walter Auerbach
Subject: FW: Martis Valley Trail

Mike

From: Barb Cohen [mailto:barb@shorehouselaketahoe.com]
Sent: Tuesday, January 11, 2011 8:43 AM
To: Mike Staudenmayer
Subject: Martis Valley Trail

Hi Mike -
I looked at your proposal for the Martis Valley Trail. I am an avid hiker, having lived on the N. Shore of Lake TAhoe for 37 years.
I am not sure, from looking at the plans, whether you are planning on using the existing trails in the Martis Valley for Stage 1, which would seem to make sense, rather than duplicating a trail in that area.
Secondly, it does not make sense to me to route a hiking trail to the Northstar Village. A hiking trail should take people away from shops and restaurants. People who hike want to be in the trees and hear the birds. Why not route it away from the village, and Northstar can add a connecting trail if they desire for their residents. That is very important to me and my fellow hikers, to leave the trail in the trees, away from civilization.
Also, I do hope you will be using existing trails once you leave Northstar Village, especially the trail from Watson Lake almost to 4 corners, which is a beautiful trail. Again, no need to duplicate what is already in place.
Please share my comments at the upcoming meeting. I will not be able to attend, but I think these are important issues, needing to be discussed.
Please update me on any meetings and changes to the plans.
Thanks -
Barb Cohen

January 19, 2011

Mr. Mike Staudenmayer

General Manager

Northstar Community Services District

Northstar, CA

Dear Mike,

This letter constitutes my comments regarding the proposed Regional Trail (The Trail) to be included in the Environmental Impact Review (EIR) process. The letter is divided into three sections:

- Comments as to why I believe the original alignment of The Trail through The Martis Valley (Original Alignment) would be far superior to the alignment being proposed by the Northstar Community Services District (NCSD)
- Possible solutions to the three principal "obstacles" to the Original Alignment that have been stated by NCSD, and steps that might be taken to overcome or avoid these obstacles- thereby making the Original Alignment feasible.
- Issues that are recommended for inclusion in the EIR

Comments on the Original versus Proposed Alignments

As you know, I am in favor of The Trail, but believe that every effort should be made to align it as was originally proposed- adjacent to or in close proximity to Route 267. I believe routing The Trail through the center of The Martis Valley as is currently proposed would not accomplish the principal objective of The Trail, and would impact the Valley's current recreational values in several ways. My reasons for this conclusion are summarized briefly below.

The Original alignment has several advantages:

1. It is the most direct and "intuitive" route through the Valley en route to The Trail's stated destination (Lake Tahoe). Cyclists who currently used Route 267 between Truckee and Lake Tahoe would naturally divert to this equally direct, yet safer and more scenic, route. It is a matter of common sense that The Trail should remain close to the road as it crossed through an otherwise undeveloped area.
2. It would have minimal impact on the environment in that this alignment remains largely on "high ground" (avoiding much of the wetlands of the Valley), utilized an existing dirt road/trail for much of the route, and crosses only one stream (Martis Creek) and at a location where the stream is already crossed by Route 267. It may also be possible to utilize the existing

embankment and concrete tunnel structure at the point where Route 267 crossed over Martis Creek, further reducing impact and cost.

3. It would have minimal negative impact of the current recreational uses and values of the Valley in that this alignment would use only one portion of the existing trail loop around The Valley (the TMT). In addition, this alignment would not cross the TMT. An adjacent or nearby footpath could easily be constructed next to or near The Trail on the "inside" (Valley side) of the paved trail so that walkers would not have to cross paths with cyclists.

4. It would have minimal impact on scenic values in that there would be no paved structures through the Valley (except The Trail itself close to Route 267); and hikers would not have to see cyclists passing through what is today a scenic and undeveloped recreational area.

Conversely, The Proposed Alignment has several significant disadvantages:

1. First and perhaps foremost, by taking a 90 degree turn to the West at the location of the Wildlife Viewing area parking lot, heading almost half a mile away from Route 267; then south into Northstar Village; then through Northstar Village where cyclists would have to walk their bikes; and then back to the east a point where The Trail can ascent to the Brockway Summit- The Proposed alignment would fail to accomplish the primary purpose of the Regional Trail (to route cyclists from Route 267 on to a safe, off road trail). It is only logical to assume that a large percentage (if not the majority) of Truckee-to-Lake Tahoe cyclists would chose to remain on Route 267 rather than divert on to what could only reasonably be called a "major detour". How can the long sought after regional trail be constructed in such a way as to defeat its primary purpose? The latter section of this letter outlines how this fundamental concern with The Proposed alignment might be evaluated in the EIR.

2. It would cross significant wetlands in two locations, and cross two streams (as opposed to one for the Original Alignment). These are Martis Creek and the tributary that comes out of the Moonlight Meadow near Jake's Bridge. Furthermore, it would cross these streams at locations that are completely undeveloped and are pristine settings in the Valley.

3. It would require utilizing and impacting several significant sections of the TMT (rather than just one section). It would cross over the TMT in at least two locations (requiring cyclists and foot traffic to crossover each other's paths). Furthermore, it would not easily allow for the existing foot trail loop to be reconstructed in a way that would in any way match its current recreational and scenic qualities. Hikers would have to walk along side of The Trail, unless an entirely new alignment for the foot trail was constructed apart from The Trail.

4. It would create inevitable scenic damage by forcing hikers and wildlife viewers to watch cyclists crossing through what are today pristine, undeveloped meadows and wetlands- the very scenery that the existing recreational users of the Valley enjoy.

5. It would create hazards with dogs. The Valley is a dog-friendly area with dogs allowed off leash. The most popular and heavily frequented part of the Valley is by people walking their dogs from the Wildlife Viewing Area west along Martis Creek. The Proposed Alignment would intersect this area as it crossed Martis Creek. This would create a hazard for dogs and cyclists; and would significantly impair the experience of residents who today walk their dogs through the Valley.

6. It would impact the TMT experience within the Northstar property and pose significant safety and convenience issues in and near Northstar Village. The proposed alignment would utilize (impact) the portion of the TMT that is the primary route for Northstar residents to enter and exit the Valley (the portion near the end of Basque and out to Jake's Bridge). It would then take much of the unpaved TMT inside of Northstar en route to the Village. It would then have to approach and cross the most congested and dangerous intersection in Northstar- the intersection of Northstar Drive and Big Springs Road. This intersection has been the site of many accidents and multiple stop sign configurations. It is also a point of heavy congestion during heavy traffic periods. The Proposed alignment would "dump" cyclists at this already problematic point with no area to disembark or re-mount their bikes. They would then have to cycle up Northstar Drive into the Village where they would inevitably enter the restricted "bus only" circle (the first to be approached). They would then have to disembark again and walk their bikes through the entire Village, including up a major stairway (unless they enter at the upper circle). This would negatively impact the Northstar Village experience; and would make the route through the Village sufficiently onerous as to discourage any "through" cyclist traffic. In effect, The Trail would become a Truckee-to-Northstar trail, rather than a Truckee-to-Lake Tahoe trail defeating the entire purpose of the Regional Trail Plan. This major failure is obvious to any who take a moment to visualize how cyclists would actually have to be routed into and through Northstar Village.

<u>Obstacles to Original Alignment and Possible Solutions</u>

Three "obstacles" to the Original Alignment have been cited by NCSD that prompted it to develop the alternative (Proposed) alignment. These are (1) finding an acceptable way past the Washoe relic area at or near the Wildlife Viewing Area parking lot, (2) crossing Martis Creek next to Route 267 and passing the "wet" area immediately to the south of this point, and (3) getting through the narrow area at the south end of the Valley between Route 267 and the Northstar Golf Course. Every effort should be made to overcome these obstacles before considering the less desirable Proposed Alignment; and I do not believe such efforts have been exhausted as summarized below.

1. <u>Obstacle #1: Avoiding the Washoe relic area on "the mound" at and near the Wildlife Viewing Area parking lot.</u> Every effort should be made to minimize or eliminate this problem with the Originally Alignment.

   One idea would be to build a raised bike trail over this area just as one would if it were a wetlands area. One could even place a fence and signage along trail to prevent cyclists from stopping and walking in the area. Further mitigation will occur because the Wildlife Viewing Area parking lot will be moved out of the relic field and up on to Route 267 (this will occur under either alignment, but not if no bike trail is constructed). In addition, the existing foot trail south of the parking lot could be relocated closer to the wetlands (i. e. moving it off the relic field as well).

If these steps are not sufficient, one could adjust the alignment of The Trail itself so as not to crossover the relic field at all. This would be accomplished by placing The Trail on a raised structure at the edge of the wetlands area just outside of the “mound” that contains the relic field. In other words, one would bring The Trail BELOW the area of the existing parking lot and around the “mound” altogether. This would add cost to the project. However, this raised area would not be any larger than the TWO raised areas that will be required under the Proposal Alignment deep in the Valley. By going around the relic field, the principal obstacle to the Originally Alignment would be eliminated. This relatively minor adjustment to the Original Alignment would be a far less significant diversion than would the Proposed Alignment.

2. <u>Obstacle #2: Crossing the steam that goes under Route 267 and the wetlands area just south of the stream.</u> As one gets beyond the “mound” (heading toward Lake Tahoe) Martis Creek goes under 267 through a concrete tunnel. The area just beyond the steam is designated wet. I have studied this area and am convinced that the bike trail can be build over the existing concrete tunnel that the stream passes under. There is a massive embankment that slopes down from the shoulder of Route 267. The concrete tunnel is at the bottom of this embankment. By moving the rocks on the embankment back 10 to 15 feet and building a retaining wall, one could bring The Trail right <u>over</u> the existing tunnel. One needs to see this to understand what I am suggesting. It is a VERY SIMPLE piece of construction. This would eliminate the need to build a bridge over the stream for The Trail, and would therefore be far simpler and less costly.

   Once past the tunnel, any wet area can be crossed by a raised structure (which again would be required anyway and more extensively under The Proposed Alignment). I have also run this area for 10 years in all seasons and, frankly, have never seen it wet. If one keeps The Trail close to the bottom of the Route 267 embankment along this area, it is not clear that any wet areas will be touched. This would also keep The Trail closer to Route 267 than the existing foot trail, avoiding the need to have The Trail confiscate or cross over the existing foot trail “loop” trail around the Valley.

3. <u>Obstacle #3: Getting through the narrow area between Route 267 and the Northstar golf course.</u> As one approaches the Northstar property (heading toward Lake Tahoe), there is a narrow area between the road and the edge of the Northstar golf course. The area in question is perhaps 50 to 75 yards long. Any reasonable person looking at this location would just move the golf course fence 5 to 8 feet to accommodate The Trail. Even if the County were unwilling to allow use its right of way, Northstar itself could easily make this adjustment. There would be no impact on

the golf course itself as the area in question is a grassy hill and is out of play. Now that Northstar has a new owner (Vail Inc.), it would be a good time to reconsider this area and see if a solution can be found.

<u>Proposed Issues to be Included for Evaluation in the EIR</u>

The issues below in part address ways to evaluate how to possibly overcome the three obstacles- making the Original alignment feasible. Other issues address the concerns stated earlier.

1. <u>Regional Trail's primary purpose</u>. Since the primary purpose of the Regional Trail is to provide for a safe, scenic route between Truckee and Lake Tahoe, the EIR should carefully evaluate whether cyclist would, in fact, use the Proposed alignment or the Original alignment. Determining this would require a specific survey of existing cyclists who frequent this route. It is recommended that such a survey be conducted as a central undertaking of the EIR process. If cyclists will not use one of the routes, it should not be constructed. And the 2006 survey was far too general to determine the answer to this critical question. In fact, no specific route or route alternatives were described in this survey. It was simply a question of concept: "Would you support a trail through the Valley and Northstar?" It would be irresponsible to proceed with a major, multi-million dollar project that will significantly impact the Martis Valley's recreational experience without first determining whether the Proposed Alignment would even accomplish the primary purpose of the Regional Trail.

2. <u>Issues specific to the Original Alignment.</u>

    a. <u>The Washoe Relic Area</u>. Variations to the Original Alignment should be explored to see if there is a way past this area that is acceptable to the Washoe elders. For example, would a raised trail (off the ground as though through a wetlands) that leaves the ground undisturbed and prevents users of the Trail from leaving it be acceptable? If not, can NCSD construct the Trail at the boundary between the high ground contain the relics and the wetlands, thereby avoiding crossing over the relic area at all?

    b. <u>Crossing Martis Creek</u>. Can the existing embankment be modified to route the Trail over the existing concrete tunnel through which Martis Creek flows thereby avoiding the construction of a separate bridge? Can

    c. <u>Crossing the wetlands</u>. Can the Trail be kept close enough to Route 267 in the area south of Martis Creek to avoid crossing over significant wetlands?

    d. <u>Getting Through the Narrow Are Between Route 267 and the Northstar Golf Course</u>. Can the fence on the golf course be moved 6 to 8 feet to allow room for the Regional Trail? Would Northstar's new owner, Vail resorts, be willing to make this accommodation in order to make the Original Route feasible?

3. <u>Issues specific to the Proposed alignment</u>

a. How many feet of wetlands will the Proposed alignment cross as compared to the Original route?

b. What will be the cost of constructing two bridges (compared tone or none on the Original route) and crossing wetlands?

c. How many times will the Proposed alignment cross the TMT? Where will it use (take away) the TMT? How will the TMT be re-constructed in these areas- alongside of the paved trail or at a reasonable, safe distance?

4. <u>Other.</u>

a. Who will hire the consultant to do the EIR? If it is NCSD, will the consultant be unbiased in evaluating the pros and cons of each route (the Proposed and the original routes)?

b. Are there any endangered species in the Valley, or species that are being considered to be listed as endangered? If so, what steps will be taken to protect their habitats?

c. Are there other possible alignments? For example, could The Trail tied into the existing trails in Glenshire; come up on the airport side of the Valley through Waddle Ranch; and connect into Northstar either at Northstar Drive or Highlands View Road?

I hope these comments will be helpful during the EIR process; and trust that they will be given full consideration.

Sincerely,

Henry DeNero

1255 Hillcrest Avenue

Pasadena, CA 91106

(626) 253-2773

And

1934 Gray Wolf

Truckee, CA 96161

(530) 562-8915

Kaitlin Costa

From: Cathy Spence-Wells
Sent: Friday, January 14, 2011 10:33 AM
To: Kaitlin Costa
Subject: FW: Martis Valley Trail Community Workshop Jan 19th

From: Mike Staudenmayer [mailto:mikes@northstarcsd.org]
Sent: Tuesday, January 11, 2011 4:21 PM
To: Walter Auerbach; Cathy Spence-Wells; lauren@streamlineimpact.com
Subject: FW: Martis Valley Trail Community Workshop Jan 19th

Mike

From: John Gaston [mailto:jmgaston1142@gmail.com]
Sent: Tuesday, January 11, 2011 10:03 AM
To: lauren@streamlineimpact.com; Mike Staudenmayer
Subject: Re: Martis Valley Trail Community Workshop Jan 19th

Unfortunately I will not be able to attend since I am out of town, but I would like to be on the record as endorsing this project 110% and to volunteer in whatever capacity is possible to help out. I am a registered civil engineer and a Northstar resident and good with a pick & shovel if need be.

Kaitlin Costa

From: Cathy Spence-Wells
Sent: Wednesday, January 19, 2011 7:00 AM
To: Kaitlin Costa
Subject: FW: Martis Valley Trail

From: Mike Staudenmayer [mikes@northstarcsd.org]
Sent: Tuesday, January 18, 2011 7:35 PM
To: Wally Auerbach; Cathy Spence-Wells; Lauren OBrien
Subject: Fwd: Martis Valley Trail

Mike Staudenmayer

Begin forwarded message:

From: ALAN GAULD <amg434@yahoo.com<mailto:amg434@yahoo.com>>
Date: January 18, 2011 7:22:15 PM PST
To: <mailto:mikes@northstarcsd.org> mikes@northstarcsd.org<mailto:mikes@northstarcsd.org>
Cc: <mailto:pacolindsay@sbcglobal.net>
pacolindsay@sbcglobal.net<mailto:pacolindsay@sbcglobal.net>
Subject: Martis Valley Trail

Mike, I would attend this meeting but will be in Arizona for the next couple of weeks, leaving early tomorrow. But I just wanted to send you a note to say that I am totally in favor of more bike trails in the area, and as many links to longer routes as possible. These trails, if completed, will be a huge asset to the area and contribute to real estate values and local businesses, as well as providing enjoyment and zero carbon transport for locals and visitors alike.
I have had homes in Truckee since 1988, and to be able to ride from the airport to the lake would be fabulous, and just might get a few cars off the road. So hope that gets incorporated in EIR.
Thanks for your support,
Alan Gauld
530-582-9763

Kaitlin Costa

From: Cathy Spence-Wells
Sent: Tuesday, January 18, 2011 4:51 PM
To: Kaitlin Costa
Subject: FW: Proposed Martis Valley Regional Trail

From: Mike Staudenmayer [mailto:mikes@northstarcsd.org]
Sent: Tuesday, January 18, 2011 4:48 PM
To: Wally Auerbach; Lauren OBrien; Cathy Spence-Wells
Subject: Fwd: Proposed Martis Valley Regional Trail

Begin forwarded message:

> **From:** Linda George <linda@ldgeorge.com>
> **Date:** January 18, 2011 4:36:57 PM PST
> **To:** <mikes@northstarcsd.org>
> **Subject: Proposed Martis Valley Regional Trail**
>
> Dear Mr. Staudenmayer,
>
> It looks like my comments are a bit late for the comment period, but I wanted to voice strong support for all four segments of the proposed trail. The addition of a safe, off-highway non-motorized route connecting Truckee, Northstar and "Four Corners" would be very much appreciated for both transportation and recreation.
>
> Thank you for your efforts on this!
>
> Linda George
> 11722 Bennett Flat Rd.
> Truckee 96161

Kaitlin Costa

From: Cathy Spence-Wells
Sent: Thursday, January 20, 2011 10:19 AM
To: Kaitlin Costa
Subject: FW: Message of Support for Proposed Martis Valley Regional Trail

---

From: Mike Staudenmayer [mikes@northstarcsd.org]
Sent: Thursday, January 20, 2011 9:29 AM
To: Walter Auerbach; Cathy Spence-Wells; lauren@streamlineimpact.com
Subject: FW: Message of Support for Proposed Martis Valley Regional Trail

Mike

From: Goerke@aol.com [mailto:Goerke@aol.com]
Sent: Wednesday, January 19, 2011 4:36 PM
To: Mike Staudenmayer
Subject: Message of Support for Proposed Martis Valley Regional Trail

Since I will be unable to attend the Community Workshop Tonight, I wanted to send a message of support for the project.

I've been living full-time in Truckee for over 11 years and I have owned property here and biked here for over 25 years.

During the summers I bicycle on 267 multiple times to Martis Lookout, to the Fiberboard Freeway and to Kings Beach - Tahoe City. The proposed trail will make these rides more enjoyable and much safer. The trail will also allow other people who want to access Fiberboard without getting on 267 to avoid a car trip.

The new trail offers a safe quiet experience for bicyclers, especially families, wanting a complete bike trail experience. It will also help establish the Truckee-Tahoe area as bike-friendly.

As one of many local residents wanting the Martis Valley to remain as pristine as possible, I am glad that the trail will be on the west side of 267 and will have minimum visual impact.

Thank you for giving me the opportunity to talk about this exciting project.

Bill Goerke
10850 Mougle Lane
Truckee, CA 96161

Kaitlin Costa

From: Cathy Spence-Wells
Sent: Friday, January 14, 2011 10:33 AM
To: Kaitlin Costa
Subject: FW: Martis valley regional trail

-----Original Message-----
From: Mike Staudenmayer [mailto:mikes@northstarcsd.org]
Sent: Monday, January 10, 2011 12:37 PM
To: Cathy Spence-Wells
Cc: Walter Auerbach; lauren@streamlineimpact.com
Subject: FW: Martis valley regional trail

Mike

-----Original Message-----
From: Benjamin Hart [mailto:blhart@ucdavis.edu]
Sent: Monday, January 10, 2011 11:39 AM
To: Mike Staudenmayer
Subject: Martis valley regional trail

Hi Mike,
This project sounds great. We have a second home on Beaver Pond (824).
We would love the trail for hiking, just like we have enjoyed other
existing trails.
Ben Hart

HOWARD & DEBORAH HENN
POST OFFICE BOX 9841
TRUCKEE, CALIFORNIA 96162
(530)386-4566 hdhenn@verizon.net

January 18, 2011

Mike Staudenmayer, General Manager
Northstar Community Services District
908 Northstar Drive
Northstar, California 96161

RE: MARTIS VALLEY REGIONAL TRAIL

Dear Mr. Staudenmayer,

We are the owners of the commercial building located at 9705 Highway 267 which appears to be directly in front of your new proposed trailhead (Phase 1). We are surprised we have not received any notification from either you or Placer County.

Because we are directly effected, we are requesting that we be notified of any information and/or correspondence you have in regards to this project as it pertains to our adjacent properties. Please forward this to our address above or email address.

Sincerely,

Howard & Deborah Henn

Howard & Deborah Henn

Kaitlin Costa

From: Cathy Spence-Wells
Sent: Thursday, January 20, 2011 10:19 AM
To: Kaitlin Costa
Subject: FW: Martis/Northstar trail

From: Mike Staudenmayer [mikes@northstarcsd.org]
Sent: Thursday, January 20, 2011 9:29 AM
To: Walter Auerbach; Cathy Spence-Wells; lauren@streamlineimpact.com
Subject: FW: Martis/Northstar trail

Mike

-----Original Message-----
From: todd huckins [mailto:trhuckins@msn.com]
Sent: Wednesday, January 19, 2011 4:47 PM
To: Mike Staudenmayer
Subject: Martis/Northstar trail

Mike,
I hope to attend this evening but if not wanted you to know that my wife and I strongly support your trail proposal. Additionally we feel that the highest use would be a paved trail.
thank you,
Todd and Carol Huckins

Katherine Waugh

From: Ellie& Don Hyatt [hyatt@usamedia.tv]
Sent: Friday, January 21, 2011 12:37 AM
To: Mike Staudenmayer
Subject: Martis Valley

Jan.20,2011

Mike Staudenmayer, General Manager
Northstar Community Services District
908 Northstar Drive
Truckee, Calif. 96161

Dear Mr. Staudenmayer,

Enclosed you will find my comments that I would like included in the Notice of Preparation of a Draft EIR for the Proposed Martis Valley Regional Trail.

As noted in my previous comment letter, I am a proponent of public safety and a bike owner myself. I am over a 35 year resident of Truckee and have used the Martis Valley for walking and exercising for years. We walked the area before the Army Corp of Engineers purchased the area that they presently own. It is rare that I ever see a bike on Martis Dam Road. Today, in less than an hour [from 1:50 p.m. to 2 :45 p.m.] , I counted 41 people walking on the dam road. All but 4 of them had their dogs with them. There were no bike riders. I asked several people who walk the Martis dam road often, how many bike riders they see in a week. The answer was perhaps one or two and usually they are the same people. We had to park almost out to route 267 as the parking area was full. This is a Thursday during mid winter. In the summer, the wildlife area parking is filled with most people walking and exercising their dogs unrestrained. It has been occurring for many years. **There will be a potential conflict between the various users. How will you resolve the conflict between the speeding bike riders and the dog walkers using the road? There was no mention in the initial 52 page study of current users of the Martis Valley area.** Dogs , joggers and walkers have been using the paths and dirt road for years. During the springtime and rainy summer periods, the Army Corp closes the lower path along the stream to dogs /foot traffic so we use the upper road. Most everyone cleans up after their dogs so as to keep the streams clean and clear running..
How will the maintenance be paid for this path? I have spoken to local residents that have color added to their asphalt and the color washes away with time and has to be replaced. Why does the surface have to be paved? How will the chemicals be kept out of the streams used for the initial paving and future upkeep? What alternative surface options have been reviewed? If the proposed trail is constructed, will the trail be plowed during winter months? How will the water quality be protected during the plowing? Does the trail conform with the intent of the Martis Valley Community plan? The plan includes provisions that require the new development be designed to blend with the natural terrain. A paved road does not blend in with the natural terrain. No matter what color you would choose for the asphalt, it would never look natural. It would not maintain the character or visual quality of the area. **If vegetation is to be replaced due to construction, what method will be used to water the new vegetation and trees that will be replaced? If the vegetation or trees die that you have replaced, will you continue to replace them until they are mature? It takes years for some trees /plants to grow.**
I would like to see a full study of all alternative alignments for the trail. Will there be a 100% equal investigation done on possible alternative routes for the proposed bike path? If not, please tell me why the investigations will not occur.
It appears that during the initial construction, a 20 foot wide disturbance will occur. Trees will have to be removed in order to complete the path. If the path were to be placed parallel to route 267 with a buffer between the path and the road, there would be no tree removal. If you have traveled to Sun Valley, Id. , you will note that the bike paths follow the roads and the dog user/jogging and walking paths are routed inland. This is what should occur in the Martis Valley. Since we are only talking about approximately a mile in length along route 267, the noise would have very little effect on bikers. They will cover the distance in very little time. It will also be ADA compliant. It would have little effect on the streams. Also, people will have little opportunity to make their own paths and create more erosion in the valley. Do you consider the current alignment the most efficient transportation route?
Last evening, it was stated that there will be approximately 86 more vehicle trips using the parking area. Since there is very little area to currently park, where do you intend to place a new parking lot and what will become of the old parking lot? Since I was told the parking area and the entrance around the lot contains so many Washoe Indian artifacts, it will be

difficult to place it in that area. Will a turning lane be installed off of route 267 for the increase volume of traffic. It appears that it will be needed for ingress/egress onto route 267.At present, it is a very dangerous area for ingress/egress!! How large will this new parking lot be?
Please remember that the Washoe Indian tribes spent their summers living in the *entire* valley; not just the area along route 267. I would like to know ,specifically ,what special sites are next to route 267 and what do they contain that other sites in the valley do not contain. Arrowheads have been found throughout the Martis Valley. Where are the Washoe burial sites located in the valley?
Please provide detailed information on the bridges or areas used for water crossings and the impact on the environment. Water quality is a large concern of the community. With all the new construction that will occur, what measures have been put in place to insure that the water quality will remain the same and that more erosion will not occur with the large areas to be effected. Martis Valley is within the 100 year flood plan. In 1997, the valley was totally flooded and looked like a large lake. What measures will be put in place insure that the asphalt /bridges/chemicals will not wash into the Martis creek?
The wildflowers of Martis Valley are abundant in the springtime. **What measures will be put in place to preserve and not disturb them? It is the only area where there is such a wide variety of flowers and they can not be found in other areas around Truckee.**

<u>In conclusion, I would again like to state that alternative routes must be totally reviewed .</u> This is such a pristine area that is enjoyed by so many and the Army Corp has worked very hard to keep it pristine and natural in appearance. Large groups of community members turn out every year to work on Truckee River Day to reroute paths to prevent further erosion in the valley. Now, it appears, that you are going to totally ignore the desires of the community to keep the area natural in appearance and add artificial means to destroy a gorgeous area. A paved path is not needed for a transportation route between Shaffer Mill road and Northstar. People can walk, as they have done for many years ,on a dirt surface. Please keep the paths in the valley natural and route the bike traffic parallel to 267. Most visitors to our area do not bring bikes with them on vacation. Most avid bike riders will not be using this path. It seems such a waste of money to destroy a beautiful area for so very few.
Thank you for your consideration.
Ellie Hyatt

Mike Kahlich
12289 Sierra Dr.
Truckee, CA 96161
(530)448-1582

Northstar Community Services District
Mike Staudenmayer, General Manager
908 Northstar Drive
Northstar, CA 96161
(530) 562-0747

Subject: EIR Notice of Preparation

Dear Mr. Staudenmayer, Jan 21, 2011

Thank you for your work on the Martis Valley Trail. While I am writing for myself, I assure you that I am not the only Truckee resident concerned about an asphalt trail through the Martis Valley. I appreciate your team's consideration of my comments as you begin preparation of the EIR. I have walked the trail's full route at various different times over my 7 years of living in Truckee, with most of my time spent walking Martis Valley's various trails. I have read the NOP, and I attended the Town Hall meeting on January 19th.

1) Please consider the impact of the proposed impervious asphalt surface on water quality. Concentrated runoff and erosion, in addition to the toxics found in asphalt, are legitimate concerns in minimizing detrimental environmental impact. While asphalt utilizes existing technology and infrastructure, as well as drawing upon existing installation knowledge, asphalt is not the world's ultimate hard surface.

The most structurally and hydrologically appropriate, aesthetically pleasing, economically advisable (over the long term), and environmentally responsible surface for the MV Trail would be pervious concrete.

A pervious concrete pavement and its subbase can provide enough water storage capacity to eliminate the need for ditches, retention ponds, swales, and other precipitation runoff containment strategies. Clogging problems are mainly an issue of design. If a natural area with grass or exposed soil is allowed to drain stormwater across a pervious concrete pavement, fine material can indeed be introduced into the system causing localized clogging.

Pervious concrete has been placed in freeze-thaw climates for over 15 years. Successful applications of pervious concrete in freeze-thaw environments have two common design features-- the cement paste is air-entrained, and the pervious concrete is placed on 6–12 inches of drainable aggregate base (¾” or larger clean gravel).

Concrete pavements have a significantly lower life-cycle cost than alternatives such as asphalt. Although the initial cost of pervious installation may be slightly higher, concrete saves money in the long run due to its superior durability and strength. It requires fewer repairs than asphalt, and has a longer overall lifespan as well. Pervious concrete is also economical in that it minimizes the need for runoff retainers, reducing property costs. There is very little overproduction since it is made directly on-site and as-needed, and it can be recycled once it has reached the end of its life-cycle. Thus pervious concrete is widely recognized as the lowest life-cycle cost option available for paving.

The key to high-performance concrete is the use of supplementary materials such as silica fume, fly ash, and blast furnace slag, all which increase durability by decreasing permeability and cracking. Concrete strength can also be maximized by installing subgrade and subbase levels of course and/or fine aggregates beneath the pavement.

Pervious concrete could also be colored to march the Martis Valley soil. Who wants a black strip of asphalt running through Martis Valley? Please consult the literature available on pervious concrete in alpen environments and consider the numerous advantages to surfacing the trail with something better than asphalt.

2) During the Jan. 19th meeting, the signage for the trail and interpretive stations - all options - appear to be visually obtrusive. It would turn the MV Trail into a spectacle. Please consider the cost, visual, and other benefits of minimal signage, displays without roofs, and generally creating interpretive centers that blend far more seamlessly with the natural landscape. Giant ranch-style entrances and the like are recipes for cost over-runs and more maintenance dollars. Shouldn't the money go toward a quality *trail* that melds with the Valley?

3) Please consider the most appropriate location and design for bathrooms. Their placement seems best kept in trees and out of sight. the farther they are away from the highway, the less they will be vandalized, used, and abused. This will lower maintenance expenses. Please consider the costs and waste incurred by piping water to any point along the trail (for drinking fountains, toilets, whatever). Composting toilets or waterless toilets seems most sensible. **No bathrooms on the trails would be my first preference. Again, this is a trail, not a park.** Restrooms are available near the trailhead at the airport business parks, and they are available at the Northstar Village.

4) Please consider using only native vegetation in the landscaping. Consider also minimizing the amount of landscaping needed. Revegetation of the wetlands should be a priority (it seems that it is, according to the comments I heard on Jan, 19th).

5) Please consider the wisdom in using some blend of bioDiesel in the equipment being employed in trail building. It is locally available (Simple Fuels Biodiesel, Chilcoot, CA) and is produced to meet the ASTM D6751 specification; it's also made exclusively from regionally collected waste vegetable oil. It is essentially the same price as diesel and can be delivered just like regular Diesel #2. There is also red-dyed bioDiesel available for offroad only machines. Contrary to what is stated in the NOP, the emissions from building 9.3 miles of trail are going to be considerable. It seems disingenuous to claim that anyone building 9.3 miles of trail won't be effected by all the Diesel fumes emitted.

Please raise the bar with this trail. The valley, its inhabitants, and its users deserve it. Northstar/Vail Resorts has the opportunity to make the trail a model for others, not just another strip of asphalt through a beautiful, undeveloped area. The MV Trail could show users how uninspired and conventional the thinking is at Northstar, or it could show users what Northstar can do and how much more enjoyable such a trail is, thus inspiring trail developers around the country to begin building the next generation of trails.

Thank you again for your time,

Sincerely,

Mike Kahlich

Kaitlin Costa

From: Cathy Spence-Wells
Sent: Friday, January 14, 2011 10:33 AM
To: Kaitlin Costa
Subject: FW: Martis Valley Trail

From: Mike Staudenmayer [mailto:mikes@northstarcsd.org]
Sent: Monday, January 10, 2011 12:38 PM
To: Cathy Spence-Wells
Cc: Walter Auerbach; lauren@streamlineimpact.com
Subject: FW: Martis Valley Trail

Mike

From: Mark Kalisch [mailto:mrkalisch@yahoo.com]
Sent: Monday, January 10, 2011 11:05 AM
To: Mike Staudenmayer
Subject: Martis Valley Trail

We support all trail upgrades to Martis Valley. Mark Kalisch 4001 Ski View

Kaitlin Costa

From: Cathy Spence-Wells
Sent: Thursday, January 20, 2011 2:20 PM
To: Kaitlin Costa
Subject: FW: Martis Valley proposed Bike Trail.

From: Mike Staudenmayer [mikes@northstarcsd.org]
Sent: Thursday, January 20, 2011 2:09 PM
To: Walter Auerbach; steveteshara@gmail.com; Cathy Spence-Wells; lauren@streamlineimpact.com
Subject: FW: Martis Valley proposed Bike Trail.

Mike

From: Brigitte Kaneda [mailto:kbkaneda@suddenlink.net]
Sent: Thursday, January 20, 2011 2:08 PM
To: Mike Staudenmayer
Subject: Fw: Martis Valley proposed Bike Trail.

----- Original Message -----
From: Brigitte Kaneda<mailto:kbkaneda@suddenlink.net>
kbkaneda@suddenlink.net<mailto:kbkaneda@suddenlink.net>
Subject: Martis Valley proposed Bike Trail.
January 20, 2011

Mike Staudenmayer,
General Manager, Northstar

Re: Martis Valley proposed paved Bike Trail.

Dear Sir,

I have used the Martis Valley area for hiking and dog walking for the last 20 years. Part of that area has already been fenced off due to development. The area for dog walking is getting smaller and smaller and if our trails are being paved for bikers we have no where to go with our dogs. It would also severely and negatively impact the wildlife and fauna in that area.

I therefore object very strongly to that project.

As an alternative to your present proposed bike trail location would you consider a paved bike path paralelling Hyway 267? If not could you give me a reason why?

Sincerely,

Brigitte Kaneda

Katherine Waugh

From: Cathy Spence-Wells
Sent: Friday, January 21, 2011 3:27 PM
To: Katherine Waugh; Kaitlin Costa
Subject: FW: Martis Valley Regional Trail

From: Mike Staudenmayer [mikes@northstarcsd.org]
Sent: Friday, January 21, 2011 2:43 PM
To: Walter Auerbach; steveteshara@gmail.com; Cathy Spence-Wells; lauren@streamlineimpact.com
Subject: FW: Martis Valley Regional Trail

Mike

From: Gina Layh [mailto:GHolmes@ierstahoe.com]
Sent: Friday, January 21, 2011 2:41 PM
To: Mike Staudenmayer
Subject: Martis Valley Regional Trail

Hello Mike,

I support the building of the Martis Valley Regional Trail. As a long time resident of the area and a mother of a baby boy I encourage any growth in recreational opportunities. It is great to have more ways to access the outdoors than just dirt trails. Dirt trails are not accessible to everyone. I am also a long time volunteer for Disabled Sports USA based in Alpine Meadows. If constructed this could be a great place to grow their adaptive bicycling program.

Thank you,

Gina Layh
Monitoring and Research

Integrated Environmental Restoration Services 2780 Lake Forest Road PO Box 7559 Tahoe City, CA 96145

Kaitlin Costa

From: Cathy Spence-Wells
Sent: Wednesday, January 19, 2011 1:57 PM
To: Kaitlin Costa
Subject: FW: Northstar Class I bike trail

From: Mike Staudenmayer [mailto:mikes@northstarcsd.org]
Sent: Wednesday, January 19, 2011 12:26 PM
To: Wally Auerbach; Cathy Spence-Wells; Lauren OBrien
Subject: Fwd: Northstar Class I bike trail

Mike Staudenmayer

Begin forwarded message:

> **From:** Carol Lindsay <carolindsay@sbcglobal.net>
> **Date:** January 19, 2011 11:53:31 AM PST
> **To:** mikes@northstarcsd.org
> **Subject: Northstar Class I bike trail**
>
> Hello Mike: I want to thank Northstar for their efforts and interest in the Northstar Class I bike trail from Northstar to the Town of Truckee. I am an avid cyclist and especially interested in additional paved trails connecting Truckee to outlying communities for commuting and recreational cycling. Unfortunately, I will be unable to attend the meeting tonight regarding this proposed bike trail. I want to give you my input regarding this Class I paved trail so my voice can be heard. I am whole heartedly in favor of this trail. I use the Martis Valley trail system daily in the summer and would love to see a paved trail for bicyling to and from Northstar to Truckee. It would be a valuable asset to the community. I visited Colorado last summer and was impressed with the extensive paved bike trails linking communities. It appeared the trails were extensively used for communting and recreation, this improving the community and providing an avenue for cyclists to commute rather than drive to and from work. Thank you for your efforts,
> Carol Lindsay

Kaitlin Costa

From: Cathy Spence-Wells
Sent: Wednesday, January 26, 2011 12:37 PM
To: Kaitlin Costa; Katherine Waugh
Subject: FW: Support for the martis Valley Trail

From: Mike Staudenmayer [mailto:mikes@northstarcsd.org]
Sent: Wednesday, January 26, 2011 11:16 AM
To: Walter Auerbach; Cathy Spence-Wells; lauren@streamlineimpact.com; steveteshara@gmail.com
Subject: FW: Support for the martis Valley Trail

Not sure if I sent this to you.

Mike

From: pacolindsay@sbcglobal.net [mailto:pacolindsay@sbcglobal.net]
Sent: Friday, January 14, 2011 2:14 PM
To: Mike Staudenmayer
Subject: Support for the martis Valley Trail

Hi Mike,

Paco Lindsay here, owner of Paco's Truckee Bike and Ski, long time resident of Truckee. I can not make the meeting regards the Martis Valley Trail on Jan 19, as I will be at the winter outdoor retailer show. I want to go on record that I completely back and support the building of this trail, and the alignment picked. I know the area quite well and feel that a class I on that side of the valley is a good choice.

Paved class I trails are all inclusive to members of a community, as well all encompassing. They benefit and serve a diverse and wide ranging user group. A trail which connects communities, as this one will, and will be used by many; just the idea of preventing it from being a paved trail is very selfish. Opposing the paving and construction only keeps it an exclusive trail enjoyed by an elite few. The area out in Martis has other dirt trails which will remain. While it is a pretty area today, and nice to recreate in, it is a far cry from some unspoiled, untouched part of the Sierra that some distracters have attempted to make it into. Our area has literally hundreds of miles of great dirt, hiking trails. The PCT, Tahoe Rim Trail, and The Donner Rim Trail are but the start of the long list. The amount of class I trails locally are few or but partially complete. Sun Valley, Jackson, Park City, Aspen, Lake Placid, Vail and other outdoor towns similar to Truckee have great networks of connective paved class I trails. Some do not like this comparison. They think of our area as some funky little town. OK, I will go further and say that hundreds of regular towns, like Sioux City Iowa, Lafayette Indiana, Greenville NC, to name but three have very will designed and well used Class I trails in place.

This trail is a far from some novel, radical idea for a town, let alone a mountain town, voted as one of the "best" Mountain towns in the USA. It is 2011, it is about time our great region catches up and builds class I trails like this planned Martis Valley Trail.
Thanks,

Paco Lindsay
587-5561
(I have contacted about 200 of my own trail advocates to either attend this meeting or to send you comments of support.)

Katherine Waugh

From: Cathy Spence-Wells
Sent: Friday, January 21, 2011 3:26 PM
To: Katherine Waugh; Kaitlin Costa
Subject: FW: martis valley trail plan draft eir

From: Mike Staudenmayer [mikes@northstarcsd.org]
Sent: Friday, January 21, 2011 1:29 PM
To: Walter Auerbach; steveteshara@gmail.com; Cathy Spence-Wells; lauren@streamlineimpact.com
Subject: FW: martis valley trail plan draft eir

Mike

From: patty lomanto [mailto:plomanto@sbcglobal.net]
Sent: Friday, January 21, 2011 1:27 PM
To: Mike Staudenmayer
Subject: martis valley trail plan draft eir

Dear Mr. Staudenmayer:

I am a 20-year resident of the Truckee/Tahoe area, Placer County taxpayer, and ardent advocate of preservation of Martis Valley and the watershed. As a frequent user of the wildlife area for exercise and recreation and a volunteer with the Truckee River Watershed Council on Truckee River Day, I have had years of enjoyment of the natural environment, beautiful vistas, changing seasons, wildlife and wild flowers that the area offers to both local residents and visitors.

While I support the idea of connectivity via a trail, I find the proposal to construct and maintain a paved, bike path through this area to be entirely incompatible with the preservation and restoration of the Martis Creek, the wetlands, and the current and historic pedestrian trail use. Lastly, the protection of the natural ecosystems and its vistas are not adequately addressed.

Here are my questions:

1. What amount and type of vehicle traffic will be generated from the trail plan?
2. Where will the vehicles park? What type of pavement. What type of left turn or other highway modifications would be made to accommodate these new uses and traffic.
3. How will the construction itself impact the environment, i.e. runoff to Martis Creek etc.
4. How wiill the bike use impact the environment, including air quality. Will mountain bikes be allowed to co-mingle with pedestrians and dogs on the dirt paths?
5. What are the alternate routes that could provide less environmental impact and visual blight?
6. Has Cal Trans reviewed and approved of the proposed trails?
7. Who will pay for maintenance, security of the trails?
8. Has a path using the newly created parking area for Waddle Ranch (near Martis Lake) been considered? Certainly, this are is less environmentally sensitve that the wildlife area.
9. What continued mitigation measures would be in place to offset environmental impacts? Will Northstar pay that or is the Placer County taxpayer to pay?
10. What is the projected volume of users for the proposed trail? Where will they orginate, i.e. Northstar, Wildlife area, Sawtooth?? What are the alternate parking or loading areas? Has Soaring Way and the PC 3 development area been included in the alternate planning? What type of coodination has been made with the the Town of Truckee?

Thank you for the opportunity to comment. Appreciate responses to questions.

Sincerely,

Patty Lomanto
10385 Pine Cone Dr
Truckee Ca 96161

Katherine Waugh

From: Cathy Spence-Wells
Sent: Friday, January 21, 2011 3:49 PM
To: Katherine Waugh; Kaitlin Costa
Subject: FW: Proposed Bike Trail through NorthStar

From: Mike Staudenmayer [mikes@northstarcsd.org]
Sent: Friday, January 21, 2011 3:35 PM
To: Walter Auerbach; Cathy Spence-Wells; steveteshara@gmail.com; lauren@streamlineimpact.com
Subject: FW: Proposed Bike Trail through NorthStar

Mike

From: Shirley [mailto:calowes@prodigy.net]
Sent: Friday, January 21, 2011 2:57 PM
To: Mike Staudenmayer
Cc: Nathan Stoll; Bowe, Susan; Robertson, Candy; Geiger, Carol
Subject: Proposed Bike Trail through NorthStar

Hi Mike,

We are Northstar homeowners for more than 17 years and have been coming to Northstar for 30 years. We could not attend the Community Trail Workshop that was held recently, but wanted to formally state our objections to the proposed Martis Valley Regional Trail alignment. We would also like our objections reflected in the EIR and attached to the letter sent to you on January 19, 2011 by our neighbor Nathan Stoll, owner, 531 Wolf Tree.
Regards,
Shirley and Simon Lowes
533 Wolf Tree

1/20/11

Mike Staudenmayer, General Manager
Northstar Community Services District
908 Northstar Drive
Northstar, CA 96161

RE: Comments on the Notice of Preparation of a Draft Environmental Impact Report for the proposed Martis Valley Regional Trail

Dear Mr. Staudenmayer:

I have some concerns regarding the above referenced Draft EIR and would appreciate it if you could address and include the following comments and questions in the scope of the document;

-how will you handle the traffic and ingress/egress for the new trailheads and where will these be located
-please provide the alternative trail alignments than those proposed and why they were not being used
-provide the impacts that trail users will create and how you will handle impacts when people leave the trails and how will this concern be avoided'
-provide alternative trail surfaces, indicate how you will deal with erosion of the petroleum products introduced in these paved trails and the maintenance of the trails with petroleum crack sealers and pavement sealers through a pristine environment
-if the trails are proposed to be used year round, how will this be accomplished-if the snow is to be removed, how will you deal with the runoff and adverse affects to the environment
-how will you deal with crossing streams, wetlands and other sensitive areas-erosion, silt into the streams and drainages
-providing access to more people and varied used-bikes, hikers, etc. how will you handle the combination of these uses for safety, traffic concerns. Address how the additional numbers of individuals will be handled-trash, flow of traffic, leaving trails.
-provide a detailed wetland map delineating the trails on the map
-the study indicates the area has cultural resources, how will these be dealt with and protected. Will there be an archeologist on site during the construction to evaluate these resources and reroute to protect them?

Thank you for your review and inclusion of my concerns in the EIR.

Sincerely,

Janet Mann

Katherine Waugh

From: Cathy Spence-Wells
Sent: Friday, January 21, 2011 11:20 AM
To: Katherine Waugh; Kaitlin Costa
Subject: FW: Comments on Martis Valley trail

From: Mike Staudenmayer [mikes@northstarcsd.org]
Sent: Friday, January 21, 2011 11:17 AM
To: Walter Auerbach; Cathy Spence-Wells; steveteshara@gmail.com; lauren@streamlineimpact.com
Subject: FW: Comments on Martis Valley trail

Mike

From: Garrett McCullough [mailto:gwmccull@yahoo.com]
Sent: Friday, January 21, 2011 11:15 AM
To: Mike Staudenmayer
Subject: Comments on Martis Valley trail

Hi Mike,

I strongly support this project. I used to regularly ride my road bike to Northstar but have stopped due to the danger (real or perceived) of riding along the shoulder of Hwy 267.

I feel that the trail should be the paved 10ft option. This will provide the best accessibility to a multitude of users including road bikes, roller blades and wheelchairs.

I am in favor of the trail alignments that place the path as far from Hwy 267 as possible.

Building a viable alternative to automotive transportation shouldn't necessitate environmental degradation. I favor the most comprehensive restoration plan possible.

Thanks,
Garrett McCullough
Truckee, CA

Katherine Waugh

From: Cathy Spence-Wells
Sent: Friday, January 21, 2011 11:20 AM
To: Katherine Waugh; Kaitlin Costa
Subject: FW: Comments from Martis Valley Regional Trail meeting

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From: Mike Staudenmayer [mikes@northstarcsd.org]
Sent: Friday, January 21, 2011 11:15 AM
To: Walter Auerbach; steveteshara@gmail.com; Cathy Spence-Wells; lauren@streamlineimpact.com
Subject: FW: Comments from Martis Valley Regional Trail meeting

Mike

From: Rachel McCullough [mailto:rachel.mccullough1@gmail.com]
Sent: Friday, January 21, 2011 11:06 AM
To: Mike Staudenmayer
Subject: Comments from Martis Valley Regional Trail meeting

Hi Mike,

I have a few quick comments about the proposed trail.

I support the project and agree with the proposed 10ft paved trail. I believe accessibility for everyone is extremely important and that pavement is necessary for this project to truly be an alternative to transport by car. I favor the alignments that are furthest from Hwy 267. I believe the restoration work done in conjunction with the TRWC to be a very valuable part of the project and favor enhancing the scope of the restoration.

Thanks,
Rachel McCullough
Truckee, CA

Kaitlin Costa

From: Cathy Spence-Wells
Sent: Friday, January 14, 2011 10:33 AM
To: Kaitlin Costa
Subject: FW: Regional Trail

From: Mike Staudenmayer [mailto:mikes@northstarcsd.org]
Sent: Tuesday, January 11, 2011 8:45 AM
To: Cathy Spence-Wells
Cc: Walter Auerbach; lauren@streamlineimpact.com
Subject: FW: Regional Trail

Mike

From: bob1.merritt@comcast.net [mailto:bob1.merritt@comcast.net]
Sent: Monday, January 10, 2011 7:28 PM
To: Mike Staudenmayer
Cc: geoff@npoa.info
Subject: Regional Trail

Mike Staudenmayer:

Our family owns property on Wolftree at Northstar. We have been an owner at Northstar since 1978 and our family use the hiking trails often. They are a wonderful benefit to the homeowners. We are unable to attend the meeting, but wish to express our very strong support for the proposed 9.5 mile Martis Valley Regional Trail under consideration. Thank you.

Bob Merritt

Kaitlin Costa

From: Cathy Spence-Wells
Sent: Friday, January 14, 2011 10:33 AM
To: Kaitlin Costa
Subject: FW: Martis Valley Regional Trail Project

From: Mike Staudenmayer [mailto:mikes@northstarcsd.org]
Sent: Tuesday, January 11, 2011 8:45 AM
To: Cathy Spence-Wells
Cc: Walter Auerbach; lauren@streamlineimpact.com
Subject: FW: Martis Valley Regional Trail Project

Mike

From: Mark Nathan [mailto:mnathan@ccmedgroup.com]
Sent: Monday, January 10, 2011 6:41 PM
To: Mike Staudenmayer
Subject: Martis Valley Regional Trail Project

I've been a property owner in Northstar for more than 20 years (1621 Deer Path).

I favor this project mainly because I have always had serious concerns about bicyclist safety on the shoulders of SR267.

This trail would promote bicycling in a safe and aesthetically pleasing way between Kings Beach and Truckee, which is a much needed feature.

It would in particular make this route far more accessible to teenagers and young adults.

My only concern is the steepness of the grade from Northstar to the Valley floor. If necessary, a curved route or switchback system should be incorporated in order to minimize the grade and optimize the accessibility.

Mark D. Nathan, M.D.

reply to: mnathan@ccmedgroup.com

Kaitlin Costa

From: Cathy Spence-Wells
Sent: Friday, January 14, 2011 10:33 AM
To: Kaitlin Costa
Subject: FW: Martis Valley Trail
Attachments: apn map.pdf

-----Original Message-----
From: Mike Staudenmayer [mailto:mikes@northstarcsd.org]
Sent: Monday, January 10, 2011 1:55 PM
To: Cathy Spence-Wells; Walter Auerbach
Subject: FW: Martis Valley Trail

Mike

-----Original Message-----
From: Geoff Stephens [mailto:geoff@npoa.info]
Sent: Monday, January 10, 2011 1:22 PM
To: Mike Staudenmayer
Cc: 'Dick Paterson'
Subject: FW: Martis Valley Trail

Hi Mike,

Here is a comment from Richard Parks. I am assuming the Richard is referring to Parcel 110-081-028 formerly 110-080-005.

Assuming this parcel could be used for possible development, how fluid is the movement of the trail within the parcel?

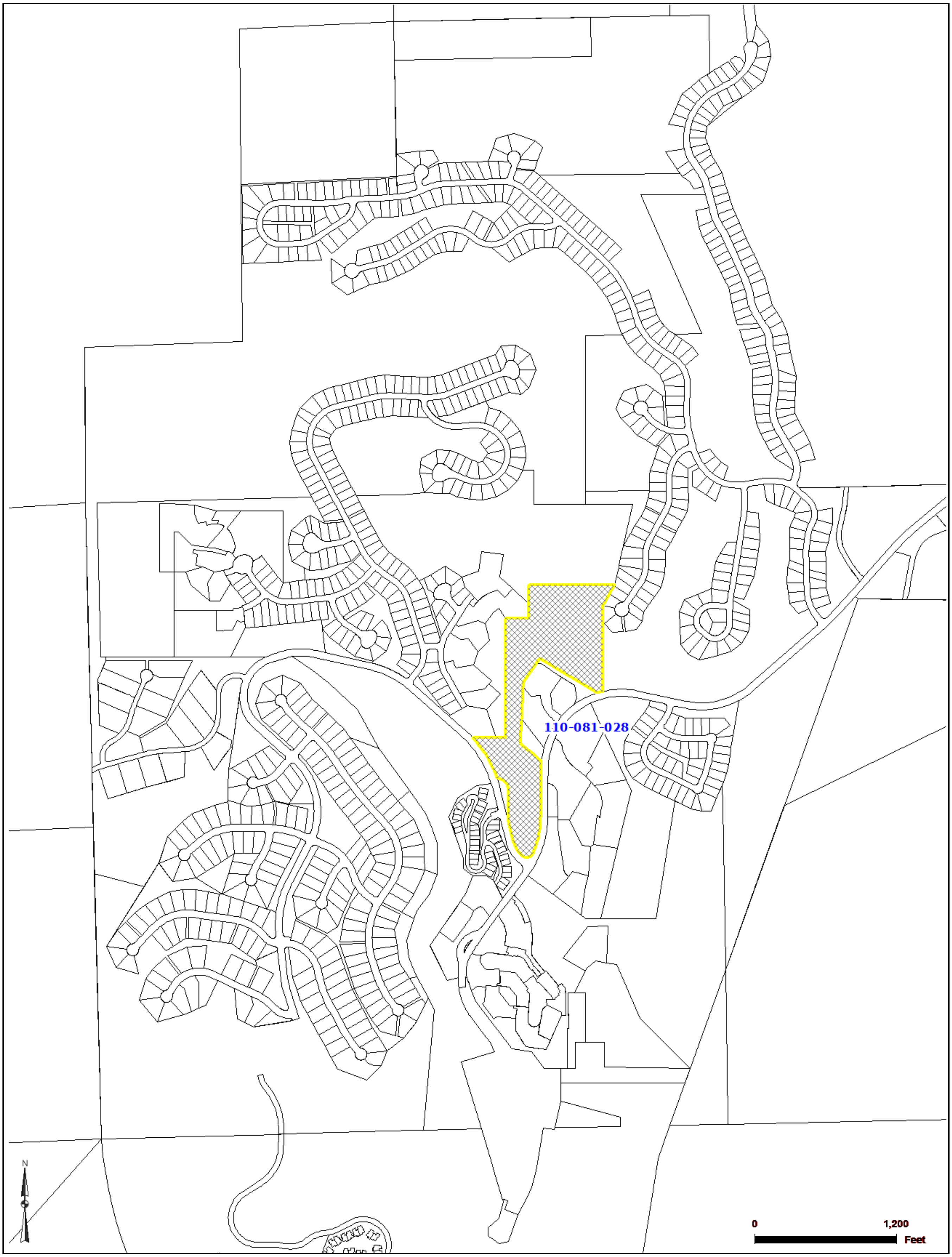
Geoff

Geoff S. Stephens
General Manager
Northstar Property Owners Association
2200 North Village Lane
Truckee, CA 96161
530-562-0322 Office
530-562-0324 Fax
geoff@npoa.info

-----Original Message-----
From: Dr. Richard Park [mailto:rijepark@sbcglobal.net]
Sent: Monday, January 10, 2011 12:35 PM

To: geoff@npoa.info
Cc: Dick Paterson
Subject: Martis Valley Trail

Hello Geoff, What is the location of the proposed trail in the area of the parcel of land that NPOA owns West of Northstar Drive near the the pond North of the CSD building? The map on the NCSD website seems to place the trail directly through NPOA land or immediately next to it.
The integrity of our parcel should be maintained as the parcel
has the potential for possible future development, sale or trade.
Best wishes, Richard Park


110-081-028
N
0
1,200
Feet

Katherine Waugh

From: dlpovey@aol.com
Sent: Friday, January 21, 2011 7:08 AM
To: Mike Staudenmayer
Subject: community trail

Dear Mike,

We are Northstar homeowners living at 151 Basque and we could not attend the Community Trail Workshop the other day, but wanted to formally state our objections to the proposed Martis Valley Regional Trail. We would also like our objections reflected in the EIR and attached to the letter sent by Nathan Stoll of 531 Wolf Tree to you on January 19th, 2011.

Regards,
Candy and Peter Robertson

Kaitlin Costa

From: Cathy Spence-Wells
Sent: Thursday, January 20, 2011 10:20 AM
To: Kaitlin Costa
Subject: FW: Comments
Attachments: --static--liam_fetch_lb.gif; --static--liam_fetch_bl.gif

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From: Mike Staudenmayer [mikes@northstarcsd.org]
Sent: Thursday, January 20, 2011 9:31 AM
To: Walter Auerbach; Cathy Spence-Wells; lauren@streamlineimpact.com
Subject: FW: Comments

Mike

From: Helga Roghers [mailto:hroghers@att.net]
Sent: Wednesday, January 19, 2011 7:15 PM
To: Mike Staudenmayer
Subject: Comments

[cid:1295492068266@dclient.mail.yahoo.com]

I understand that Northstar wants to connect their vacationers to Truckee and the Northshore by a new paved trail, which is good for Northstar and our business community, but the walking trails need to remain intact. This is also good for the health of our visitors, locals and a place for our dogs. I have been a resident of Tahoe for 25 years and have used the trail system for many years. It has been reduced several years ago by an ugly fence and a huge sign to keep out of Northstar's property. People have been trying to protest, but to no avail. I suggest that you open that part of the trail through the woods again, which is cool in the summer and much more scenic. I have nothing against a bicycle path that is totally separate from the walking folks who are looking for a quiet and pristine environment. Having to dodge bikers is not my idea of relaxation nor is it safe. The parking problem also needs to be addressed as well as a safe turning lane.
Thank you for your consideration,
Helga Roghers
P.O.Box 898, Carnelian Bay, Ca. 96140

[cid:1295492068267@dclient.mail.yahoo.com]

Kaitlin Costa

From: Cathy Spence-Wells
Sent: Friday, January 14, 2011 10:33 AM
To: Kaitlin Costa
Subject: FW: new trail

-----Original Message-----
From: Mike Staudenmayer [mailto:mikes@northstarcsd.org]
Sent: Tuesday, January 11, 2011 8:45 AM
To: Cathy Spence-Wells
Cc: Walter Auerbach; lauren@streamlineimpact.com
Subject: FW: new trail

Mike

-----Original Message-----
From: Charles Schmuck [mailto:cschmuck@pacbell.net]
Sent: Monday, January 10, 2011 8:18 PM
To: Mike Staudenmayer
Subject: new trail

Hi,

I think this is terrific. I would also love to someday see a bike trail from Northstar to Truckee.

Keep up the good work protecting our precious space there.

Charles

Kaitlin Costa

From: Cathy Spence-Wells
Sent: Friday, January 14, 2011 10:33 AM
To: Kaitlin Costa
Subject: FW: Comment on Martis Valley Trail

-----Original Message-----
From: Mike Staudenmayer [mailto:mikes@northstarcsd.org]
Sent: Monday, January 10, 2011 12:37 PM
To: Cathy Spence-Wells
Cc: Walter Auerbach
Subject: FW: Comment on Martis Valley Trail

Mike

-----Original Message-----
From: Alex Sherer [mailto:drfaces@sbcglobal.net]
Sent: Monday, January 10, 2011 12:33 PM
To: Mike Staudenmayer
Subject: Comment on Martis Valley Trail

Mr. Staudenmayer,

The description of the trail mentions pedestrians, bikes and "other non-motorized transportation" or similar phrasing.

We would like to see explicit inclusion of equestrian (horses) transport in the description.

Thank you for passing our comment along to appropriate parties.

Happy New Year,

Alex & Christine Sherer
Owners 3063 Silver Strike in Aspen Grove

Kaitlin Costa

From: Cathy Spence-Wells
Sent: Friday, January 14, 2011 10:33 AM
To: Kaitlin Costa
Subject: FW: FW: Martis Valley Trail Community Workshop Jan 19th

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From: Mike Staudenmayer [mailto:mikes@northstarcsd.org]
Sent: Tuesday, January 11, 2011 4:21 PM
To: Walter Auerbach; Cathy Spence-Wells; lauren@streamlineimpact.com
Subject: FW: FW: Martis Valley Trail Community Workshop Jan 19th

Mike

From: Geoff Stephens [mailto:geoff@npoa.info]
Sent: Tuesday, January 11, 2011 9:13 AM
To: Mike Staudenmayer
Subject: FW: FW: Martis Valley Trail Community Workshop Jan 19th

Geoff S. Stephens
General Manager
Northstar Property Owners Association
2200 North Village Lane
Truckee, CA 96161
530-562-0322 Office
530-562-0324 Fax
geoff@npoa.info

From: Nathan Stoll [mailto:nathanstoll@gmail.com]
Sent: Tuesday, January 11, 2011 9:09 AM
To: donielle@npoa.info; geoff@npoa.info
Subject: Re: FW: Martis Valley Trail Community Workshop Jan 19th

This is a HORRID plan. I'll send along my more formal objections shortly when I have a chance to do it when I'm not in the office. You can rest assured I'll be lobbying the ENTIRE wolf tree block to prevent this plan from violating the quiet serenity of our woods.

On Mon, Jan 10, 2011 at 11:38 AM, Donielle Summers <donielle@npoa.info> wrote:

Attention NPOA Members,

The Martis Valley Regional Trail Project is moving forward and the preferred trail alignment crosses Martis Valley through NPOA open space and eventually to the Village at Northstar.

Please take time to review this project proposal and provide your support or concerns in a timely manner. Just follow the links below.

Should you have any questions please feel free to contact me at the Association office.

Geoff S. Stephens

General Manager

Northstar Property Owners Association

2200 North Village Lane

Truckee, CA 96161

530-562-0322 Office

530-562-0324 Fax

geoff@npoa.info

Kaitlin Costa

From: Cathy Spence-Wells
Sent: Wednesday, January 19, 2011 10:10 PM
To: Kaitlin Costa
Subject: FW: Martis Valley Trail -- Objections by homeowners to current proposed alignment
Attachments: Martis Valley Trail proposed alignment - Objections from homeowners.pdf

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From: Mike Staudenmayer [mikes@northstarcsd.org]
Sent: Wednesday, January 19, 2011 3:41 PM
To: Walter Auerbach; Cathy Spence-Wells; lauren@streamlineimpact.com
Subject: FW: Martis Valley Trail -- Objections by homeowners to current proposed alignment

Mike

-----Original Message-----
From: Nathan Stoll [mailto:nathanstoll@gmail.com]
Sent: Wednesday, January 19, 2011 3:27 PM
To: geoff@npoa.info; Mike Staudenmayer; rpatterson@gencap.com
Subject: Martis Valley Trail -- Objections by homeowners to current proposed alignment

Hi Geoff, Mike, and Dick --

Please find attached an electronic scan of the letter I'm dropping in the mail objecting to the current proposed alignment of the Martis Valley Trail. While I have written this letter, a number of my neighbors have written me to express their willingness to sign on, and I quote several of them in the letter.

It is extremely concerning to me that this serious proposal is one that most of us have learned of only practically by accident. Many Northstar homeowners are unaware this is happening. I cannot attend the community workshop today, nor can many of my neighbors who now know about the issue. I hope our opinions are reflected at the event.
While the process by which the proposal has been developed and surfaced was extremely flawed, it can still be fixed.

I hope you will work to remedy the situation. Please know that I am willing to help you in doing so. As I close in my letter, I look forward to your responses, and I will attempt to reach you all in person to speak by phone.

Regards,
Nathan Stoll
415-683-6228

Nathan W Stoll
548 Market St #68813, San Francisco, CA 94104
(please use the above as mailing address)
531 Wolf Tree, Truckee, CA 96161
(415) 683-6228
nathanstoll@gmail.com

January 19, 2011

Mike Staudenmayer
General Manager
Northstar Community Services District
908 Northstar Drive
Northstar, CA 96161

Geoff Stephens
Northstar Property Owners Association
General Manager
2200 North Village Lane
Northstar, CA 96161

Dick Paterson
Northstar Property Owners Association
President of The Board
2200 North Village Lane
Northstar, CA 96161

Objections to Martis Valley Regional Trail Proposed Alignment

Dear sirs,

I am writing as a homeowner of Northstar to vehemently object to the current proposed Martis Valley Regional Trail alignment that will take the trail directly through / across the Martis Creek Lake area, and right above my home on Wolf Tree. This route will cause grave environmental harm, greatly reduce the natural beauty and peace and quiet of our remaining Northstar forests, the Martis Creek Lake area, and our community. The environmental impact of the additional bike traffic has not been adequately considered. The indirect nature of the route and detour through Northstar Village will keep many bikers using Highway 267, which is incredibly unsafe.

I support an alternative alignment that would parallel Highway 267, which alleviates all of these concerns and only requires a modest amount of additional funding.

I am not alone in my beliefs, and all of my neighbors on Wolf Tree, Conifer, and Basque that I've spoken with so far agree with me. This includes my immediate neighbors the Lowes who have been longtime homeowners and residents (30+ years).

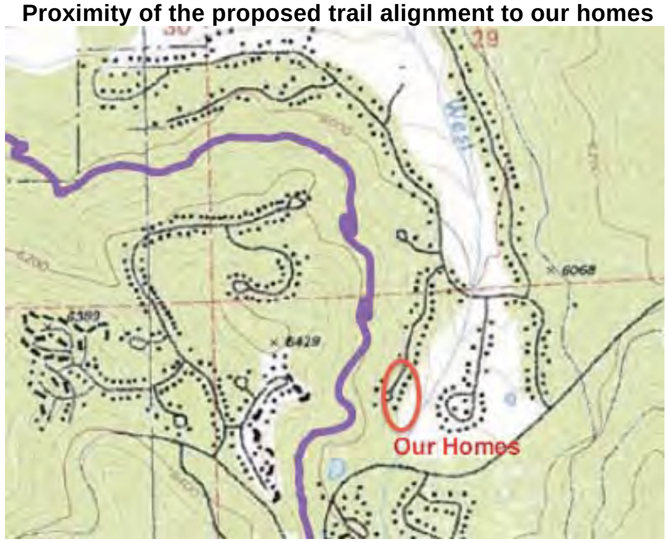
Affected homeowners have not been adequately included in the process of decision making for the route, nor has it been communicated with any great degree of effort. I find this appalling.

My more detailed objections follow below, and I plan to speak with each of you to find out what your planned remedies are.

1. My background

Before detailing my objections, I'd like to briefly express who I am and where I am coming from. I'm an engineer and scientist by training, but entrepreneur by profession. I sold my most recent company to Google, and grew Google's news service into one of the largest news services in the world. My entrepreneurship generally involves the study of people, listening to their desires and beliefs, observing their behaviors, and then trying to improve their lives through products that they find refreshing, magical, simplifying, or just plain helpful. I travel frequently, to advise the startups I work with that are all over the country, from Ann Arbor, to Washington DC (where I am today and why I will miss the community meeting), San Francisco, Chicago, and others. I've lived at Northstar for almost 4 years now at 531 Wolf Tree, a quiet cul-de-sac just above Basque drive and the TMT trail entrances to the Martis Lake Creek. I've attached a picture below showing the proximity of the proposed trail routing to our home (and the homes of my neighbors). Northstar is my one home, the place I have my permanent belongings, the place I come to relax, run, bike, hike, cross-country ski, read by the recreation center pool, or just think. I make extensive use of the TMT trail on a daily basis when I'm at Northstar. I'm an avid long distance runner who trained competitively for two decades. My partner bikes, runs, and swims competitively as well, and has represented the US at the triathlon world championships. We love the peacefulness of Northstar, and the solid community development that it has and plans to continue controlled growth. We are concerned about the extent of that growth, but are by and large supportive of those goals.

Proximity of the proposed trail alignment to our homes



2. Objections to the current preferred alignment through Martis Creek Lake

As a homeowner that lives on Wolf Tree, the proposed preferred alignment through the Martis Creek Lake area would require a disruptive, country-road sized development through the lone remaining peaceful forest area behind my neighbors and my homes. This is a quiet nature area we regularly use and consider an enormous part of our Northstar enjoyment. When I purchased my home on Wolf Tree, one of its major selling points was being a quiet cul-de-sac with close proximity to a peaceful forest in which I regularly walk, run, snowshoe, and nordic-ski. The existing TMT trail network does an excellent job preserving the peaceful beauty of this natural environment. A paved country-road sized bike trail would not, and would be a major invasive action in the forest and fields. Paving a road across the Martis Creek Lake zone would be a travesty, and a signal of where Northstar stands on protecting our limited remaining nature zones.

The environmental impact of a paved bike trail connecting Northstar Village to Truckee through the Northstar forests and Martis Creek Lake area will inevitably bring additional impacts on that have not been properly investigated or documented. There will be trash and trash cans. These will be an additional draw for the many bears we see frequenting these forests and fields. The trail will go through a dark forest which will likely eventually lead to invasive lighting to prevent accidents during evening usage by cyclists. The construction effort will also destroy a wider swath than a simple bike path, and there is no discussion in the proposal of how to constrain these effects on the forest and fields. Seeing a map with a line is not enough; we the homeowners deserve to see the true impact of the proposed path in a clear picture on the ground.

The proposed routing would be unlikely to be utilized by existing bike riders, who currently follow Highway 267 to ride to and from the lake. The proposed routing is incredibly additive to the existing bike route. As described in the proposal, it "meanders", and most road bikers do not enjoy "meandering" trails, because they're a pain to navigate, especially at speed while descending a mountain. Has this research into bike rider preferences been conducted? What percentage of riders prefer either of the routings? I highly doubt these bikers will want to detour up to Northstar Village to start their way down to Tahoe or Truckee -- but why not just ask them? The cynic in me thinks this is entirely a ploy to get additional recreational users coming to Northstar Village's commerce area. This is wishful thinking, since Highway 267 is what bikers use now, and what they will continue to use as a route because it is the straightforward path between Lake Tahoe and Truckee. Sadly, the goal of the trail -- to connect the Lake and Truckee for cyclists -- will fail to be met by the current proposal.

3. The routing along Highway 267 alleviates these concerns

The possible, but not currently preferred, routing along Highway 267 just makes sense, for environmental, community, and bike user behavioral reasons. Environmentally, this is very obvious, but since it follows the existing Highway 267 alignment, there will be a minimalist impact on any of the nature areas. The other possible impacts to the environment are also better provided for along Highway 267, particularly lighting. This routing would no longer be an intrusion into the peacefulness of the community, as the Highway 267 is consistent with existing traffic flows. Finally, this is probably the routing most bikers between Tahoe and Truckee would prefer, and thus this routing will likely be highly used, and thus dramatically improve safety.

4. My neighbors at Northstar share this opinion

Having spoken with a number of my neighbors, I understand that they feel similarly. My immediate neighbors are one example -- the Lowes have been homeowners and residents for nearly 30 years and are original Northstar residents. To use their own words:

> "I too am concerned that they are going to destroy nature and natural dirt trails and once again pour pavement and manmade products into a forest area. Seems criminal to impact

> nature once again. Obviously they are envisioning a lot of usage which certainly will impact the "quietness" of our street."
>
> --Shirley Lowe

5. Communication and opinion gathering practices by the Northstar Property Owners Association with respect to this major proposal were at best, appallingly insufficient and negligent. At worst, it has been deceptive and a failure of representational duties.

As a homeowner, the Northstar Property Owner's Association is supposed to represent my and my neighbors interests in these matters. The proposal is ready to be put into action, and only then are we even remotely consulted. While the proposal has probably been on the Northstar Community Services District site for some time, where were the information packet and notifications, in addition to property owner surveys asking us our opinions, in clear, plain english, about the concept of a trail and its variety of routes?

The only reason I know about the proposal is that I received a cleverly and seemingly deceptively hidden invitations to a "community trail workshop" that has a completed, surveyed, and ready to go proposal and a pre-existing preference. While I hope you had the right intentions, my cynical side believes that this has been an attempt to slip the proposal past the homeowners, rather than a true, honest, and open attempt to find out our opinions about a major change -- all while looking as if we've been asked for input to public sector entities like the Army Corps of Engineers.

When the Northstar Property Owners Association Recreation Center membership policies were planning to be revised, extensive surveys were started years in advance to collect member preferences and opinions. When significant changes are being proposed, there is a history -- and therefore an expectation -- that a reasonable amount of information gathering and notification will be done before any proposals are laid out.

A "preference" for a proposed routing should not exist unless the property owners association has actually gathered those preferences from members. If you haven't talked to homeowners, and in particular, homeowners living close to the trail routing and the nature area you are about to harm, you cannot be claim to be performing your representational duty to us.

I was appalled to hear from other homeowners I spoke to that the "Trees on the ridge were already being tagged in October," e.g., which ones would be cut down to make way for the pavement, and even worse, that only the Army Corps of Engineers and their planning processes stopped the NPOA committing to and actually *starting* the project in the fall before any of us homeowners could learn of it.

From my own limited investigation, I believe very few homeowners currently know of the plan. Once informed, the reaction is quite negative, but it has taken me very little effort to reach out to a few neighbors, and word is spreading now that I've mentioned what is going on in plain english. For example, just moments ago I got an email from another neighbor down Basque, who asked to be included in this letter:

> Shirley and Simon Lowes have forwarded some correspondence you've had about the proposed paved bike trail. Thank goodness you are alert to what is going on! Could you please add our names to any letter you are sending to object to this proposal? We are at 151 Basque and would certainly be very unhappy with any disruption to our lovely, peaceful view from the back of our house. Please let me know what else we should be doing. Unfortunately, we don't get up to Tahoe very often at all, so can't attend any meeting.
>
> Thanks for your insight and input!
> Candy and Peter Robertson

Most of the neighbors I've spoken to also cannot attend the community workshop, which isn't a surprise, since those I've talked to hadn't opened the email until I emailed them personally about it with a clearer email title. I will be continuing to work to assemble my neighbors objections and reach out to them directly, and if you'd like me to help you do the same I'm more than willing to do so.

I do not want to be a cynic. I want to believe you are acting in good faith and the best interest of the homeowners of Northstar, but right now I have not seen facts that would support such a view. I'd like to know that you actually surveyed homeowners prior to the project, and what methods you've used to proactively communicate to homeowners these significant changes.

In conclusion

To review my remarks, I and many other neighbors at Northstar have strong objections to the Martis Valley Trail proposal as it currently stands with a routing through Martis Lake Creek area and the forests of Northstar. We believe the Highway 267 routing is a much better solution. The outreach and involvement of the Northstar community on this matter has been appalling, and needs immediate remedy.

I believe you are all good intentioned, and I'm more than willing to work with you reasonably on this matter. I want to be able to believe in our neighborhood and community and its leadership. I'd like to hear a plan from your teams for remedying this situation, with the specific actions you plan to take to involve the homeowners and community before trying to execute this plan in our backyards.

I look forward to your responses, and will attempt to reach you all in person to speak by phone before the community workshop today.

Regards,

Nathan Stoll
531 Wolf Tree
(415) 683-6228

Kaitlin Costa

From: Cathy Spence-Wells
Sent: Friday, January 14, 2011 10:33 AM
To: Kaitlin Costa
Subject: FW: Martis Valley Regional Trail

From: Mike Staudenmayer [mailto:mikes@northstarcsd.org]
Sent: Tuesday, January 11, 2011 4:22 PM
To: Walter Auerbach; Cathy Spence-Wells; lauren@streamlineimpact.com
Subject: FW: Martis Valley Regional Trail

Mike

From: Greg & Sara [mailto:taddojones@gmail.com]
Sent: Tuesday, January 11, 2011 1:06 PM
To: Mike Staudenmayer
Subject: Martis Valley Regional Trail

Hello Mike,
I am contacting you to publicly comment on the release of the Draft EIR of the proposed Martis Valley Regional Trail alignment and trails. I am particularly supportive of Segments 1 and 2, with Segment 2 connecting the Town of Truckee trails with the Village at Northstar.

In addition to supporting trail construction in accordance with California Environmental Quality Act (CEQA), I am also delighted to learn that NCSD can partner with the Watershed Council and the Army Corps of Engineers on watercourse and stream bank restoration in the Martis Valley watershed.

Please consider this an official letter of support for the prepared Draft EIR on the proposed Martis Valley Regional Trail.

--
Sara Taddo Jones
Truckee, CA

Kaitlin Costa

From: Cathy Spence-Wells
Sent: Thursday, January 20, 2011 4:30 PM
To: Kaitlin Costa
Subject: FW: Martis Valley Regional Trail

From: Mike Staudenmayer [mikes@northstarcsd.org]
Sent: Thursday, January 20, 2011 2:57 PM
To: Walter Auerbach; Cathy Spence-Wells; lauren@streamlineimpact.com; steveteshara@gmail.com
Subject: FW: Martis Valley Regional Trail

Mike

From: Andrew & Jeanette Terry [mailto:a_t_terry@hotmail.com]
Sent: Thursday, January 20, 2011 2:49 PM
To: Mike Staudenmayer
Subject: Martis Valley Regional Trail

Some thoughts about the Martis Valley Regional Trail scoping meeting last night now I've have more time to consider.

First there was far too much focus on Northstar (N*) rather than the full vision of non-motorized paved trails connecting the Truckee/Kings Beach/Tahoe City triangle. Presenting this as part of the full-vision would be far more politically viable than highlighting N* as a destination. Your audience last night don't view N* very positively, to generalize and to be charitable.

Transportation vs. Recreation

* There are different design constraints between transportation and recreation uses although one can recreate on a transportation route and not so much vice versa. Transportation routes should be more direct and avoid elevation changes as much as feasible while recreational use tries to avoid roads and include 'features' such as streams, curves, elevation changes, views.

* I perceive that N* based recreational users are not going to be capable of some of the required elevation changes and hence the trail system is more for recreational marketing and not recreational use. This generalization excludes mountain bikers (who don't need paved trails in the first place).

* The trail system, as conceived, is in competition for recreational users with the Truckee River Legacy Trail, especially if/when it is extended/completed. This project is generally less interesting to the visiting recreational user-base because of elevation changes as well as fewer trail heads. There are also a plethora of non-paved recreational trails throughout the area.

* Hence I conclude the emphasis should be more on this trail becoming more of a transportation route which then could influence trail routing.

Routing

* It was my understanding that the Martis Camp development was required to develop a non-motorized trail system to N*. This routing would eliminate any US Army Corps of Engineers

Federal requirements by bypassing their (our) land. Something that should be evaluated and presented.

* Other, preferred for me, trail routings would be to use the existing boardwalk/bridge neighboring Lahontan rather than creating a new Martis Creek bridge crossing and then another boardwalk across the wetlands to the south of the new proposed bridge. This would help to avoid conflicts with the existing Martis Creek trail and trail users.

* An even more attractive routing would be to use the existing jeep road that runs parallel to 267 to the well-head and then the boardwalks to the golf course and hence into N*. The existing route is disconnected from the highway either by distance or elevation. And 267 road users will be able to see the trail and hence it would be a kind of permanent visual marketing for the trail.

* There should be a spur to access Waddle Ranch (both via the Martis Dam Road and via the gate opposite the well-head)

Trail design

* Why do we need the bells and whistles ? Build trails with the available funds and once built 'they' will come and then the requirements for features will develop.

* Close to trail heads the trail needs to be wider to handle the additional conflicts. Once one gets more than a mile or two from a trail head the conflicts diminish quickly (with the exception of the Truckee River Trail between Squaw and Tahoe City). Hence one could conceivably narrow the trail width, to 6'?, once away from congested zones.

* Don't redirect overflow parking to the Martis Creek Wildlife Viewing Area parking. That will create conflicts as that parking is frequently full.

* Are we sure we need a line down the middle of the trail making it more road like ?

EIR

* No comments other than I thought elements within the EIR were marked rather harshly which could influence mitigation issues and hence adding to costs

* The Wahoe connection is tennuous, at best.

Conclusion

Reading the above it would seem I am against the project ... I'm not. I see this as potentially valuable infrastructure for the region. I am, however, skeptical, about how much use it will actually get. My hope is that if Truckee and N* are linked it will see similar usage patterns to the Tahoe City/Squaw pairing. I doubt this will happen because of the elevation changes and additional distances potentially involved even though the proposed trail is wider.

I wish you luck in moving the project forward but suggest that you've now poked the hornet's nest of local NIMBY-ism where people are concerned about the negative impacts on the Martis Creek Wildlife Viewing Area and wasteful inflated government spending on an arguably unnecessary additional development within the Martis Valley (much of which is trashed with a highway, an airport, multiple golf courses, a dam, upscale developments, … the existence of which should help make the EIR effectively mute).

Regards, Andrew Terry
(530) 582-8672

Katherine Waugh

From: Sun Mountain Landscaping [sunmt@sbcglobal.net]
Sent: Thursday, January 20, 2011 3:56 PM
To: Mike Staudenmayer
Subject: RE:

Thanks for replying. Why is there a sign that says wildlife refuge at the entrance? they should not have that sign there if it isnt true.
Why didnt you get public comments when deciding on the location of the trail? I believe you plan would be approved easily by everyone if the trail was adjacent to the highway, and that should be an alternative. There should be alternatives. Peggy

--- On **Thu, 1/20/11, Mike Staudenmayer <*mikes@northstarcsd.org*>** wrote:

From: Mike Staudenmayer <mikes@northstarcsd.org>
Subject: RE:
To: "Sun Mountain Landscaping" <sunmt@sbcglobal.net>
Date: Thursday, January 20, 2011, 11:39 AM

Peggy, thanks for your opinions.

You make a few misstatements that I need to correct you on.

The meeting last night was to educate and inform the public on the proposed project and get feedback from the attendees. Every attendee was given comment cards and instructions on how to provide written comments for the EIR scoping. Everyone was allowed to talk, in fact we were there until after 8pm listening to people talking about their ideas and concerns. During the draft EIR circulation period, the public will have the opportunity to address the decision making body (NCSD Board) with their concerns and support as well.

There is no “Martis Valley Wildlife Refuge”.

The Army Corps of Engineers does allow paved trails and in fact supports them. (see attached letter)

Regards,

Mike

From: Sun Mountain Landscaping [mailto:sunmt@sbcglobal.net]
Sent: Thursday, January 20, 2011 10:54 AM
To: Mike Staudenmayer
Subject:

There is alot of opposition to your proposed paved trail in the Martis Valley Wildlife Refuge area. You should have gotten public comment when deciding on the location of the trail, the issue of it connecting to the Village and the width of the trail. Your planning process has so far been inept. You act like the NCSD owns this land and you do not. You make false assumptions and false comments. Many people have worked very hard to protect and preserve the Martis Valley. Your plan could eventually result in lawsuits which will just cost you alot of money and time and it wont be worth it. You said you decided not to install the paved trail adjacent to the highway because there is more scenic quality within the valley. Your paved trail greatly reduces the scenic quality for us who currently use the trails. And there is no real safety issue of having the trail by the highway because there is a fence there. The only benefit of connecting the Village to this trail is for the business owners and guests at Northstar. These people do not make up the majority of public use of the Martis Valley Wildlife Refuge. You would be changing the type of users in the area and that creates a conflict. You are changing the area from a non developed recreation site used for nature study and conservation to a developed recreation area. I dont think their is any significant value of connecting the Village to Martis Valley Wildlife Refuge area. The Army Corps of Engineers doesnt allow a paved trail in this area, so how are you getting by that? Why would the Army Corps want to sell out to developers? And why would we allow that? Last night you didnt allow people to talk and that was unfair. You have not addressed many of the important issues. Peggy Towns Truckee Ca

DEPARTMENT OF THE ARMY
U.S. ARMY ENGINEER DISTRICT, SACRAMENTO
CORPS OF ENGINEERS
1325 J STREET
SACRAMENTO, CALIFORNIA, 95814-2922

November 19, 2004

Englebright Lake

Martyn Hoffman
DMB Highlands Group
Truckee, CA

Dear Martyn,

The purpose of this letter is to provide answers to some of the questions that have been raised regarding trails on U. S. Army Corps of Engineers property at Martis Creek Lake, specifically hardened trails and trails below gross pool. I understand that the proposed trail will be part of a "regional" trail that runs from Lake Tahoe to Truckee. The portion of the trail crossing Corps lands will connect Schaffer Mill Road to Northstar, running roughly parallel to Hwy 267.

Corps regulations allow for recreational trails and encourage them to tie into existing trail systems, where possible. Generally, for foot trails, our preference is for a natural surface, wood chips, gravel, etc. However, where heavy traffic is anticipated, trails may be paved. For bike trails, a paved surface is preferred. Thus, we are supportive of a paved trail.

Facilities below gross pool elevation are generally not encouraged at Corps projects since they are subject to inundation and because of the potential for negative impacts to the flood storage capabilities of the dam. The decision whether or not to allow this trail is, however, a management decision. In this instance, a trail located below gross pool will not interfere with the flood control capabilities of the dam. Thus, we do not object to a portion of the trail being located below gross pool. One caution I want to mention is that the trail must be constructed such that it does not create a dike or dam that could collect water should the lake inundate the trail. This would create a pool that could potentially trap fish when the lake recedes.

As we have already discussed, Martyn, there are several hurdles we must get past before I can give you a final and definite approval for the trail on our property. Some of the hurdles are as follows, although there may be more. We must comply with CEQA and NEPA requirements in preparing the proper environmental documentation. We must get the proper 404, 401, and any other required regulatory permits either from the Corps Regulatory Section or the Lahontan Regional Water Quality Control Board. We need to find out if the proposed location of the trail is within the Cal Trans easement. We need to have an archeological survey/assessment done. Finally, we need to prepare an agreement between the Corps and a sponsor or partner (Northstar CSD?). This agreement must address the complete plan for funding, planning, construction, and future maintenance, and then be signed by both the Corps and the sponsor/partner.

Assuming we can comply with all of the above requirements, we would support the trail and allow it to be paved, with a portion of it below gross pool. I hope I have answered your questions and provided you with the information you need to proceed with your planning efforts. The primary contact on this project will be Ranger Jacqui Zink, who can be reached at (530) 587-8113. If you need to speak with me directly, I can be reached at (530) 432-6427. I am generally in the office Monday – Friday from 8:00 am – 4:00 pm.

Sincerely,

/s/ Douglas E. Grothe
Park Manager
Englebright/Martis Creek Lakes

Kaitlin Costa

From: Cathy Spence-Wells
Sent: Wednesday, January 19, 2011 10:13 AM
To: Kaitlin Costa
Subject: FW: TRAIL

From: Mike Staudenmayer [mailto:mikes@northstarcsd.org]
Sent: Wednesday, January 19, 2011 10:11 AM
To: Wally Auerbach; Cathy Spence-Wells; Lauren OBrien
Subject: Fwd: TRAIL

Mike Staudenmayer

Begin forwarded message:

> **From:** "J. Thomas Van Berkem" <tom@vanberkem.com>
> **Date:** January 19, 2011 9:25:06 AM PST
> **To:** "mikes@northstarcsd.org" <mikes@northstarcsd.org>
> **Subject: TRAIL**
>
> HI
>
> Just a quick note to give my full support for the trail project!
>
> ***s/TOM***
>
> **J. Thomas Van Berkem**
>
> **Tom@VanBerkem.com**
>
> **Telephone:**
>
> 530-562-1385 TRUCKEE-TAHOE, CA
>
> **Mailing Address:**
>
> 2538 North Summit Place, Truckee CA 96161
>
> **E-Mail: emilykourounis@gmail.com**

Kaitlin Costa

From: Cathy Spence-Wells
Sent: Tuesday, January 18, 2011 2:58 PM
To: Kaitlin Costa
Subject: FW: Trails

From: Mike Staudenmayer [mailto:mikes@northstarcsd.org]
Sent: Tuesday, January 18, 2011 11:09 AM
To: Walter Auerbach; Cathy Spence-Wells; lauren@streamlineimpact.com
Subject: FW: Trails

Mike

From: Peter Werbel [mailto:werbs@exwire.com]
Sent: Monday, January 17, 2011 5:27 PM
To: Mike Staudenmayer
Subject: Trails

Dear Mike Staudenmyer, WIll not be able to attend the upcoming meeting on trails but wanted you to know I support the trail being paved #1 and the alignment #2.

Regards,

Peter Werbel

Kaitlin Costa

From: Karen Williams [krwilliams@yahoo.com]
Sent: Friday, January 21, 2011 5:12 PM
To: Mike Staudenmayer
Subject: Fw: input and questions re: MVRT proposal

Dear Mike - my e-mail was returned because I made a typo!! Hope you will still consider this letter relative to the time the original was sent. Thank you.

----- Forwarded Message ----
From: Karen Williams <krwilliams@yahoo.com>
To: mikes@northsatrcsd.org
Sent: Fri, January 21, 2011 4:54:28 PM
Subject: input and questions re: MVRT proposal

I have several concerns regarding this project but will address only a few: tactics, environmental concerns, and public safety. In my opinion it is particularly insensitive that this proposal was forwarded and seemingly finalized with minimal, if any, community input. Special interests tend to be more heavily funded (and, ironically, this project is funded in part by tax-payer money) louder and more organized than the local independent stakeholders. Granted, we live in a resort community; nevertheless businesses should be cognizant of the local citizens and their concerns. This issue has not been presented in a timely manner; the stealth campaign that suddenly appeared had no scoping period or public sessions prior to the 1-19-11 meeting where the plans were firm already. **Why was oral community input and discussion not allowed at that meeting?** The notice of EIR prep was presented December 17th, during the Holidays when people are away or distracted by other events. The deadline date for public comments was unreasonable, given that the issue appeared in the Sierra Sun only a week before. Why have you given the community such a short period to reply. Many local agencies with a vested interest in this area were unaware of this effort to pave Martis Valley. The ploy of honoring the Washoe Indians was especially disingenuous – honor them by paving over and disrupting their ancestral home?? Put up a plaque in the undisturbed area and preserve the artifacts of their area.

The area under consideration runs through wetlands and a pristine riparian area with unique characteristics and historic value. Martis Valley is one of the remaining areas close to development that is accessible to a wide a variety of stakeholders: bird watchers, dog walkers, senior citizens with limited mobility who still want to enjoy the open spaces and trails, and families with small children. These type of areas are progressively being denigrated due to development. **How do you intend to preserve the Martis Valley Wildlife Area it for all various users, not just bikers? How do you intend to preserve the safety of all users?** There are other routes this path could take that would be safer for all. We already have a paved trail, the Legacy Trail, which has been usurped by bikers and is hazardous to walkers, those with strollers and those walking dogs.
How will you insure only native plants will be used?
How will you maintain these planting until maturity? What is the plan for follow-up of these plantings should they die?
Where will you get the water need for these plants and the proposed 'pool'?

Safety is a major concern; for those trying to walk with bicycles buzzing by them and for the increased number of vehicles trying to leave – and more importantly – get back on Highway 267. **Will there be a turn lane thoroughly investigated?**
Where will the additional parking be located? How will you mitigate negative impact to the area with this additional disturbance?
How will you mitigate the effect of the chemicals used in planting and construction from vegetation and stream?

Who will be responsible for maintenance of this project? How will this be funded?

My feelings are the tip of the iceberg. I realize that there has been an effort to avoid public knowledge and discussion of this issue because there are many of us who have a vested interest in this area. Many locals have worked at Martis Wildlife area on Truckee River Day, restoring and preserving this pristine area which will now destroyed. Residents of all ages and backgrounds work hard to preserve the integrity of Martis Creek and the surrounding sensitive meadow areas. To pave this over would be an abomination.
The renderings are more reminiscent of Golden Gate Park than the Tahoe area. **How will you preserve and maintain the wild nature of this area?**

Please think again, reroute this path, consider the other alternatives, especially the one paralleling Highway 257. **Why has this route been ignored?**

Most sincerely,
Dr. Karen R. Williams
Truckee, Ca

Kaitlin Costa

From: Kim Williams [outside4me09@yahoo.com]
Sent: Friday, January 21, 2011 5:25 PM
To: Mike Staudenmayer
Subject: Martis Valley Trail Proposal

Kim Williams, Skyline Ct
Active runner/hiker/cyclist

I have lived in the area full time 9 years but have been using the natural resources 45 years. Moved here to escape the urban lifestyle and lack of natural trails to run, hike and bike on.

I do not support the proposed Martis Valley Trail. I understand the thinking behind it ,to allow for access to Northstar Village from downtown and to get folks out of their cars. However, this is not the answer. It has been my experience that pedestrians and cyclist do not mix well on paved paths. I have tried to both run and cycle the bike path from Squaw Valley to Sugar Pine State Park and discovered that I needed to go around 6 am to avoid the variety of users, ie: strollers, dogs, children bikes and rollerbladers. I love seeing all these people out, however it is one of the most dangerous areas to bike on. I know several people who have had bad accidents as well as witnessed several accidents on the bike path. And this bike trail is buried in snow 6 months out of the year for it is not plowed. Who is going to pay to maintain a trail through Martis Valley to be used year round?

I think Martis Valley should be left just as it is. I am sick of paying for "urban frills" that I moved to escape. What is wrong with leaving our natural resources just as they exist?

Kaitlin Costa

From: Suzanne Woodhead [woodcats@sbcglobal.net]
Sent: Friday, January 21, 2011 5:09 PM
To: Mike Staudenmayer
Subject: Proposed Martis Valley Regional Trail - Comments and Questions

Dear Mr. Staudenmayer,

As a full-time resident and property owner for the last 20 years in the Truckee/Tahoe area, we have seen and experienced many changes and improvements to our surroundings in both Nevada and Placer Counties. While I'm not opposed to improving our current trail system within the Martis Valley, as a resident and a frequent user of the trail system, I'm very concerned in path NCSD is headed.

When I heard and then read about NCSD's proposed paved trail system thru Martis Valley, alarmed, I came to your meeting on Wednesday evening expecting a more informative explanation from NCSD about your plans, and as with the others in attendance, the opportunity to glean information with a question and an answer period. While the "breakout" sections did afford a bit more enlightenment, I fear it only caused me much more concern about the preservation and protection of the natural ecosystem in this valley.

For me, my neighbors, and my friends, the Martis Valley affords US (hikers with or without dogs, runners, mothers/families with their small children and strollers) a wonderful and safe opportunity to get out for a "low impact" quick walk or run. It's one of the last areas that is close to home, which is easily accessible, safe, and that is NOT paved. Most importantly, EVERYONE gets along!

Constructing a 10 foot paved pathway wherein you're adding bicycles to the mix of dogs, walkers, and children will only cause havoc. As an avid cyclist, on both road and trail, I would never consider riding any of my bikes through the Martis Valley trail system, nor have I ever seen anyone using the trail system on a bike – it's just not compatible with the user population. My fear is that if this "proposed" trail system goes through, the trail will enable trail bikes to venture off into the valley where they haven't in the past, thus causing more damage to the valley and all its inhabitants.

Has anyone from the NSCD recently visited the Truckee River Trail to review the condition of the asphalt, and to first hand witness the improbability of bicyclist, families with small children, children learning to ride their bikes, zigzagging to either side of the trail without any control? I'll tell you, it's a scary proposition, and you're toast if both your attention and your predictability wanders as to what's ahead and behind. I have, and I know many people who have chosen minor to major injury in their blink-of-an-eye decision to bite the dirt or a tree in avoidance of an unsuspecting child or dog while out on the trail system.

1. I found out that the EIR was NOT planning to research the alternate Northern routes along Hwy 267 to the full extent and time that they were instructed to devote to the "preferred" trail system, thru the valley. **Please allot the same time and attention in your research for ALL routes**. A paved and/or unpaved trail system through the valley should never be a considered as the major thoroughfare.

2. My next question concerns the kind of materials to be used for the trail system. IF the major thoroughfare, or any parts thereof, ultimately ends up traveling through Martis Valley, **why was only asphalt considered?** Why wouldn't NCSD consider and then instruct the EIR to search out alternative kinds of materials to be used for the pathways - decomposed granite, or a sustainable *engineered* wood product like *TimberTech* or *Trex?* And then, what about the freeze and thaw with asphalt? Martis Valley has the lowest record temperatures for

the Truckee/Tahoe area.   Wouldn't these materials be more environmentally friendly and be less costly to maintain?

3. Parking? Where are all these new users going to park? How will all these new users get SAFE ingress and egress to and from Hwy 267?

4. What will happen to the accessibility of the existing trails that are not part of the major thoroughfare?

5. Where is the money coming from to maintain and sustain the trail system?

Mr. Staudenmayer, ALTERNATIVE appears to be the operative word that is lacking in your EIR draft for the Martis Valley Trail Plan. I do believe that the development of a properly researched and planned improved trail system in the Martis Valley would be an exciting addition to our community; but, only if it's done in good conscience for the preservation of the valley's ecosystem and with full consideration to all the alternatives. Thus far, I haven't been shown where the use of "good conscience" or the investigation into alternative routes and/or materials have been exercised.

Thank you for this opportunity to express just a few of my views and concerns as I know my neighbors and friends will have covered the remainder. I can only hope that you respond to my questions and listen to the residents of our community to expand your scope of the EIR. I look forward to the EIR public circulation draft in May.

Sincerely,

Suzanne Woodhead
12996 Filly Way
Truckee, CA 96161

NAME: Debby Broback

CONTACT INFO:

dbroback@fs.fed.us

see back →

COMMENTS:

1) Paving a trail increases the speed of the bike riders. Currently recreation is slow paced walking, running or slower riding on gravel. Paving trail will create conflicts between current users and potential new faster users. Two feet of a native surface does not create a safe place for walkers. Also too narrow →

to walk side by side and make conversation.

2) Presentation really pushed one alternative and did not openly offer information on the others. We had to ask to glean info. on other options/alternatives. Is there truly an open process? Open minds?

3) I hope the future meetings are publicized earlier with longer comment periods. Two days is short. People work and two days is not long enough to study up & comment.

4) Who or what plans are there for long term maintenance?

5) What does "all season" trail mean? Are there plans to groom it in the winter?

Debby Broback

COMMENTS: dbroback@sbcglobal.net

6) If W Star to Corp property
Segment is completed
before Corp does NEPA
it will appear to have
been done for "leveraging"
7) I have heard Willow Flycatcher
out There in the willows. I
assume the EIR/EIS will discuss/
analyse for this. ??
8) Has The Army Corp truly been
involved in this project?
When will they be @ a presentation?
9) I prefer the Segment 3A & 3b
alternative. I ride this green
Segment now and it is a good
ride. ~~[illegible]~~ less user conflicts →

Debby
Broback
dbroback@sbcglobal.net

COMMENTS:

10) Keep the current use
where the "proposed"
red trail segment 2A
is located. Keep the
pavement ~~t~~ closer
to the highway.

I am a bike rider and
a mountain bike rider and
a runner and a walker.
I understand and want a
paved trail but not in
the "proposed" location.

Braille on interpetive

NAME: Candace Cable

CONTACT INFO:

candace@turningpoint-tahoe.com

COMMENTS:

Who will maintain the trail?

NAME: Linda Chaplin

CONTACT INFO:

11878 Brentwood Ct
Nevada City, CA 95959
lchaplin@hotmail.com

COMMENTS:

- provide rest areas at intervals for hikers, especially young + old, also break or rest areas for wheelchair users
- provide interpretive signage in various

Linda Chaplin

COMMENTS:

locations on ecological features of Martis Valley area

- Vista points may be good areas to discuss broader topics, such as geological features (Basin + Range) or vegetative communities of native plants
- address winter recreation opportunities
- are bathroom facilities along the trail part of the plan - need to be available for servicing but also available for wheelchair users, little kids + older folks
- how will you address bike speed/safety issues with slower hikers, wheelchair users

NAME: DIANE COLSON

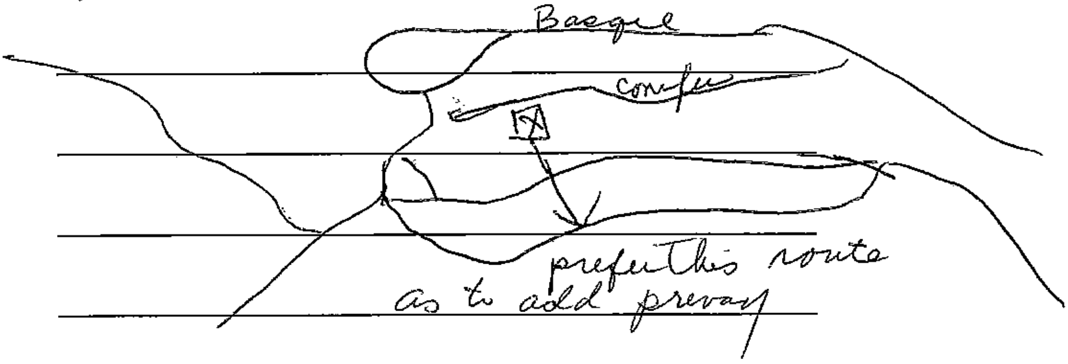
CONTACT INFO:
EMAIL or EDCOLSON@AOL.COM
EDACOL@AOL.COM

COMMENTS:
We live on Conifer in Northstar. The
existing trail comes close to our house
and we can see it from our bedroom
& bath window, it has an upper part

Diane Colson page 2

COMMENTS:

and lower part parallel to each other. We would like the upper part used for privacy. a walking trail outside your window is quite different from a 10ft paved trail. Can't wait to see it marked in the summer. Thanks for a very organized presentation.



Ed Colson Page 3

COMMENTS:

If the proposed trail is in close proximity to our house, would there be an opportunity to vegetation screen the trail where the distance warrants it?

NAME: Teresa Crimmens

CONTACT INFO:

teresac@tahoerimtrail.org

775-298-0232

COMMENTS:

The Tahoe Rim Trail Assn is happy to see plans for a trail that will Connect Truckee to the Tahoe Rim Trail. Please keep us in the loop + we're happy to help as we can, especially with signage when its time comes.

NAME: Colleen Dalton
year-round resident
15 years.
Northstar-at-Tahoe
employee

CONTACT INFO:

530-587-6929
cdalton@vailresorts.com

COMMENTS:

100% in support of this project, as planned. Wish it could include planned development of the dangerous turn-off from 267 to the ~~[illegible]~~ Martis Valley wildlife dirt parking lot. I don't think it does, right?

From: Ulla Davis <ulladavis@sbcglobal.net>
To: mike@northstarcsd.org
Sent: Tue, January 18, 2011 12:29:20 PM
Subject: Martis Wildlife Area

TO: Mike Staudenmayer, General Manager of the Northstar Community Services
RE: Proposed paving of hiking/dog walking trails

Dear Mr. Staudenmayer,
For many many years, I have been hiking the trails at the Martis Wildlife area with my dogs and long-term friends from Truckee (I have my home in Incline Village). I have always enjoyed the trails and am very dismayed that there seems to be a plan to disturb this beautiful area by constructing "cement roads", to be used by bicycles.
I urge you to NOT consider this project. Please keep in mind the tremendous expense it would cost to destroy a beautiful natural hiking area - please help us to prevent this from happening.
Thank you for your consideration
Ulla Davis

To Be included in the draft EIR

1/18/2011

NAME: BOB FINK

CONTACT INFO: BOBFINK@GMAIL.COM
530-580-8242

COMMENTS:

TO ME THE BIG UNANSWERED QUESTION IS HOW THIS PROPOSED TRAIL WILL INTERACT / ~~AFFECT~~ THE EXISTING MARTIS WILDLIFE PUBLIC USE (WHICH INCLUDES WALKERS, HIKERS, RUNNERS, OFF-ROAD BIKES AND DOGS OFF LEASH) OVER

YOU CANNOT PLAN A
TRAIL SUCH AS THIS WITHOUT
WIDESPREAD PUBLIC INTERACTION
AND COMMENTS, AND IT MUST
INCLUDE ARMY CORPS
DECISION MAKERS, IN PUBLIC VIEW.

THE ENVIRONMENTAL ASPECTS
OF YOUR PLAN SEEM GOOD,
BUT RISK BEING OVERWHELMED
BY POOR PUBLIC INTERACTION.

3

NAME: Marilyn Forno

CONTACT INFO:

forniwm@aol.com

COMMENTS:

Concerns:

A. Disturbing Martis Valley to Construct this trail. It is just begining to come back after herds of cows that were grazing there in Summer

COMMENTS:

B. Making Such a wonderful area so developed.

C. Would prefer a crushed granite trail rather than black top

D. I think we do need a trail to town - Maybe one that parallels the Hwy. It would be less invasive of the Valley

NAME: Karyn Freested

CONTACT INFO:

kfreested@gmail.com

COMMENTS:

To the TOT – nothing makes sense without the Ponderosa Golf Course extension.

COMMENTS:

How do you get to the town of Truckee? and up into the other trail systems.

Separate side gravel trail for dog walkers. Dog walkers + bikes don't work.

NAME: Nancy Gisko

CONTACT INFO:

ngisko@mac.com

(530) 562-0900

COMMENTS:

- I am in favor of creating a trail link from Truckee to Kings Beach through Northstar
- Although this is my first time attending

Nancy Gisko, pg 2

COMMENTS:

a community workshop on the issue,
I feel it would be helpful to have an
open public ~~content~~ comment period to hear
how others are feeling/viewing the
proposed trails.

- I am "far" away from any part of
the trail. will there be "parking areas"
close to the trail?

NAME: Judy Hawes

CONTACT INFO:

ajhawes@me.com

COMMENTS:

How will we handle extra parking? Will Northstar have to patrol our neighborhood for illegal parking?

Judy Howes pg 2

COMMENTS:

How will you be able to keep bikes from going off trail?

NAME: TODD + CAROL HUCKINS

CONTACT INFO:

JRHUCKINS@MSN.COM

COMMENTS:

WE SUPPORT BUILDING A PAVED TRAIL AS SOON AS POSSIBLE!

Please include all 3 pages in draft EIR - Thank you

Ellie& Don Hyatt

Detail

From: "Ellie& Don Hyatt" <hyatt@usamedia.tv>
To: "Ellie Hyatt" <hyatt@usamedia.tv>
Sent: Tuesday, January 18, 2011 11:49 PM
Subject: MARTIS VALLEY

COMMENTS ON THE INITIAL MARTIS VALLEY STUDY FOR A BIKE TRAIL
ELLIE HYATT
35 YEAR RESIDENT OF TRUCKEE

I READ THE 52 PAGE INITIAL STUDY PUT TOGETHER BY NORTHSTAR COMMUNITY SERVICE. NO PLACE IN THE STUDY COULD I FIND ANY MENTION OF THE CURRENT USERS OF THE TRAIL SYSTEM. AS MOST OF YOU ARE AWARE, EVERYDAY, 3 SEASONS OUT OF THE YEAR, OUR COMMUNITY MEMBERS TAKE THEIR DOGS EXERCISING IN MARTIS VALLEY **WITH NO FEAR OF SPEEDING BIKES** ON THE TRAIL. [YOU CAN NOT LET YOUR DOGS BE UNRESTRAINED ON THE BIKE PATH BETWEEN SQUAW VALLEY AND THE WEST SHORE---IT IS FAR TOO DANGEROUS.] JOGGERS, SENIORS, CHILDREN AND ALL AGE GROUPS UTILIZE THE TRAILS OF MARTIS VALLEY. I DO NOT THINK THAT MOST OF THE SENIOR POPULATION WILL BE RIDING A BIKE IN MARTIS VALLEY AND TRYING TO EXERCISE THEIR DOGS AT THE SAME TIME. IT IS A GREAT AREA FOR THE COMMUNITY TO SOCIALIZE. I USUALLY WALK SEVERAL TIMES A WEEK IN THE WILDLIFE AREA. IN THE SPRINGTIME, IT IS A WONDERFUL AREA TO VIEW THE WILDFLOWERS ALONG THE SIDES OF THE PATHS. MANY EVEN GROW ON THE PATH . DURING THE SPRINGTIME AND DURING A RAINY PERIOD, YOU MUST USE THE UPPER DIRT ROAD TO WALK IN ORDER TO PREVENT RUINING THE CURRENT TRAIL NEXT TO THE STREAM AND POLLUTING THE STREAMBED. *TRUCKEE RIVER DAY* BRINGS ALL AGES OF THE COMMUNITY OUT TO REPAIR AND REROUTE THE TRAILS TO ENSURE THAT THE MARTIS CREEK REMAINS A CLEAR RUNNING STREAM. WE HAVE WORKED HARD TO BUILD WALKWAYS ACROSS SENSITIVE MEADOW AREAS TO PRESERVE THE WETLANDS. **THE PROPOSED TRAIL WILL BE ASPHALT AND WITH THE CONCERN OF THE SPEEDING BIKES, COMMUNITY MEMBERS WILL NOT BE ABLE TO UTILIZE IT FOR DOG WALKING OR HIKING IN GENERAL.** IT IS NOT COMPATIBLE FOR BOTH BIKE RIDERS AND DOG WALKERS, HIKERS , JOGGERS, ETC. MOST PARENTS WORK AND CHILDREN ARE IN SCHOOL DURING THE WEEK SO THE USE FOR CHILDREN WOULD BE DURING THE SUMMER MONTHS ,WEEKENDS AND HOLIDAY PERIODS. I OFTEN WALK THE 5 MILE LOOP IN THE WILDLIFE AREA AND FIND PEOPLE FROM ALL AREAS OF THE STATE WALKING ON THE TRAIL. SO MANY HAVE COMMENTED THAT IT IS WONDERFUL THAT WE HAVE THIS AREA SO CLOSE TO TRUCKEE AND THE DOGS CAN RUN WITHOUT BEING RESTRAINED. IT IS OUR ONE REMAINING AREA FOR DOGS TO EXERCISE WITHOUT BEING ON A LEASH. I AM AN ADVOCATE FOR PUBLIC SAFETY AND A BIKE OWNER. I STRONGLY URGE THAT YOU CONSIDER THE ROUTING OF THE BIKE PATH AND PLEASE ROUTE IT PARALLEL TO ROUTE 267 WITH A BUFFER BETWEEN THE PATH AND THE ROAD. THIS WOULD ALSO NOT NECESSITATE THE REMOVAL OF TREES. THE CURRENT PROPOSAL STATES THAT TREES WOULD HAVE TO BE REMOVED FROM WITHIN THE ALIGNMENT OF THE TRAIL CORRIDOR. THE STUDY ALSO STATES THAT THE TRAIL WOULD PROVIDE SAFE PASSAGE FOR ALL USERS . IT WOULD BE ACCESSIBLE TO THE WIDEST VARIETY OF POTENTIAL USERS DURING ALL SEASONS OF THE YEAR.
SINCE MOST OF THE CURRENT USERS ARE DOG WALKERS, JOGGERS , CHILDREN AND HIKERS, HOW DO YOU PROPOSE TO KEEP SAFE PASSAGE FOR ALL USERS?
THERE APPEARED TO BE NO MENTION OF ANALYZING AN ALTERNATIVE SITE FOR THE PATH.

Ellen M. Hyatt
Jan 18, 2011

Ellie& Don Hyatt

From: "Ellie& Don Hyatt" <hyatt@usamedia.tv>
To: "Ellie Hyatt" <hyatt@usamedia.tv>
Sent: Wednesday, January 19, 2011 12:00 AM
Subject: MARTIS VALLEY

AS YOU ARE AWARE, THE MARTIS VALLEY HAS ARTIFACTS FROM THE WASHOE INDIAN TRIBES. THERE WAS MENTION IN THE INITIAL STUDY THAT YOU WERE CONSIDERING POSSIBLY BUILDING AN INTERPRETIVE PANEL AND DISPLAYS TO RECOGNIZE THE WASHOE TRIBE AND THEIR USE OF THE MARTIS VALLEY. I COMMEND YOU FOR THAT. IT APPEARS THAT THE INTERPRETIVE SITE COULD BE CONSTRUCTED NOW. MOST PEOPLE WHO USE THE AREA DO NOT NEED PAVED ROADS TO GET TO AN INTERPRETIVE SITE. THE ARCHEOLOGICAL SITES SHOULD BE PRESERVED AND NOT PAVED OVER. I CAN NOT ENVISION A CONTRACTOR CHECKING CONSTANTLY TO SEE WHAT HE HAS REMOVED WHILE BULLDOZING AREAS. CINDY TONG AND I SPENT MANY DAYS WALKING AND LOOKING FOR ARROWHEADS IN THE VALLEY. SHE TOLD ME THAT THE PEOPLE BEFORE THE WASHOE TRIBE MADE VERY CRUDE ARROWHEADS BUT THE WASHOE INDIANS REFINED THEIRS.
WILL THERE BE A LOCAL ARCHEOLOGIST ON SITE DURING THE PROPOSED BULLDOZING OF THE TRAIL SYSTEM WITHIN THE MARTIS VALLEY?

We Never Removed anything that we found.

Ellen M. Hyatt
Jan 19, 2011

Ellie& Don Hyatt

From: "Ellie& Don Hyatt" <hyatt@usamedia.tv>
To: "Ellie Hyatt" <hyatt@usamedia.tv>
Sent: Wednesday, January 19, 2011 12:04 AM
Subject: MARTIS VALLEY

MARTIS CREEK MASTER PLAN
THE RESOURCE USE OBJECTIVES INCLUDE PRESERVING THE AESTHETICS OF THE AREA FOR THE RECREATING PUBLIC. ADDING ASPHALT TO CONSTRUCT A 10 FOOT WIDE BIKE PATH DOES NOT SEEM TO BE AN APPROPRIATE WAY OF PRESERVING AESTHETICS OF AN AREA. ADDING COLOR TO THE ASPHALT DOES NOT ALWAYS STAY IN THE ASPHALT AND MUST BE REDONE.

Ellie & Don Hyatt
Jan. 19, 2011

NAME: Nancy Ives

CONTACT INFO:

562-0240

NCSD Board Member

COMMENTS:

Let's Do it!! – great project!

① Perhaps color pavement brown or gray – better still – consider limestone. Blacktop is upsetting – TOO URBAN.

COMMENTS:

② Since most in this area are "minimalists" – please use smaller, unobtrusive signs, etc. stonework, etc. The current designs look like an amusement park – No need for all that decoration + structures –

Need signage to BLEND into the environment –

③ Route #1 or #2 are both preferable.

④ Love the bridges + boardwalks.

COMMENTS:

(4) Please retain as much original TMT as possible for those who want to walk on dirt

NAME: Otis Kantz

CONTACT INFO:

530587-1315 ph/fax

vkantz@mac.com

COMMENTS:

I Love it - 40 year resident of truckee - 35 year cyclist looks to me you've done your homework - Let's get going

Otis Kantz

1/19/11

NAME:

phone 775 323 7731
or 775 857
9760

CONTACT INFO:

Kary Kielhofer @
Kielhofer al
AOL .com

COMMENTS:

We have communicated our concerns to Mike S. and have an ongoing dialogue ~~about~~ our issues regarding The trail across Joerger property

NAME: Markus Lang

CONTACT INFO:

phone: 805 637 1482 (cell)

hm: 530 550 1492

mark_uslang@msn.com

COMMENTS:

after walking/riding the proposed alignments and reviewing alternative alignments, I am in support of the trail as proposed (alignment-wise). Every effort should be taken to reduce the visibility of the paved trail from 267 and to visually blend the trail w/the natural environment as viewed in any season.

#1

NAME: Lynne LARSON

CONTACT INFO: 582-8749
Cookie Jarlynne@pacbell.Net

COMMENTS:

This proJect has No effct ON me
I AM deeply Concerned THAT A project
Like This CAN GO forward When There are
FAR more Serious & important TRAil
issues : Such As:
for The Residents THAT Live iN Sierra

Larson #2

COMMENTS:

Meadows & All The hundred of Residents Cannot Safely anywhere. NOT to TOWN, NOT to The MARKET, NOT to The POST office, etc The priorities are Skewed - IF We Truly WANT TO GET FOLKS OUT of Their Cars - The Propose Trail is NOT The ANSWER. IT Sounds Like A FINANCIAL win for N/S at The Expense of the rest of US (Saftey, et)

NAME: MICHAEL LEFRANCOIS

CONTACT INFO:

michael@garydavisgroup.com

COMMENTS:

PLEASE STUDY WHAT OPPORTUNITIES MIGHT EXIST FOR WINTER OPERATION (PLOWED) OR UNPLOWED (GROOMED)

WINTER

NAME: Danny Pearson

CONTACT INFO:

11175 Rancho View Ct. Truckee

COMMENTS:

The EIR needs To address The visual impact in The actual report

Jan 19,2010

Mike Staudenmayer, General Manager
Northstar Community Services District
908 Northstar Drive
Northstar, Ca 96161

RE:Comments on the Notice of Preparation of a Draft EIR for the
Proposed Martis Valley Regional Trail

From Ann Penfield 30 year Truckee Resident

I agree with all of the Project Objectives sited in the NOP section 2.2 and I think that its great that Northstar is taking the lead in developing some bike trials in the area which would benefit both Northstar and the local residents.
But I believe that the proposed trails selected to meet the objectives will have a severe Negative Environmental Impact on the entire Martis Valley. Segment 2A cuts through the middle of the Martis Creek Wildlife area, which is currently used for hiking and walking by people of all ages and abilities from all areas including Northstar, Lahontan and Truckee as well as tourists from all over with their families, and dogs. I think the current use is the best and highest use as it both protects the area from additional development and allows a place for people of all abilities to enjoy.

In the Project Description's first sentence it points out the problems that will be encountered if it becomes a 14 foot wide new bike trail.
"The existing trail along Martis Creek through the Martis Creek Wildlife Area **is one of the most popular trails in the Truckee/North Tahoe area. The heavy use of this trail has led to water quality impacts as erosion of the trail and stream banks lead to sedimentation of the creek, and impacts to wildlife** from the presence of humans and dogs in the area (Truckee River Watershed Council). The Watershed Council and Corps are involved in ongoing restoration activities including **"rerouting some portions of the existing trails away from stream banks, meadows and wetlands, restructuring and rebuilding portions of trails, and stabilizing stream banks through extensive revegetation"** to reduce sedimentation and enhance natural habitat (Truckee River Watershed Council).

Why would it be wise to add another huge layer of users and disturb the habitats with a 20 foot wide area to construct a paved trail in to this "Wild Life Area" if this trail is already one of the most popular trials in the area? As stated above the current users are walkers and hikers, since no bikes are allowed in the area, due to the damage heavy bike use would cause to the delicate environment, of streams, and bogs which are present all spring and early summer. The current users over the last 10 or so years have volunteered in the ongoing restoration activities to help reduce impacts to the area described above and upgrade the walking/hiking trails with their time & hard work each year on Truckee River Day.

What are the plans to address the parking issues for the various trail access points? This walking/hiking area is a treasure enjoyed by many, and the parking lot is usually full all summer long. The impact of people driving to Segment 2A (the first completed in 2011) to bike ride will be a major problem, as I would guess that the parking would have to be doubled, further tearing up the fragile area. It is already difficult to navigate the right or left turn off of 267 to park, if you add another huge layer of cars pulling off and trying to find a parking space to unload bikes it will certainly become a more dangerous.

What about using the North side of Highway 267 for the entire trail to from the Airport to the traffic signal on Highway 267 at the Northstar entrance to replace the proposed Segments? This area is connected by the paved road to the dam and would not damage the existing wild life trail areas and is an area not currently being used for recreation. Can this avenue be explored as? then it would be possible to add a new feature and keep the existing feature as is. A hiking trial to the Northstar Village would also add a great feature for current Northstar residents and people hiking in the Valley. I think if you surveyed Northstar guests there would be as many hikers as bikers, people who are traveling often don't bring their bikes, but the always have shoes. All travelers to North Star would be able to then see the bike trail and would be more likely to use it. This alternative would leave the wild life area wild.

What happened to the Segment 3A, 3B, 3C shown on one of the maps, which follows along Highway 267? This would be a preferred area to use, but Segment 1 should follow the hwy rather than the creek beds and bog areas. Most bike trails currently installed in the Lake Tahoe area follow the main highways, and don't cut thru the wild areas if at all possible. Many towns such as Sun Valley have popular bike trails that follow the highways, allowing easy, safe and scenic access to bikers. In Sun Valley they also groom the trail so Xcountry skiers can have access, which if we did it along 267 it would be a great asset to the North Star resort as well as the town of Truckee. Donner Lake was groomed for a few years and that allowed more recreation areas for various users in the winter.

While the proposed Segment 2A may be a short cut to the Northstar Village, I don't think it is the best use of the Martis Wildlife area. In addition to the Environmental Factors mentioned in the Proposed Trail plan other items in the EIR should be considered as potentially significant regarding the areas of Aesthetics, Biological Resources, and Geology and Soils.

Aesthetics – item C- Substantially degrades the existing Visual character or quality of the site and its surroundings – as it is for hiking currently not biking. The MVCP designates the Wildlife Viewing Area as a Scenic Overlook, of fields and meadows not a 14 foot wide path cut thru the flowers and bogs. This can not be mitigated by just changing the color of the road from black to brown.

Biological Resources damages will be potentially significant on many counts.
There are few wild flowers anywhere in the Truckee area, but the Wildlife area has a diverse plant life along the river and in the bogs. In a wet spring there are acres of Dwarf Lupin, Camas Lilies, Shooting Stars and Larkspur , many of those would have to be plowed under to create the bike trail. We have so few areas like this that are accessible to walkers it would be a crime to destroy even one acre of this with a 14 foot wide trail thru the beautiful meadow.
This area draws many birds even the occasional larger birds like Hawks and Cranes.
There is no Mitigation that can offset these assets.

The damage to the **Geology and Soils** could be potentially significant in this area I would think, As there will be significant soil erosion in all parts of the valley by the 14 road way which will run off into the plant life and into the water sheds. This can't be mitigated nor can the damage to the area done in the construction cycle, the area will forever be changed from a Wild Life area, to a busy bike way.

Please reconsider the site selection for Segments that cut thru our last treasure in the Martis Valley and select another site for the bike connection trail. I love to bike, but I don't way to see our Valley paved over, why not put the paving nearer to the highway where it belongs. Most of us live here mainly because we love the natural beauty around us; please don't destroy it now as there is no way to get it back once it is gone.

Sincerely

Ann Penfield

NAME: GEOFF S. Stephens

NORTHSTAR Property Owners Association

CONTACT INFO:

Geoff@NPOA.info

(530) 562-0322

COMMENTS:

Our main concern is determining IF NPOA MEMBERSHIP is Supportive of the Route through NPOA Common AREA. Membership reach out is paramount to determine level of support within membership.

Over

membership will need to consider the following

- should The Village be a destination
- increase or decrease of property values
- trail impacts to neighboring homes
- noise, litter
- night use
- What are the advantages to having this trail go through NPOA property.
- Advantage to NPOA owners
- Parking on local streets to access trail
  who enforces

NAME: ANDREW TERRY

CONTACT INFO:

582-8672

A_T_TERRY@HOTMAIL.COM

COMMENTS:

WHAT'S THE GENERAL CONSENSUS OF THE GROUP?
THERE'S A HIGHWAY GOING THROUGH THE
VALLEY - THE INCREMENTAL EIR DOESN'T
REFLECT THE MINIMAL INCREMENTAL IMPACT
... ACTUALLY IT EXAGGERATES THE IMPACT

COMMENTS:

Using 267 As An Alternative Is DEADLY
Access To Waddle Ranch? Using 267?!
All Airport Land Is Conceptually Available,
Not Just Formal Easement

Please Make Sure It's A 10' Paved Trail
Despite The Nay-Sayers!
Paved Trail Or Do Nothing In My Book
Why Redo The Legacy Trail Argument?
Don't Push Overflow Parking To The Wildlife
Viewing Area - That Already Gets Full

Don't Need Entrance Signage - Overkill

NAME: Peggy Towns, Truckee, Ca

CONTACT INFO:

587-2700 sunt6sbcglobal.net

COMMENTS:

The army Corps Master Plan for This area does not allow a paved trail. How are you getting around this? Why wasn't public comment obtained

COMMENTS:

in alternatives for trail location and size?

I hike on this trail often, for eleven years and I enjoy the 'natural' quality. To me, a large paved trail changes the experience. It decrases The scenic quality and reduces the pristine experience. This is not addressed. The type of users will be changed. Connecting The trail to Northstar Village is inappropriate. It may benefit a few business owner in the Village and a few Northstar property

COMMENTS:

owners, but will not benefit the majority of the trail users.
This is public land. The U.S. Army Corp designates this area as a wildlife refuge and that is it's primary benefit. It is not part of Northstar to be used for 'Developed' recreation. The proposed paved trail is a road, not a trail.
It will irreveribility alter the pristine quality of Martis Wildlife Refuge in an adverse way. The trail should run adjacent to the highway and connect to the golf course. The Army Corps should not approve this plan.

Trail signage needs to be integrated with a regional signage program being developed around Lake Tahoe
Ron Treabaug

When will Truckee Trails be finished along Brockway road.
Karen Freested

Interpretive signage should include Braille and Type fonts should be Large and contrasting colors
Candace Cable

Martis Valley Trail Opposition

January 19, 2011

Kim Williams, Skyline Ct
Active runner/hiker/cyclist

I have lived in the area full time 9 years but have been using the natural resources 45 years. Moved here to escape the urban lifestyle and lack of natural trails to run, hike and bike on.

I do not support the proposed Martis Valley Trail. I understand the thinking behind it ,to allow for access to Northstar Village from downtown and to get folks out of their cars. However, this is not the answer. It has been my experience that pedestrians and cyclist do not mix well on paved paths. I have tried to both run and cycle the bike path from Squaw Valley to Sugar Pine State Park and discovered that I needed to go around 6 am to avoid the variety of users, ie: strollers, dogs, children bikes and rollerbladers. I love seeing all these people out, however it is one of the most dangerous areas to bike on. I know several people who have had bad accidents as well as witnessed several accidents on the bike path. And this bike trail is buried in snow 6 months out of the year for it is not plowed. Who is going to pay to maintain a trail through Martis Valley to be used year round?

I think Martis Valley should be left just as it is. I am sick of paying for "urban frills" that I moved to escape. What is wrong with leaving our natural resources just as they exist?

Kim Williams

January 19, 2011
Robert Williams
Skyline Ct., Truckee

I have been a full time Truckee resident for 9 years and have been visiting and enjoying the area for over 60 years. I am also an avid trail runner and run the Martis Valley trail system several times a week when the trails are clear of snow. My dog usually accompanies me on these outings. I do **NOT** want to run on a paved pathway! I do **NOT** want to run among a cluster of cyclists! You only have to look at the paved trail system from Squaw Valley to Tahoe City to observe how poorly that combination of trail users clashes.

I support a trail from Truckee to Lake Tahoe. Why it must pass through the Village at Northstar I am not sure. I think an alternative route would be to parallel Hwy 267 to the one mile sign for Northstar. The path would then turn right on the existing road that runs above the golf course, past the gold maintenance facility, and directly to Northstar Drive. This is a hard packed dirt road that has been in place since Northstar's inception and generates no traffic.

I ask that you keep the paved pathway out of Martis Valley and consider the alternative I have suggested.

Thanks,

Robert Williams

R. Williams

APPENDIX A3

Initial Study Supplement

SCOPE OF ENVIRONMENTAL IMPACT ANALYSIS FOR MVT HIGHWAY ALIGNMENT

Introduction

The MVRT EIR evaluates two potential trail alignments at an equal level of detail. Detailed descriptions of each alignment are provided in the EIR. In summary, the Valley Alignment would route the trail through Martis Valley through open space within the Northstar at Tahoe residential areas, into Northstar Village, and then north through forested lands towards Brockway Summit. The Highway Alignment would route the trail at the edge of Martis Valley along State Route (SR) 267, up Porcupine Hill, along Northstar Drive, and then through forested lands north of Northstar Drive to provide access to Northstar Village and to the portion of the trail extending towards Brockway Summit.

The potential impacts of the Valley Alignment were evaluated in the Initial Study circulated with the Notice of Preparation for the MVRT EIR. The Initial Study analysis determined that many impacts of the Valley Alignment would be less than significant, and therefore these impacts are not addressed in the MVRT EIR. This memorandum evaluates the impacts of the Highway Alignment to identify those impacts that would remain less than significant and do not need to be considered in the EIR.

Potentially Significant Impacts to be Evaluated in the EIR

The Initial Study concluded that environmental impacts related to biological resources, cultural resources, and hydrology and water quality are potentially significant and will be evaluated in the EIR. The EIR will provide analysis of the potential impacts in these resource areas for each of the two trail alignments being considered.

The Initial Study concluded that environmental impacts related to aesthetics, recreation, and transportation and circulation would be less than significant. However comments on the Initial Study and Notice of Preparation raised concerns regarding these conclusions. Therefore the EIR will address potential impacts from each alignment on the aesthetics and visual character of the project area, potential conflicts with existing recreation activities and potential conflicts between various MVT user groups, parking demand associated with use of MVT, and traffic safety on SR 267 associated with turning movements to and from the trail parking lot.

Highway Alignment Project Description

The Highway Alignment includes the following segments:

- Segment 1 – same as the Valley Alignment from Town of Truckee/Placer County boundary to existing wildlife parking area (±1.8 miles, 9,244 linear feet)
- Segment 3A/3B – along existing dirt trail alignment through southern edge of cultural resource site Placer 5, then adjacent to SR 267 past Northstar golf course, and traversing Porcupine Hill to Northstar Drive (±2.67 miles, 14,115 linear feet)
- New Segment 3F – between Northstar Drive and Northstar Village (±1.5 miles, 8,400 linear feet)
- Segment 4 – same as the Valley Alignment from Northstar to Four Corners (±3.1 miles, 16,451 linear feet)

In relation to the Valley Alignment, Segments 3A, 3B, and 3F (4.17 miles) would replace Segments 2A and 2B (3.5 miles) and would be constructed in the first two construction phases. These segments are being evaluated at a project level, as described in the EIR. The Valley Alignment also includes Segment 3E (0.8 miles) which would be constructed in a future construction phase and is being evaluated at a programmatic level. The total trail length of the Highway Alignment would be 9.07 miles, while the total length of the Valley Alignment would be 9.2 miles.

Creek Crossing and Drainage Features

No creek crossings would occur within Segment 1. Segment 3A would cross Martis Creek and two stream tributaries to Martis Creek. Bridges or raised boardwalks would be used for each crossing within Segment 3A. Based on the preliminary alignments for Segments 3F and 4, it is expected that each of these segments would include one crossing each of West Martis Creek and may include crossings of unnamed drainageways. In both Segments 3F and 4, crossing of West Martis Creek would occur at existing crossing locations.

Other Trail Components

Other components of the trail, such as trail construction techniques, use of Best Management Practices, the interpretative program, public access, signage and fencing, construction schedule, and long-term maintenance and management would be the same regardless of which alignment is constructed.

Highway Alignment Impacts Determined to be Less than Significant

Agricultural and Forestry Resources

No farmland, Williamson Act properties, or any type of active agricultural uses on lands crossed by Segments 3A, 3B, and 3F. With issuance of a Minor Use Permit from Placer County, any portions of Segment 3F crossing lands zoned TPZ and/or FOR would not conflict with that zoning. Construction and operation of the Highway Alignment would result in no significant conflicts with any forestry uses or activities.

Air Quality

The overall trail length is generally the same under each alignment. Construction emissions of air pollutants for the Highway Alignment would be the same as estimated in the Initial Study and the same mitigation measures would apply to ensure impacts remain less than significant. Operation of the trail in either alignment is not expected to generate air pollutant emissions.

Geology and Soils

Seismic risks are the same for each alignment. The Highway Alignment area already supports trail uses and State Route 267, which indicates that the soil is sufficiently stable to support a paved trail. The project would be constructed in compliance with local and State construction standards and building codes, which would ensure that design, site preparation, and construction of the proposed trail is appropriate for local seismic and geologic/soil conditions determined through geotechnical sampling and analysis of conditions in the project area.

Erosion control during construction would be ensured through the use of Best Management Practices as required by Placer County grading permits and in compliance with the requirements of the National Pollutant Discharge Elimination System (NPDES). Obtaining an NPDES permit requires implementation of a Stormwater Pollution Prevention Plan (SWPPP), which must be approved by the local Regional Water Quality Control Board. The SWPPP must include BMPs for slope stabilization, dust control, and temporary and permanent erosion control devices. Implementation of required erosion control measures and BMPs would ensure that impacts from erosion and sedimentation would remain less than significant.

Greenhouse Gas Emissions

The overall trail length is generally the same under each alignment. Construction emissions of greenhouse gases for the Highway Alignment would be the same as estimated in the Initial Study, and would represent a less than significant impact. Operation of the trail is not expected to generate any greenhouse gas emissions.

Hazards and Hazardous Materials

Construction of the Highway Alignment would include the use of hazardous materials, as described in the Initial Study. The Initial Study includes mitigation measures, which would be applicable to the Highway Alignment, to ensure that use, storage, and transport of hazardous materials during construction would not result in significant impacts. The Initial Study also includes a mitigation measure, which would be applicable to the Highway Alignment, to ensure that construction activities do not result in increased fire risks in the region.

Use and maintenance of the proposed trail in either alignment would not result in the routine transport, use, or disposal of hazardous materials. No schools exist within one-quarter mile of the Highway Alignment trail corridor.

Land Use and Planning

For either alignment, the trail would not divide an established community. The trail would be consistent with applicant land use plans and polices for the area. No habitat conservation or natural community conservation plans have been adopted for the project area.

Mineral Resources

The Highway Alignment project area and adjacent properties are not known to support any mineral removal activities.

Noise

For either alignment, trail construction would result in temporary increase in noise levels but would not chance the permanent ambient noise conditions in the area. Mitigation measures identified in the Initial Study to control construction noise levels for the Valley Alignment would be applicable to construction of the Highway Alignment and would ensure that construction noises do not result in significant impacts.

Population and Housing

For either alignment, the proposed trail is not expected to generate population growth in the region, generate the need for new housing, demolish existing housing, or displace existing residents.

Public Services

For either alignment, the proposed trail is not expected to generate population growth in the region and would therefore not generate the need for new or expanded public services.

Transportation and Circulation

For either alignment, the proposed trail is not expected to generate substantial increases in vehicle traffic in the project area, alter the mix of vehicle traffic on existing roadways, or conflict with transportation plans in the region. For both alignments, the EIR will include an analysis of traffic safety on SR 267 with respect to turning movements to access the trail parking area and an analysis of parking demands associated with the project.

Utilities and Service Systems

For either alignment, the proposed trail is not expected to generate population growth in the region and would therefore not generate the need for new or expanded utilities and services.

Highway Alignment Project Approvals

The project approvals required for the Valley Alignment identified in the Notice of Preparation for the MVT EIR would also be applicable to construction of the Highway Alignment. No additional project approvals would be needed.

APPENDIX B

PRELIMINARY TRAIL PLANS

APPENDIX B1

Preliminary Trail Plans

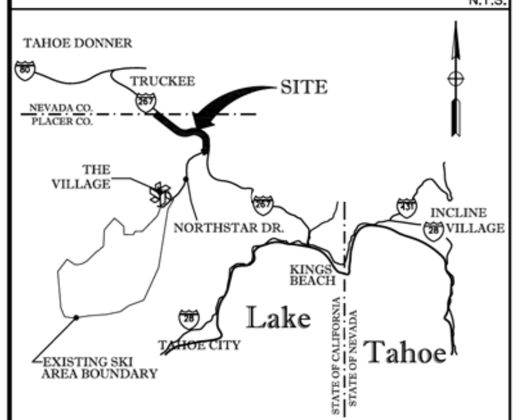
PRELIMINARY LAYOUT FOR NORTHSTAR COMMUNITY SERVICES DISTRICT MULTI-PURPOSE TRAIL

PLACER COUNTY CALIFORNIA

N.C.S.D. UTILITIES

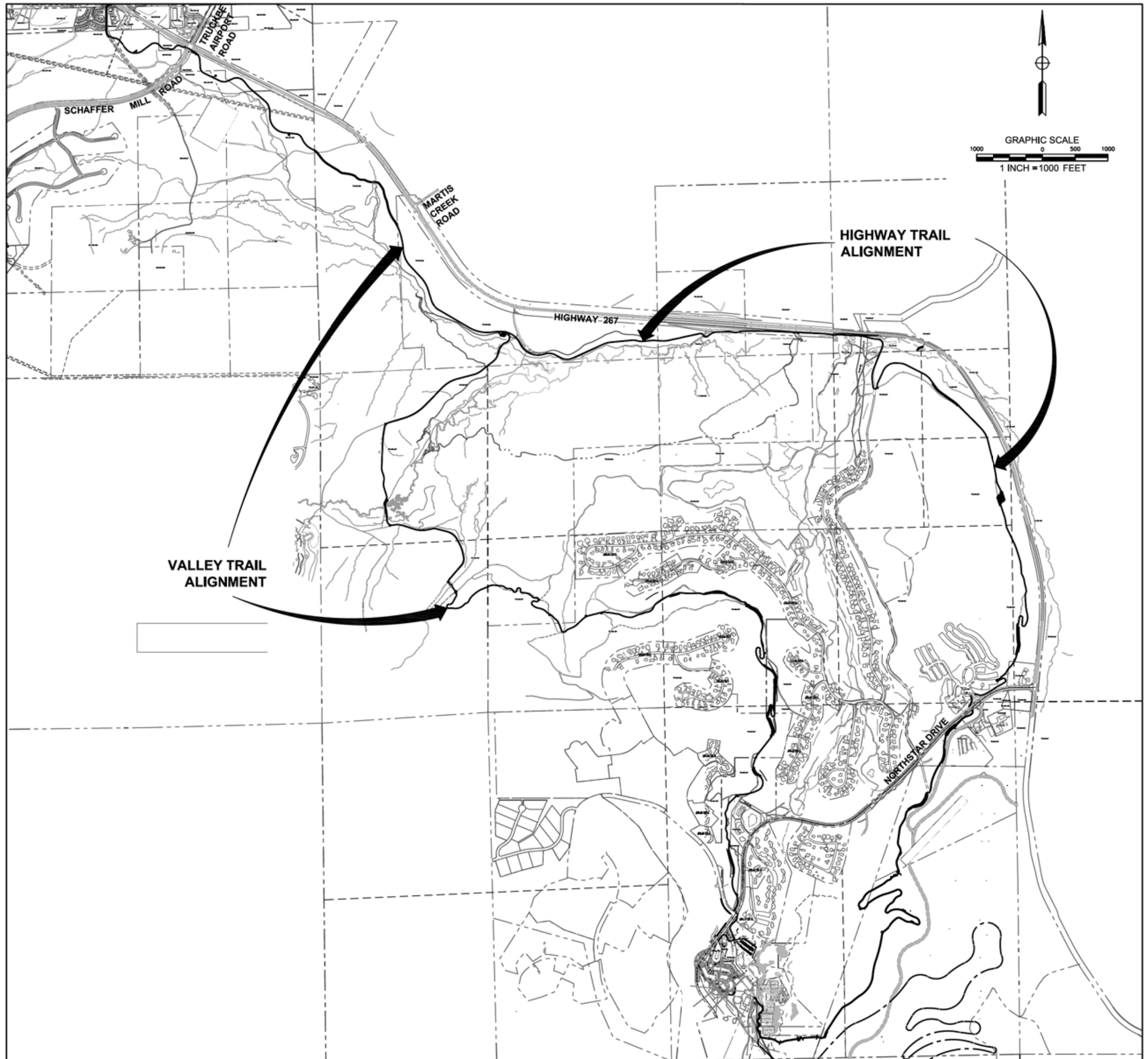
VICINITY MAP

N.T.S.



SHEET INDEX

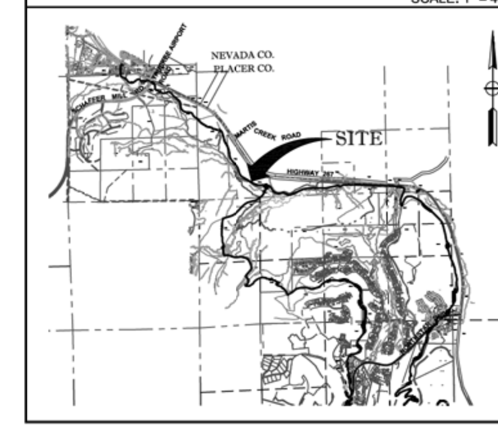
DWG NO.	SHT. NO.	DESCRIPTION
1	G1	TITLE SHEET
2	G2	NOT USED
3	G3	SHEET INDEX
4	G4	100-YR FLOODPLAIN
5	G5	PARKING ALTERNATIVES
6	C1	PLAN
7	C1A	PARKING ALTERNATIVE-1
8	C1B	PARKING ALTERNATIVE-2
9	C1C	PARKING ALTERNATIVE-3
10	C2	PLAN
11	C3	PLAN
12	C3A	PARKING ALTERNATIVE-4
13	P3	PROFILE
14	C4	PLAN
15	C4AF	PLAN
16	P4	PROFILE
17	C5	PLAN
18	P5	PROFILE
19	C6	PLAN
20	P6	PROFILE
21	C7	PLAN
22	C8	PLAN
23	C9	PLAN
24	C10	NOT USED
25	C11	PLAN
26	P11	PROFILE
27	C12	PLAN
28	C13	PLAN
29	C14	PLAN
30	C15	PLAN
31	C16	PLAN
32	P16	PROFILE
33	C17	PLAN



OVERALL DEVELOPMENT PLAN

PROJECT SITE

SCALE: 1" = 4000'



CONTROL POINTS

◆	NORTHING	EASTING	ELEVATION	DESCRIPTION
243	93258.6112	42429.0164	6216.81	1/2REBARCAP
1366	93712.5165	42310.3150	6224.18	1/2REBARCAP
1372	93626.0281	42232.3870	6242.31	1/2REBARCAP
1381	93525.2548	42440.9143	6211.04	1/2REBARCAP
1382	93498.8375	42539.2859	6200.56	1/2REBARCAP
1383	93287.7397	42536.1015	6204.79	1/2REBARCAP

REV	DATE	REVISIONS	INITIAL

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PRELIMINARY LAYOUT FOR
NORTHSTAR COMMUNITY SERVICES DISTRICT
MULTI-PURPOSE TRAIL

TITLE SHEET

TRUCKEE PLACER COUNTY CALIFORNIA

BAR IS ONE INCH ON ORIG. DRAWING IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

PROJECT NUMBER: 985.14B
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SURVEY DATE: 8/18/09
DESIGN BY: NC/BC
DRAFTING BY: LK/BC
CHECKED BY: WRA
FILE PATH: J:\985.14B\dwg\Final Sheets\EIR 985.14B_EIR-G1-G2.dwg
DATE: APRIL 2, 2012
SCALES: AS SHOWN HORIZONTAL; N/A VERTICAL

SHEET: G1

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PRELIMINARY LAYOUT FOR
NORTHSTAR COMMUNITY SERVICES DISTRICT

MULTI-PURPOSE TRAIL

NOT USED

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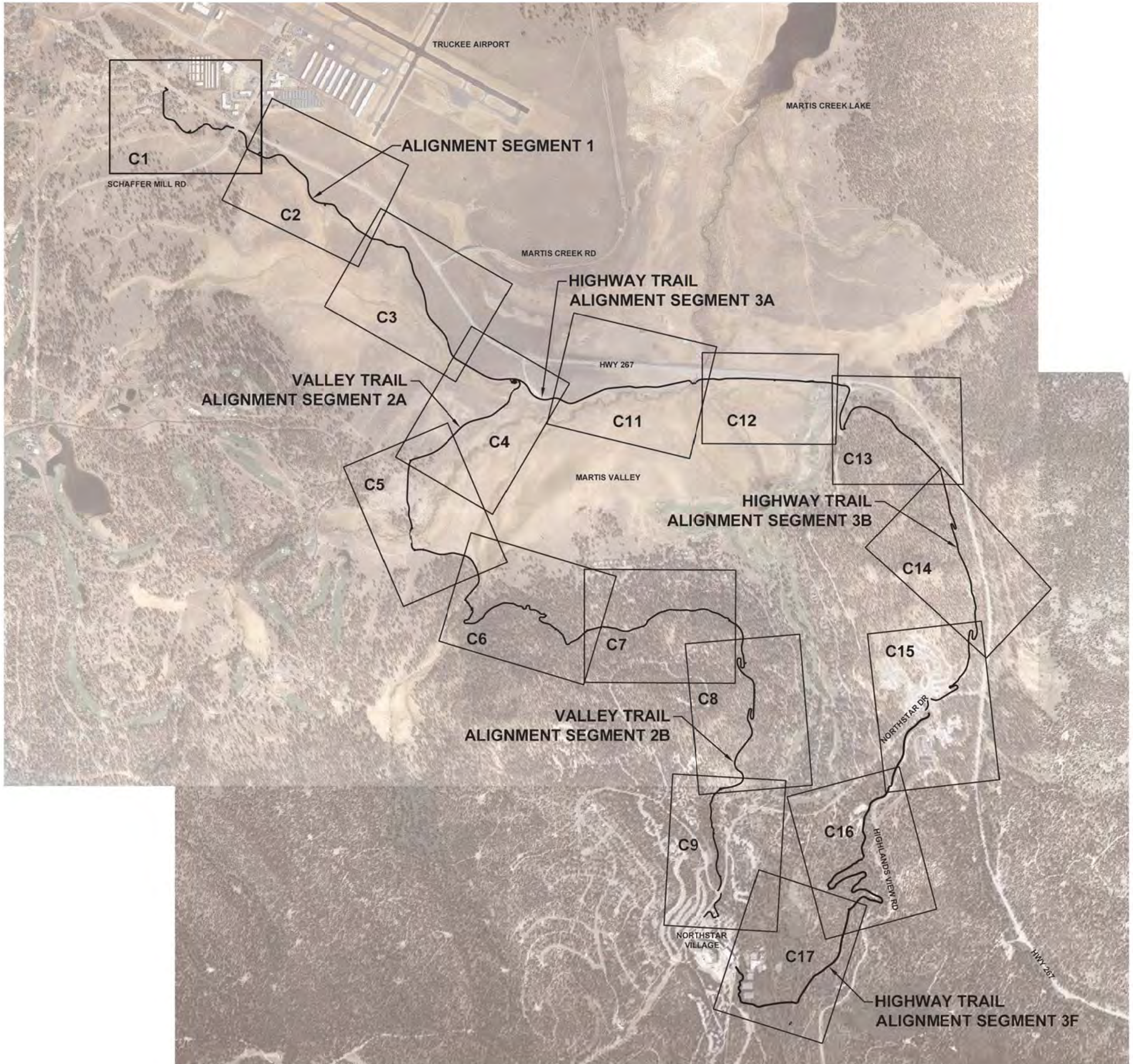
N/A VERTICAL
SHEET: G2



SHEET INDEX

GRAPHIC SCALE

1000 0 500 1000

1 INCH = 1000 FEET

NOT FOR CONSTRUCTION

PRELIMINARY LAYOUT FOR
NORTHSTAR COMMUNITY SERVICES DISTRICT

MULTI-PURPOSE TRAIL

SHEET INDEX

TRUCKEE | PLACER COUNTY | CALIFORNIA

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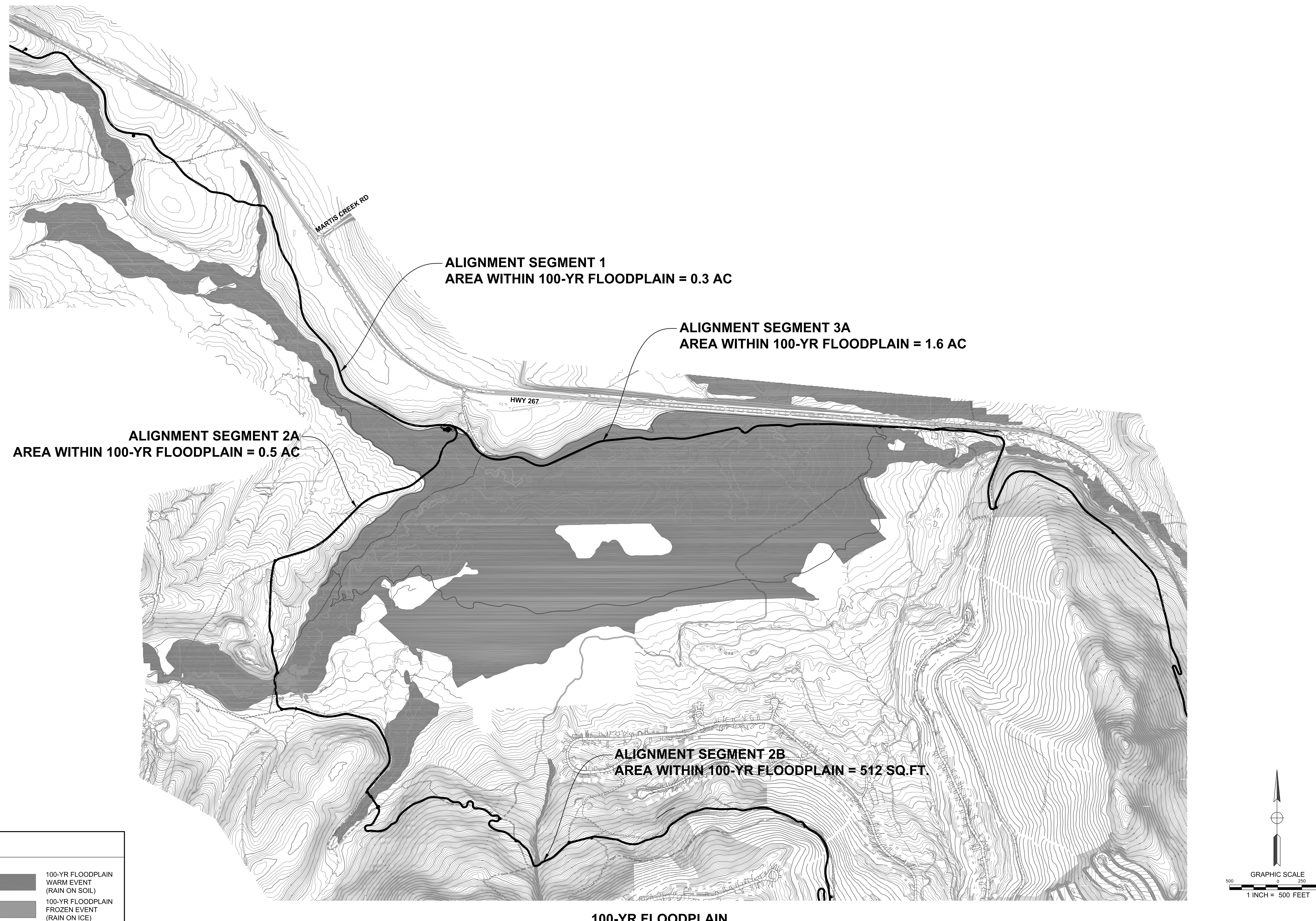
SHEET:	G3



100-YR FLOODPLAIN

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PRELIMINARY LAYOUT FOR
NORTHSTAR COMMUNITY SERVICES DISTRICT
MULTI-PURPOSE TRAIL

100-YR FLOODPLAIN

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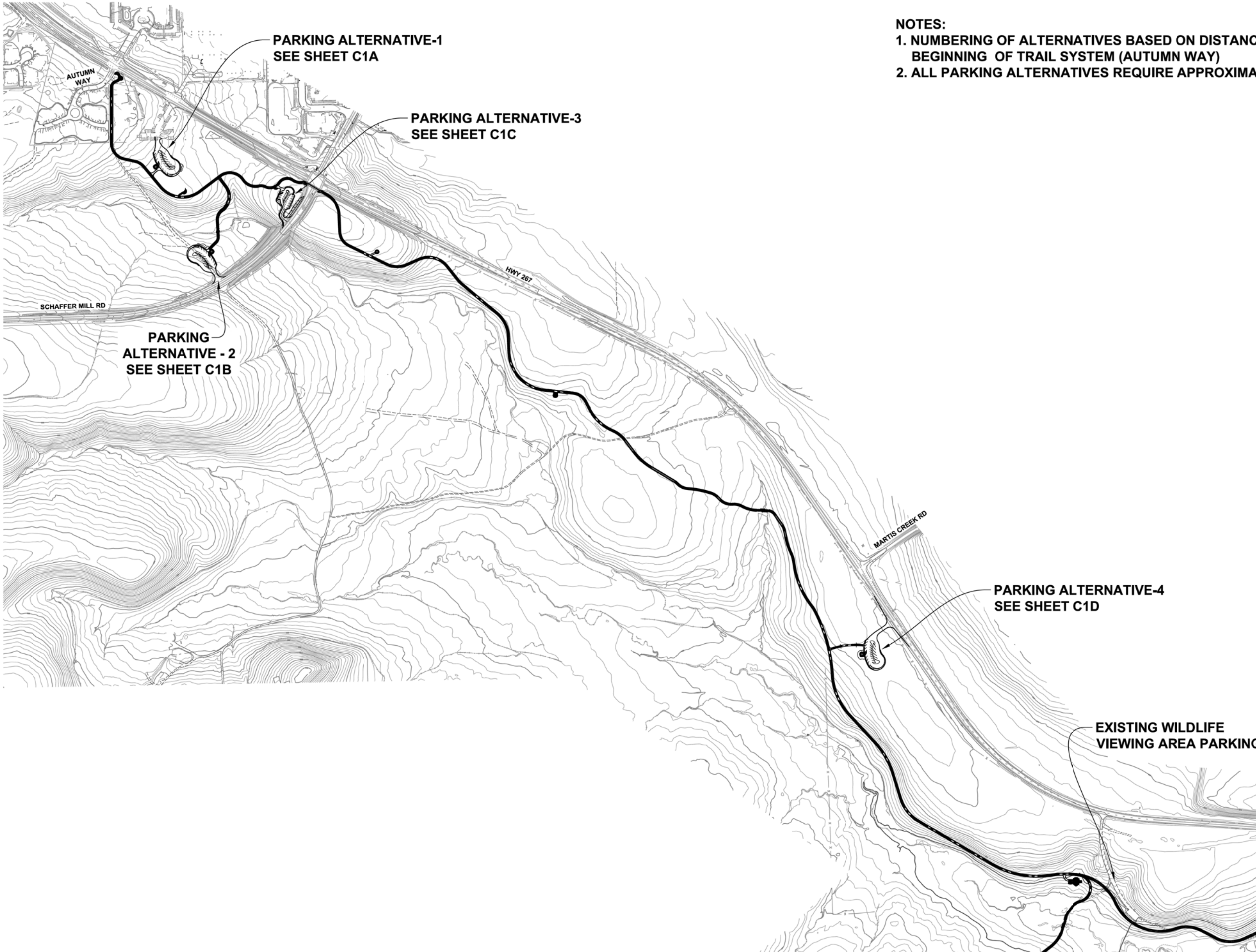
DATE:	APRIL 2, 2012

SCALES:
1" = 500' HORIZONTAL
N/A VERTICAL

G4
SHEET: 4 of 33



NOTES:
1. NUMBERING OF ALTERNATIVES BASED ON DISTANCE FROM BEGINNING OF TRAIL SYSTEM (AUTUMN WAY)
2. ALL PARKING ALTERNATIVES REQUIRE APPROXIMATELY 0.5 ACRES

NOT FOR CONSTRUCTION

PRELIMINARY LAYOUT FOR
NORTHSTAR COMMUNITY SERVICES DISTRICT
MULTI-PURPOSE TRAIL

PARKING ALTERNATIVES

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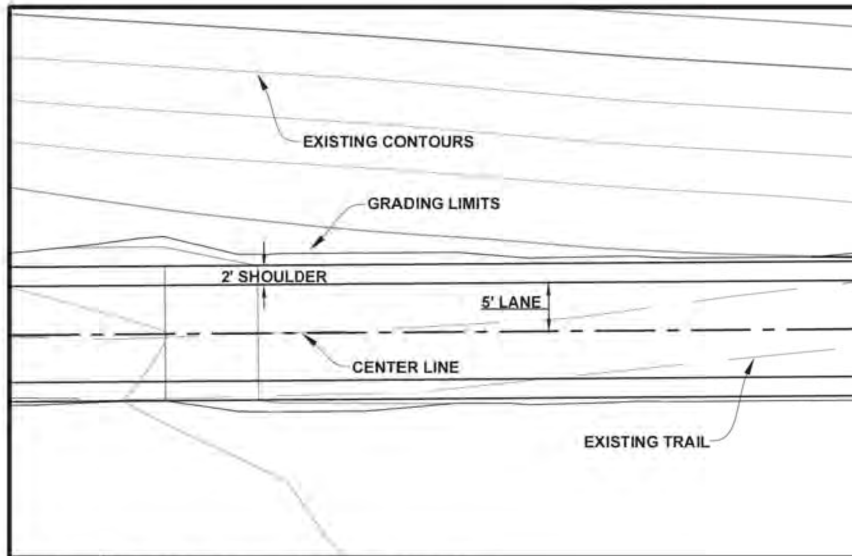
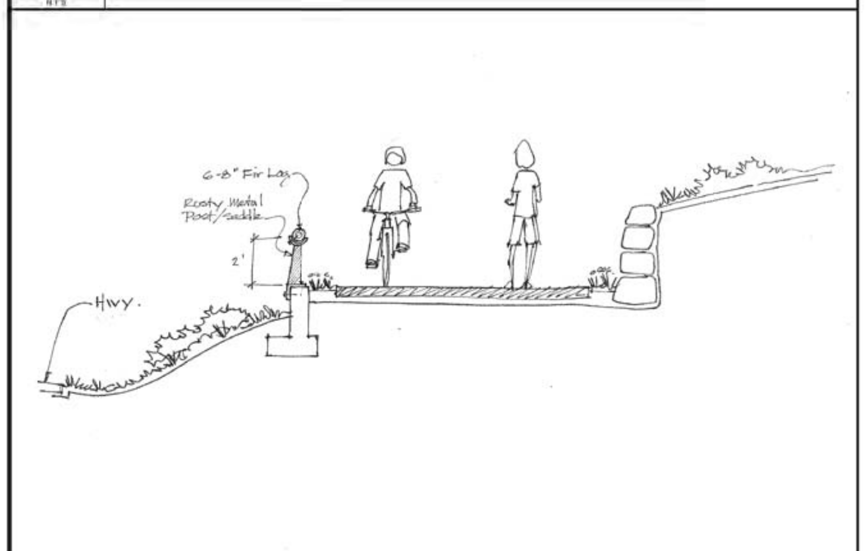
SCALES: 1" = 500' HORIZONTAL; N/A VERTICAL	G5
SHEET:	5 of 33



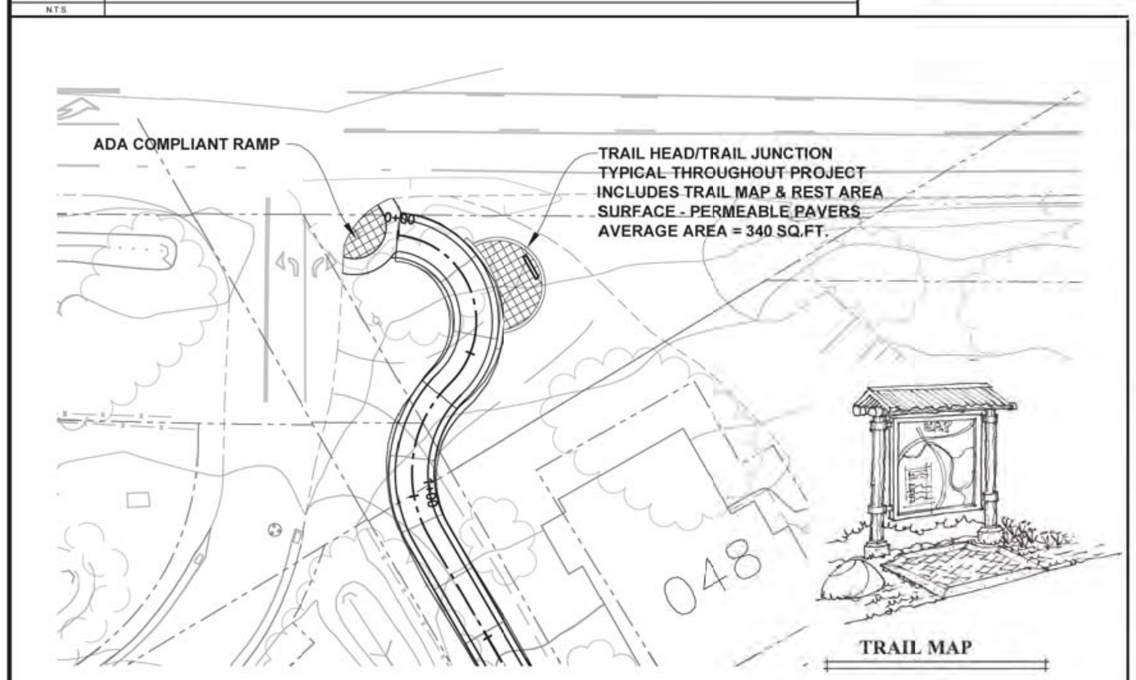
1 STANDARD TRAIL PLAN VIEW

N.T.S.



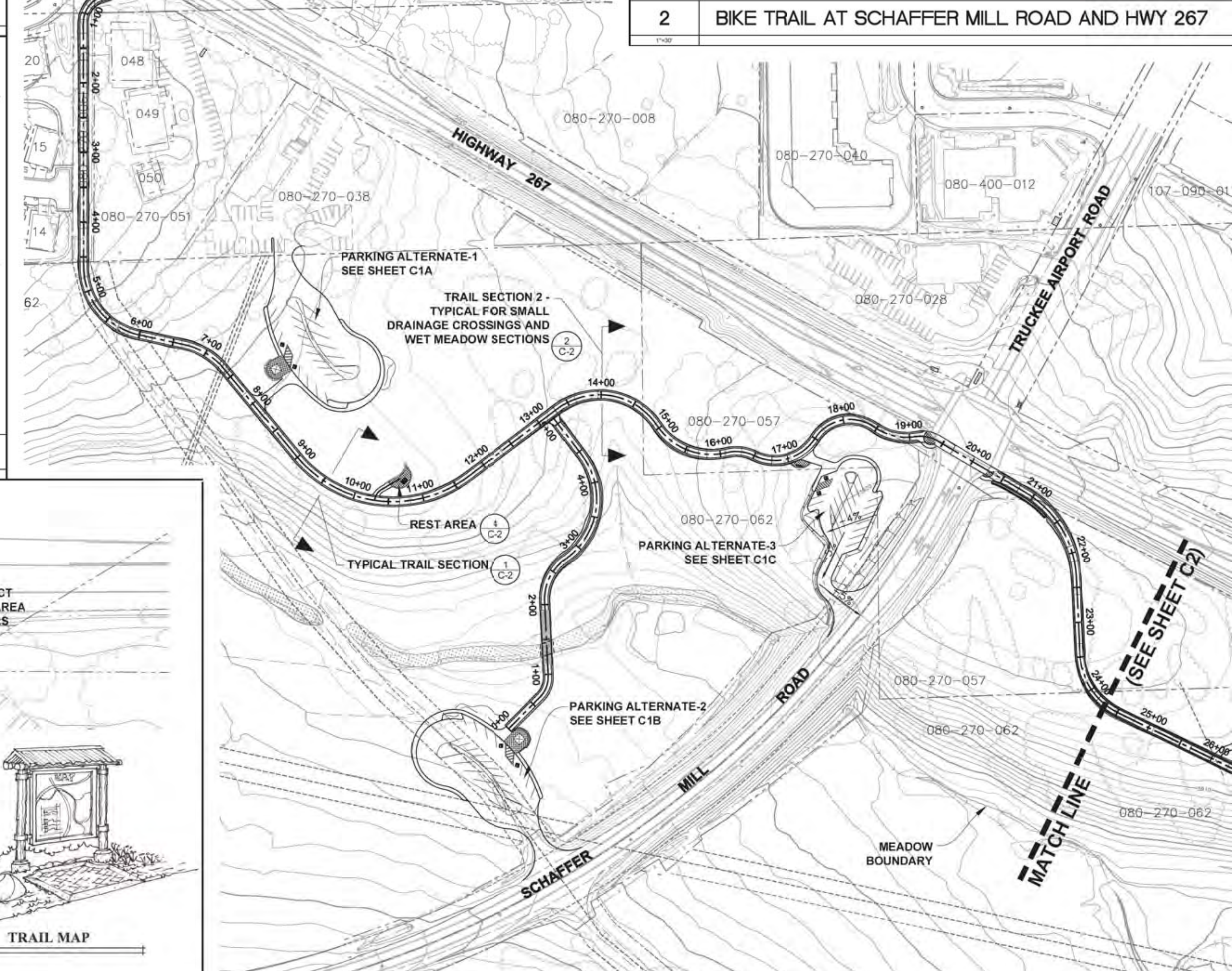
3 TRAIL CROSS-SECTION AT SCHAFFER MILL RD

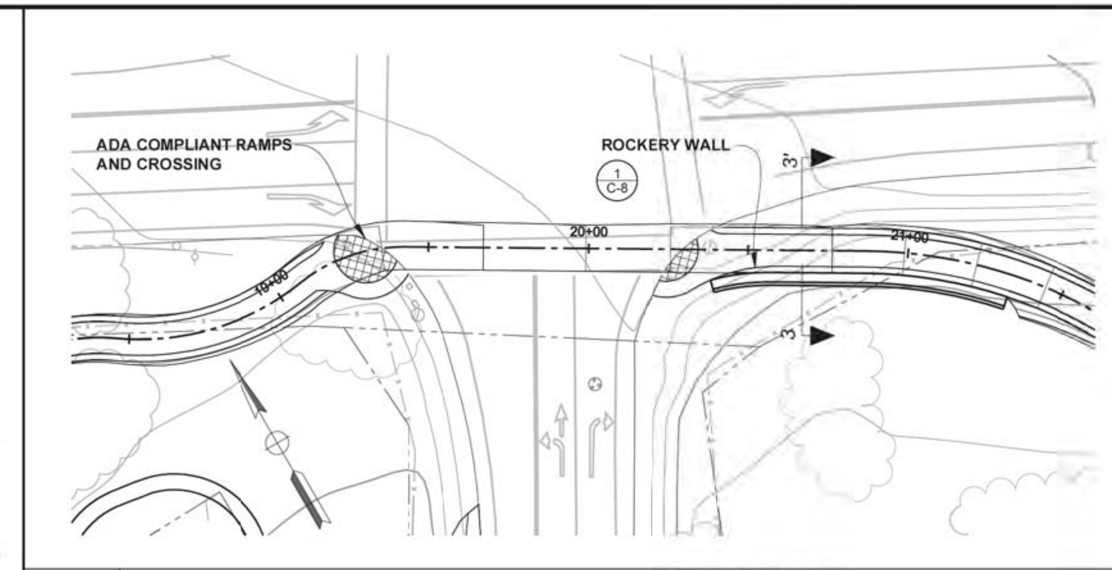
N.T.S.



4 BIKE TRAIL ENTRANCE AT AUTUMN WAY AND HWY 267

1"=30'





2 BIKE TRAIL AT SCHAFFER MILL ROAD AND HWY 267

1"=30'

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PRELIMINARY LAYOUT FOR
NORTHSTAR COMMUNITY SERVICES DISTRICT
MULTI-PURPOSE TRAIL
HIGHWAY & VALLEY TRAIL
PLAN
TRUCKEE PLACER COUNTY CALIFORNIA

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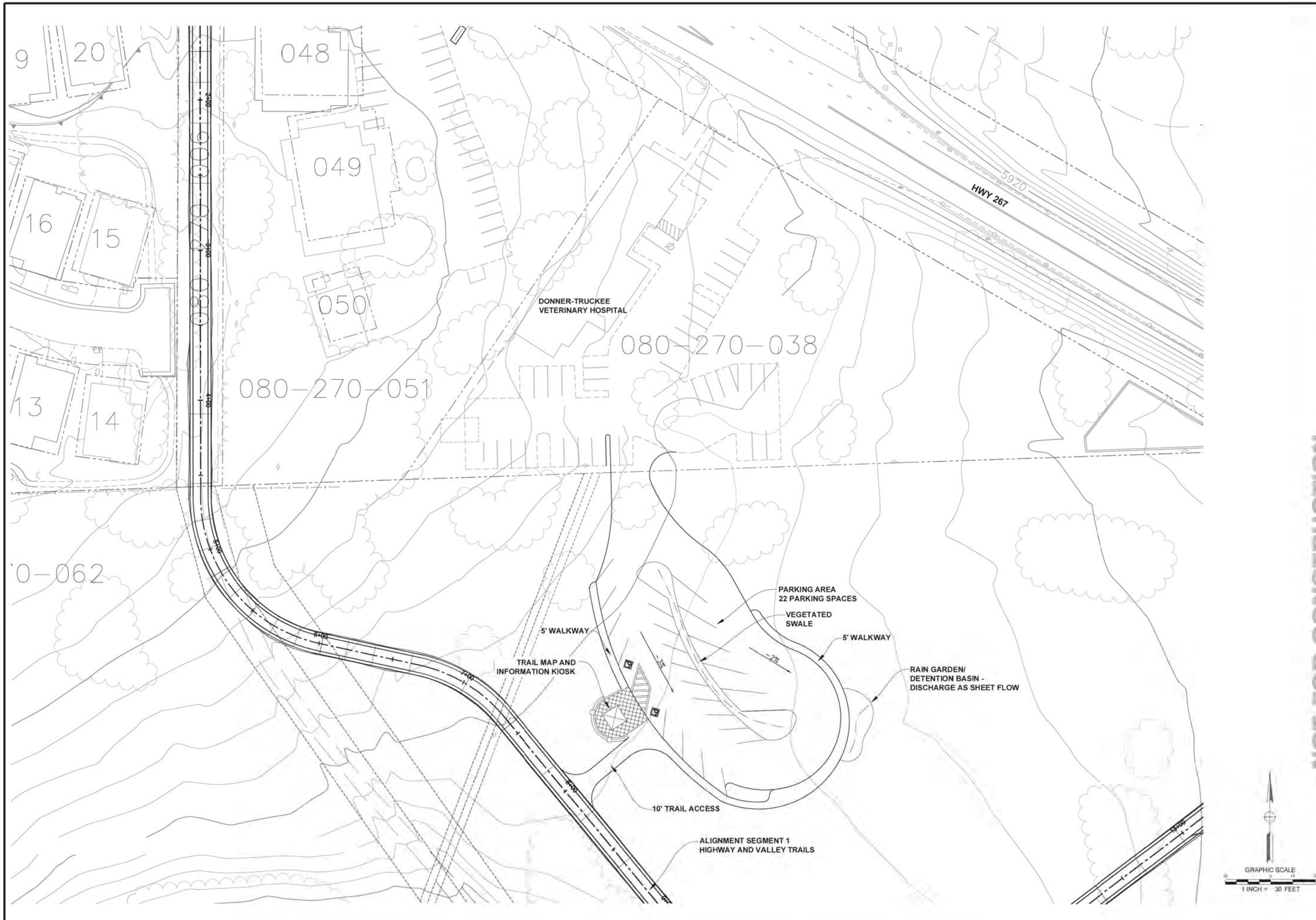
DATE: APRIL 2, 2012

SCALES: 1" = 100' HORIZONTAL; N/A VERTICAL

SHEET C1

6 of 33



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PRELIMINARY LAYOUT FOR
NORTHSTAR COMMUNITY SERVICES DISTRICT

MULTI-PURPOSE TRAIL

PARKING ALTERNATIVE - 1

PLAN

TRUCKEE — PLACER COUNTY — CALIFORNIA

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SURVEY DATE:	9/18/09
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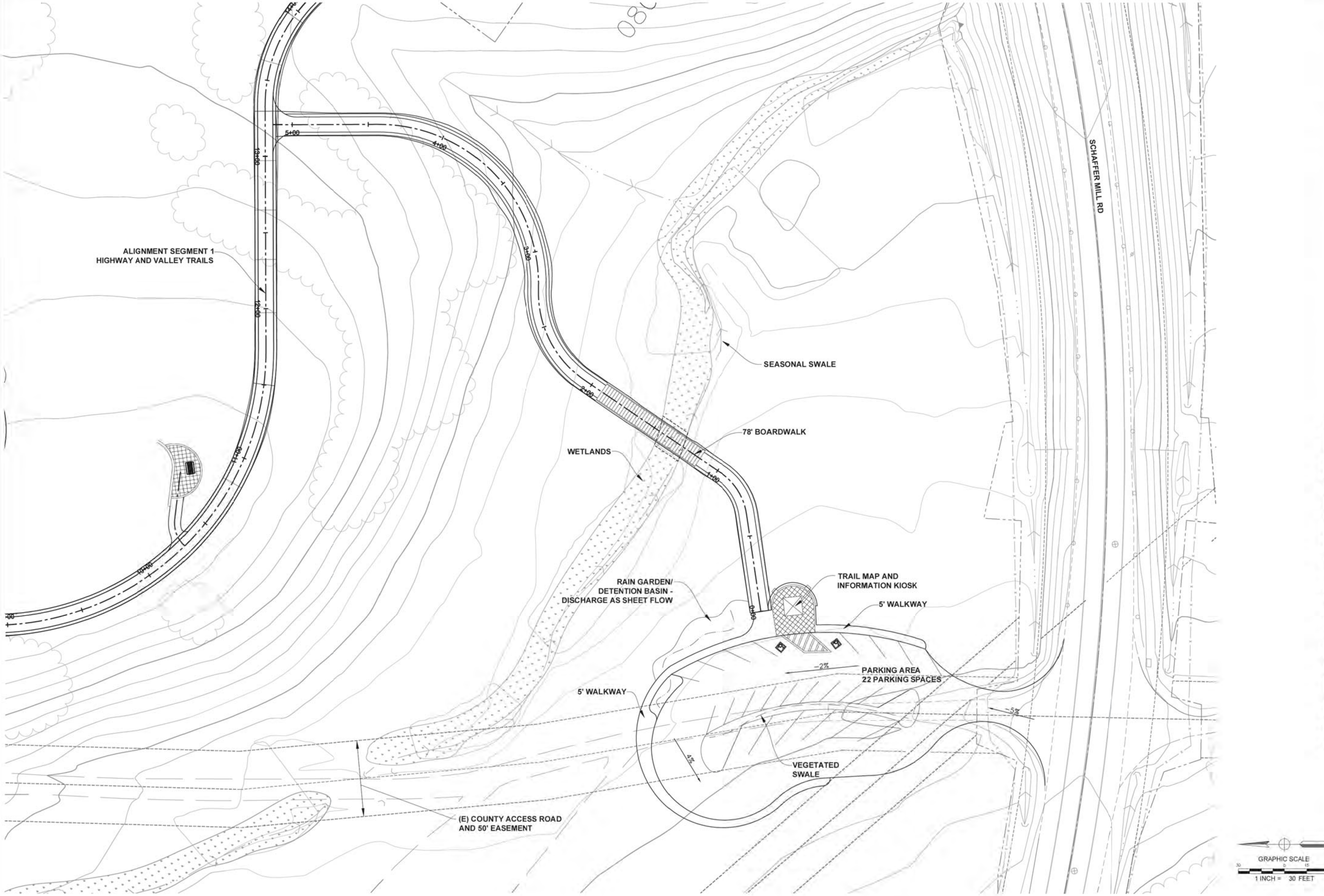
SCALES: 1" = 30' HORIZONTAL; N/A VERTICAL	C1A
SHEET:	7 of 33



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PRELIMINARY LAYOUT FOR
NORTHSTAR COMMUNITY SERVICES DISTRICT

MULTI-PURPOSE TRAIL

PARKING ALTERNATIVE-2

PLAN

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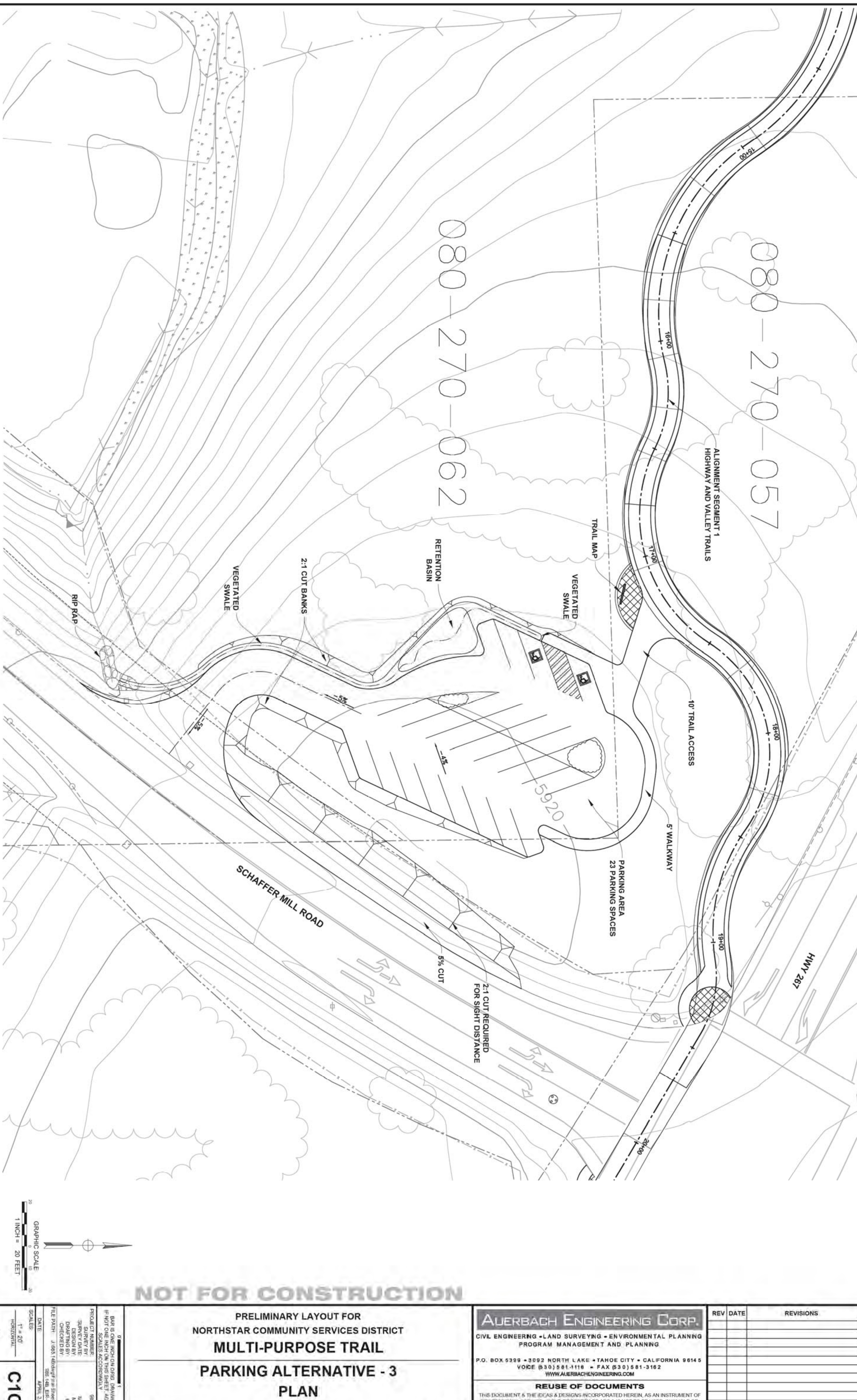

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PRELIMINARY LAYOUT FOR
NORTHSTAR COMMUNITY SERVICES DISTRICT

MULTI-PURPOSE TRAIL

PARKING ALTERNATIVE - 3

PLAN

TRUCKEE PLACER COUNTY CALIFORNIA

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0 1

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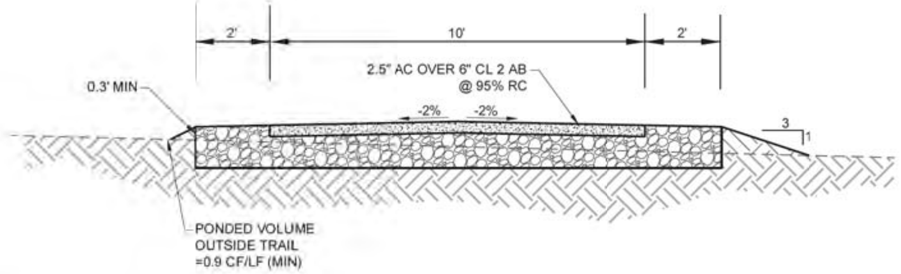
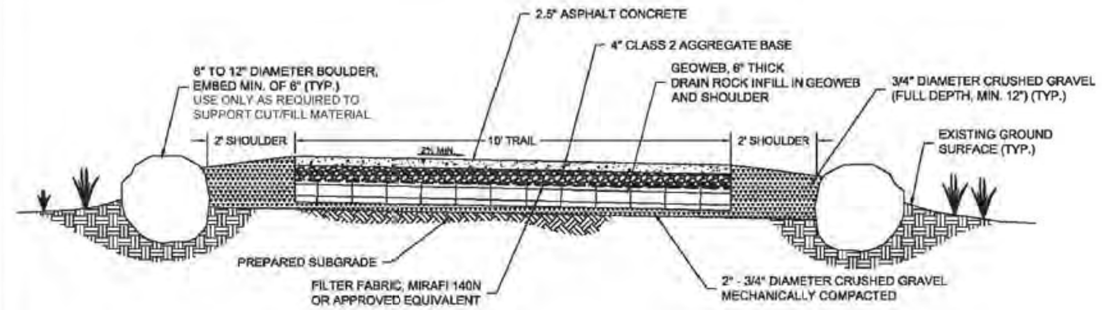


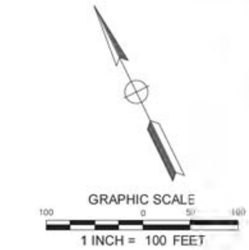
1 TYPICAL TRAIL SECTION

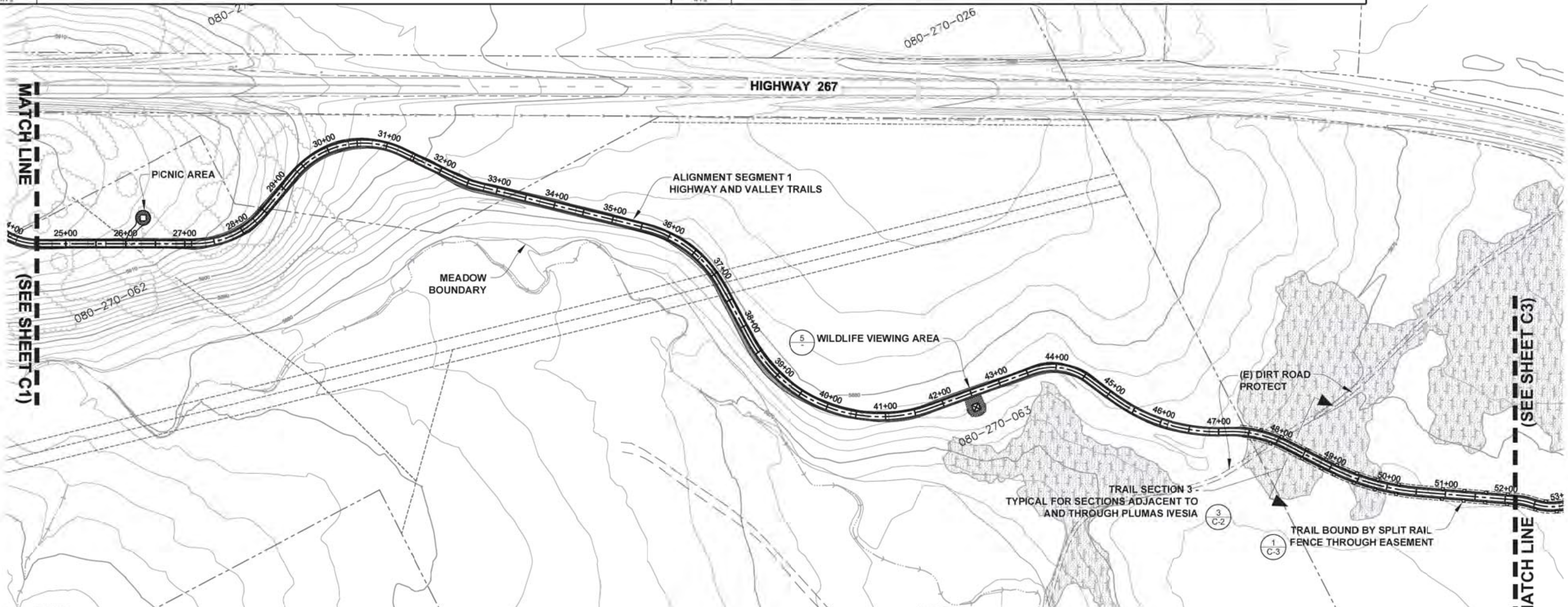
NTS

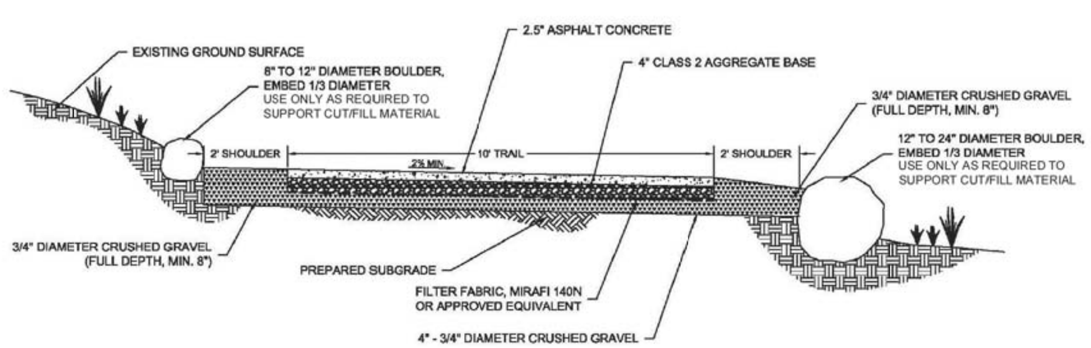


2 TYPICAL WET-MEADOW SECTION - BLANKET DRAIN

NTS







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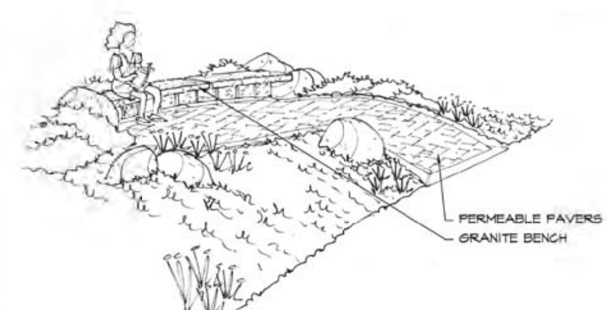

4 REST AREA

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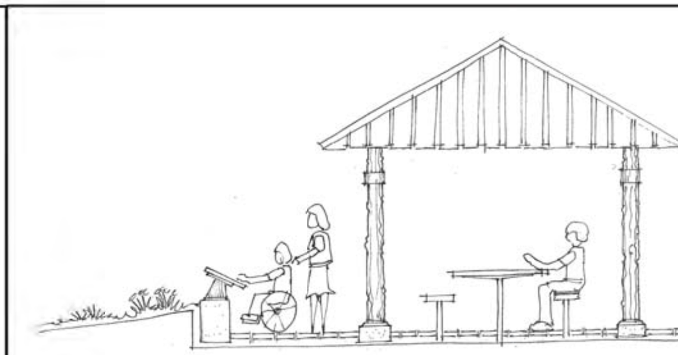

5 WILDLIFE VIEWING AREA STRUCTURE

NTS

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PRELIMINARY LAYOUT FOR
NORTHSTAR COMMUNITY SERVICES DISTRICT

MULTI-PURPOSE TRAIL

HIGHWAY & VALLEY TRAIL

PLAN

TRUCKEE | PLACER COUNTY | CALIFORNIA

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SURVEY DATE:	9/18/09
DESIGN BY:	NC/BC
DRAFTING BY:	LK/BC
CHECKED BY:	WRA
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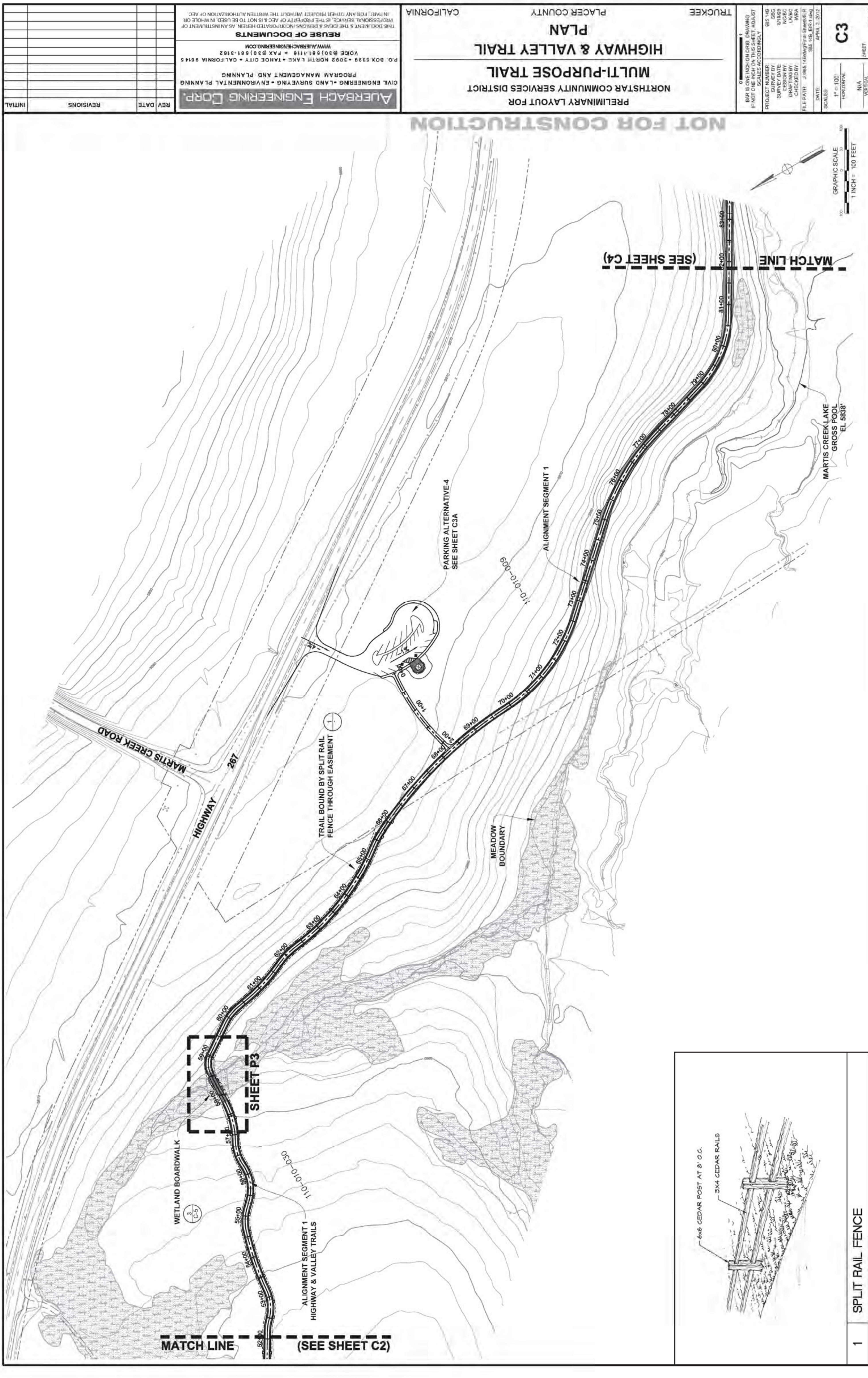
DATE:	APRIL 2, 2012

SCALES:
1" = 100' HORIZONTAL
N/A VERTICAL

SHEET C2

10 of 33



PRELIMINARY LAYOUT FOR
NORTHSTAR COMMUNITY SERVICES DISTRICT
MULTI-PURPOSE TRAIL
HIGHWAY & VALLEY TRAIL
PLAN
TRUCKEE
PLACER COUNTY
CALIFORNIA
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DATE
REVISIONS
INITIAL
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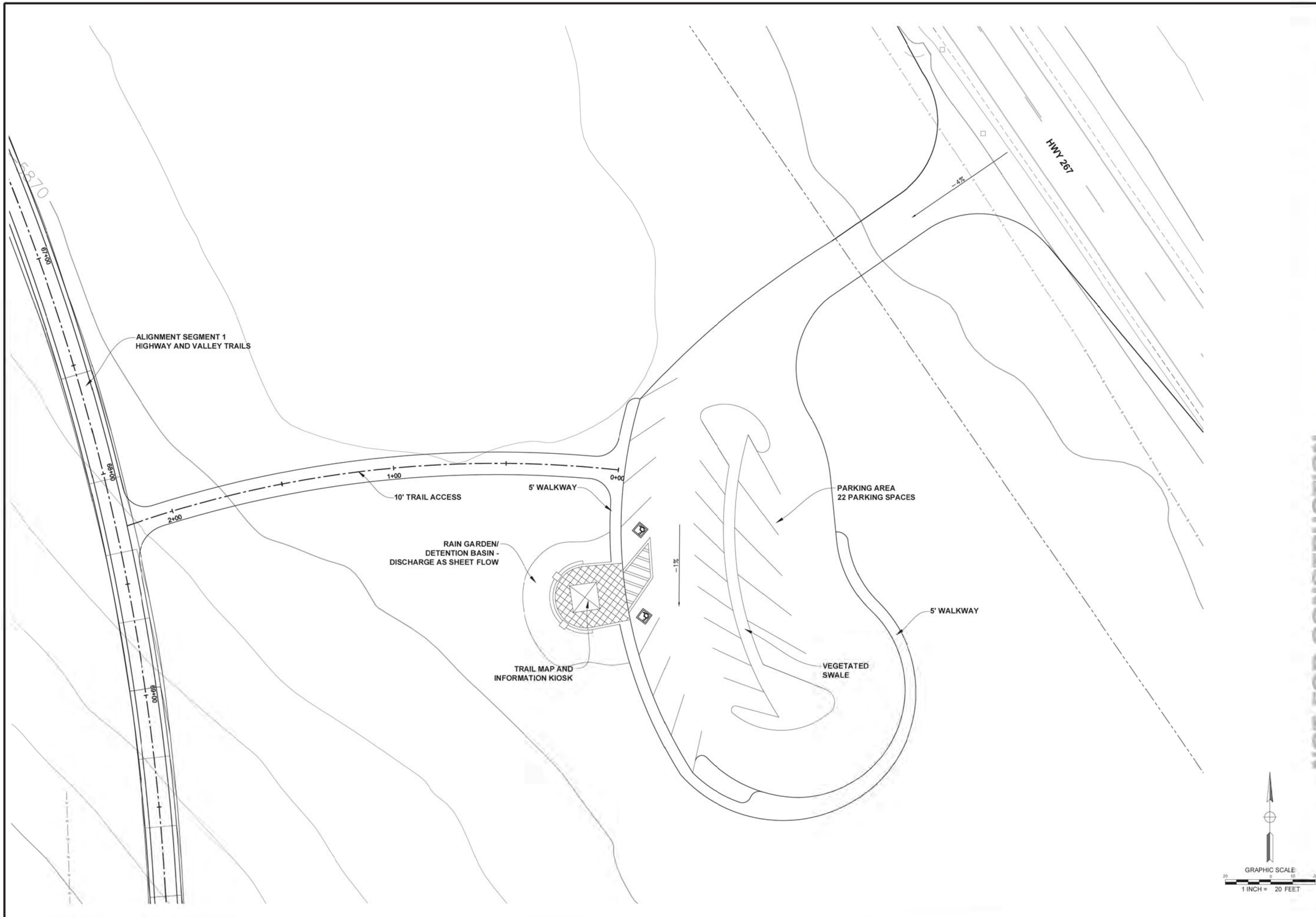
DATE: APRIL 3, 2012
SCALES: 1" = 100' HORIZONTAL
N/A VERTICAL
C3
SHEET 11 of 33
NOT FOR CONSTRUCTION
GRAPHIC SCALE
1 INCH = 100 FEET
MATCH LINE
(SEE SHEET C4)
MARTIS CREEK LAKE
GROSS POOL
EL 5838'
ALIGNMENT SEGMENT 1
PARKING ALTERNATIVE-4
SEE SHEET C3A
110-010-009
MARTIS CREEK ROAD
HIGHWAY 267
TRAIL BOUND BY SPLIT RAIL FENCE THROUGH EASEMENT
MEADOW BOUNDARY
SHEET P3
WETLAND BOARDWALK
110-010-030
ALIGNMENT SEGMENT 1
HIGHWAY & VALLEY TRAILS
MATCH LINE
(SEE SHEET C2)
6x6 CEDAR POST AT 8' O.C.
3X4 CEDAR RAILS
1
SPLIT RAIL FENCE



REV	DATE	REVISIONS	INITIAL

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PRELIMINARY LAYOUT FOR
NORTHSTAR COMMUNITY SERVICES DISTRICT

MULTI-PURPOSE TRAIL

PARKING ALTERNATIVE - 4
PLAN

TRUCKEE | PLACER COUNTY | CALIFORNIA

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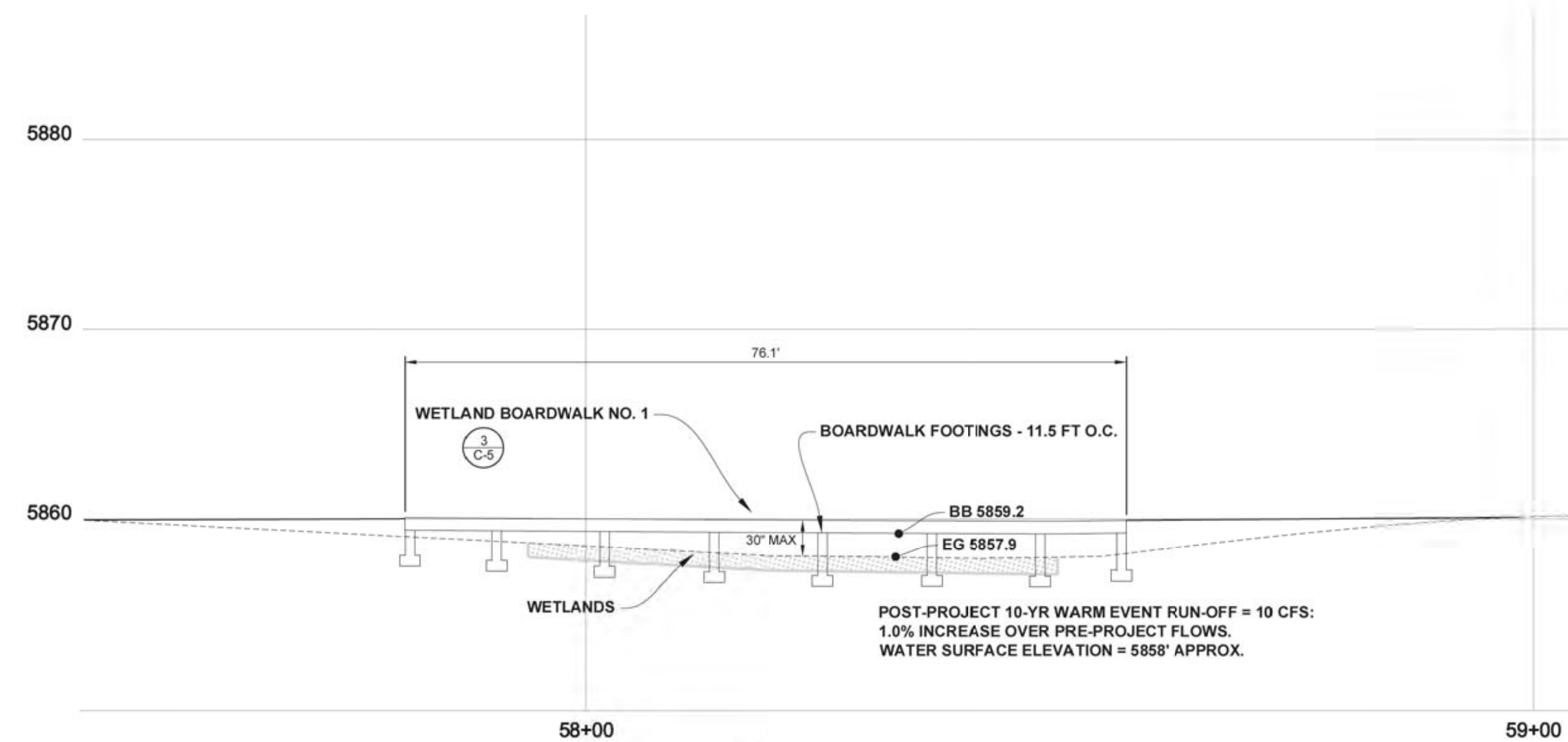
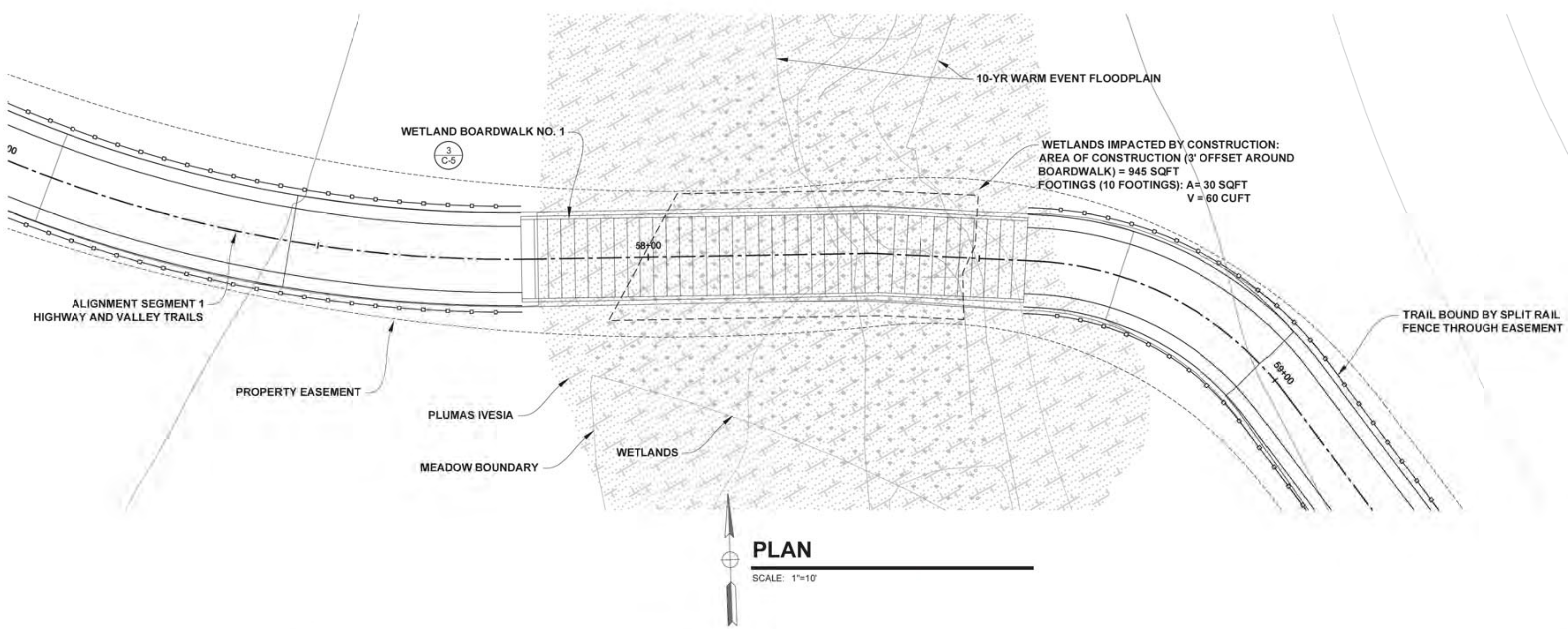
PROJECT NUMBER:	985.14B
SURVEY BY:	SBG
SURVEY DATE:	8/18/09
DESIGN BY:	NC/BC
DRAFTING BY:	LK/BC
CHECKED BY:	WRA
FILE PATH:	J:\985.14B\dwg\Final Sheets\EIR 985.14B_EIR-1.dwg
DATE:	APRIL 2, 2012
SCALES:	1" = 20' HORIZONTAL; N/A VERTICAL
SHEET:	C3A

12 of 33



PROFILE - A

SCALE: 1"=10' (H)
1"=5' (V)



PLAN

SCALE: 1"=10'

NOT FOR CONSTRUCTION

PRELIMINARY LAYOUT FOR
NORTHSTAR COMMUNITY SERVICES DISTRICT
MULTI-PURPOSE TRAIL

BOARDWALK NO. 1 PLAN & PROFILE

TRUCKEE PLACER COUNTY CALIFORNIA

REV	DATE	REVISIONS	INITIAL

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PROJECT NUMBER:	985 14B
SURVEY BY:	SBG
SURVEY DATE:	9/1/9/09
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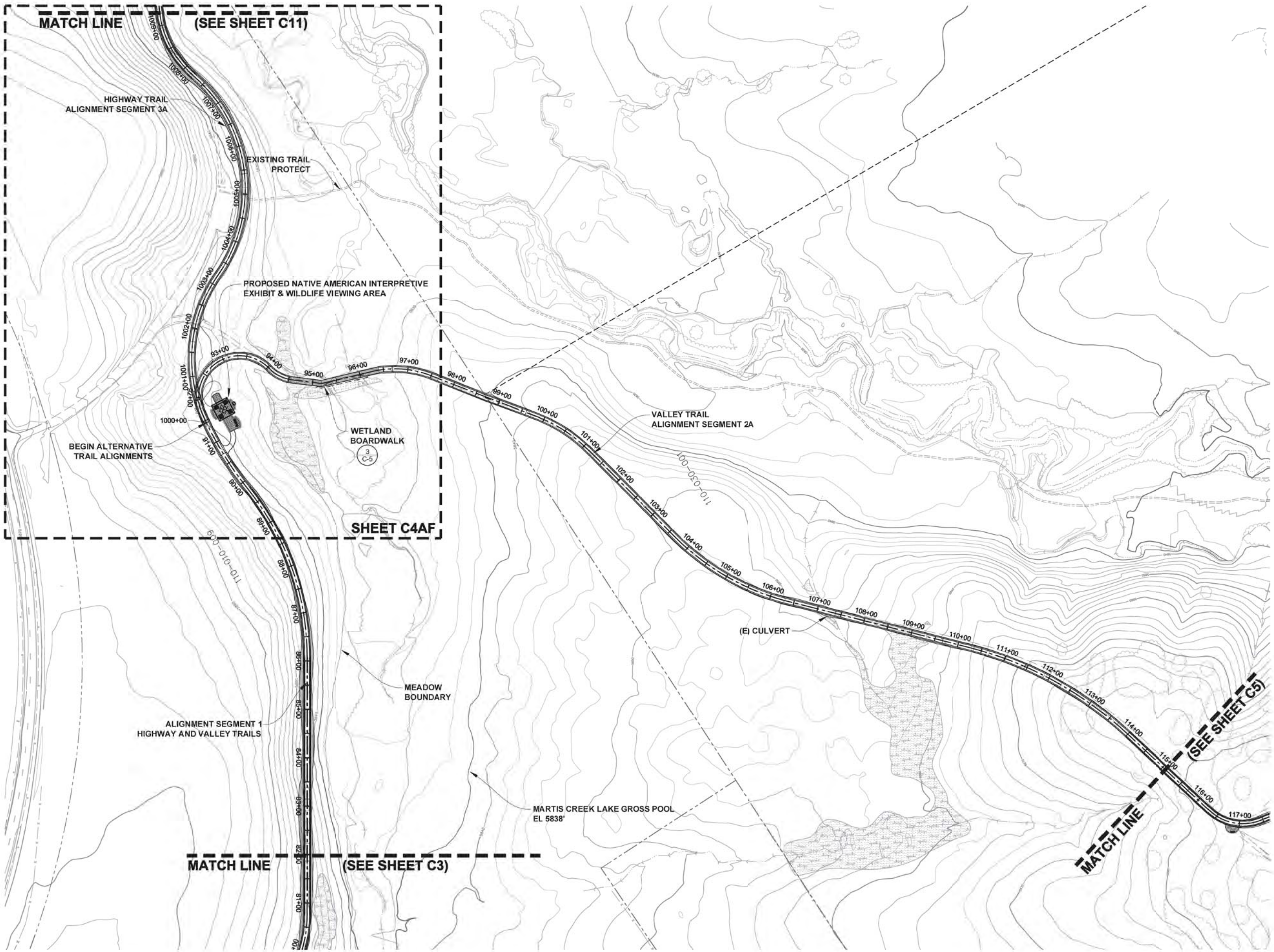
CHECKED BY:	WRA
FILE PATH:	J:\985.14B\dwg\Final Sheets\EIR 985.14B_EIR-1.dwg
DATE:	APRIL 2, 2012

SCALES:
AS SHOWN HORIZONTAL
AS SHOWN VERTICAL

P3



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PRELIMINARY LAYOUT FOR
NORTHSTAR COMMUNITY SERVICES DISTRICT

MULTI-PURPOSE TRAIL

HIGHWAY & VALLEY TRAILS

PLAN

TRUCKEE | PLACER COUNTY | CALIFORNIA

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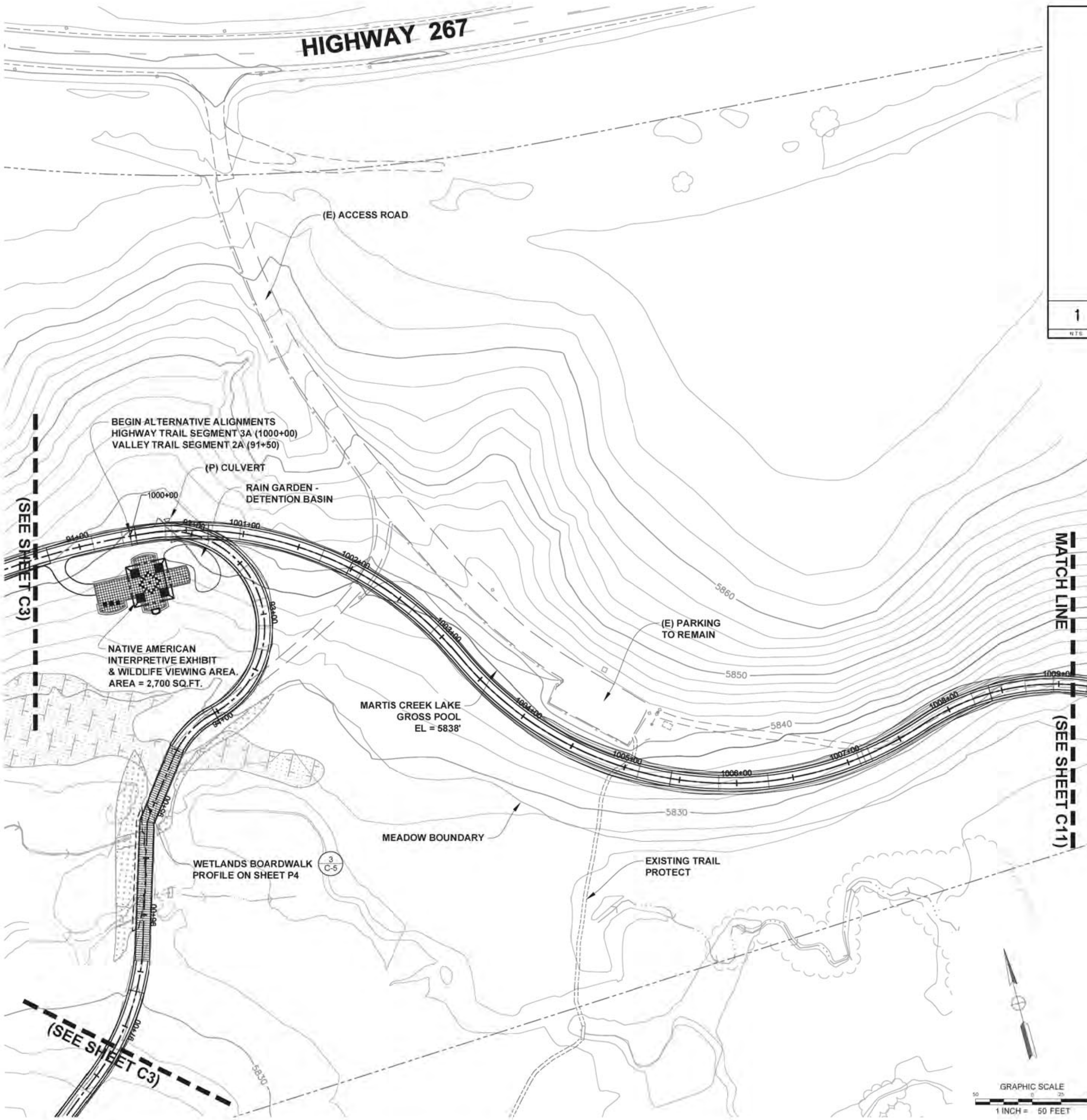
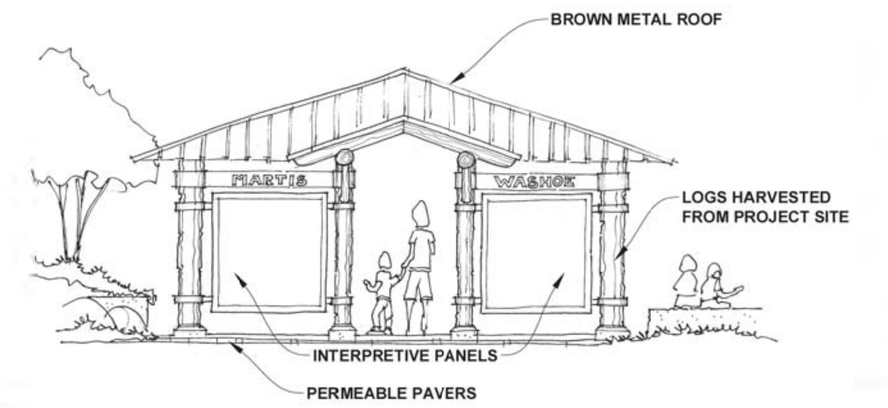
SURVEY BY:	SBG
SURVEY DATE:	9/18/09
DESIGN BY:	NC/BC
DRAFTING BY:	LK/BC
CHECKED BY:	WRA
FILE PATH:	J:\985.14B\dwg\Final Sheets\EIR 985.14B_EIR-1.dwg
DATE:	APRIL 2, 2012
SCALES: 1" = 100' HORIZONTAL; N/A VERTICAL	C4
SHEET	14 of 33





1 NATIVE AMERICAN INTERPRETIVE EXHIBIT + WILDLIFE VIEWING AREA

N.T.S.

REV	DATE	REVISIONS	INITIAL

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NORTHSTAR COMMUNITY SERVICES DISTRICT

MULTI-PURPOSE TRAIL
HIGHWAY & VALLEY TRAILS
PLAN

TRUCKEE — PLACER COUNTY — CALIFORNIA

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PROJECT NUMBER:	985 14B
SURVEY BY:	SBG
SURVEY DATE:	5/1/6/09
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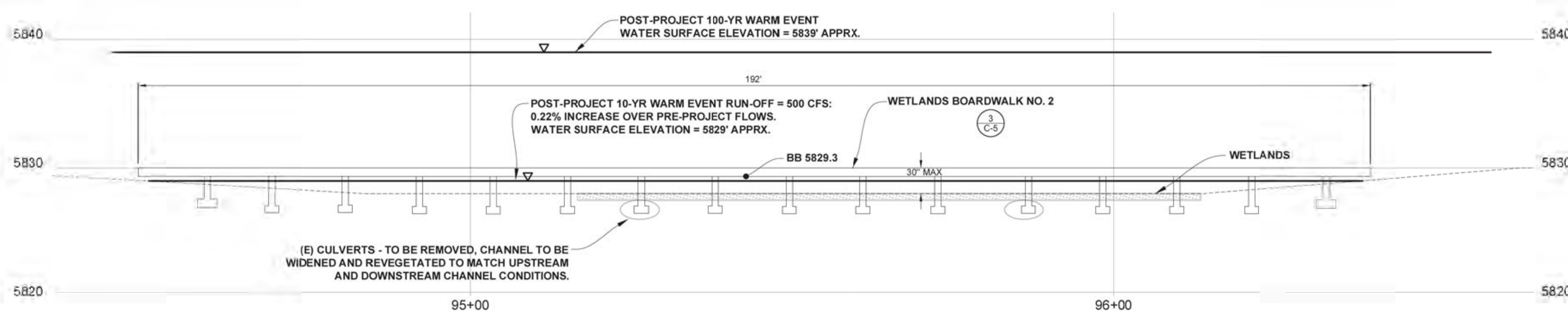
DRAFTING BY:	LK/BC
CHECKED BY:	WRA
FILE PATH: J:\985.14B\dwg\Final Sheets\EIR	985 14B_EIR-1.dwg
DATE:	APRIL 2, 2012

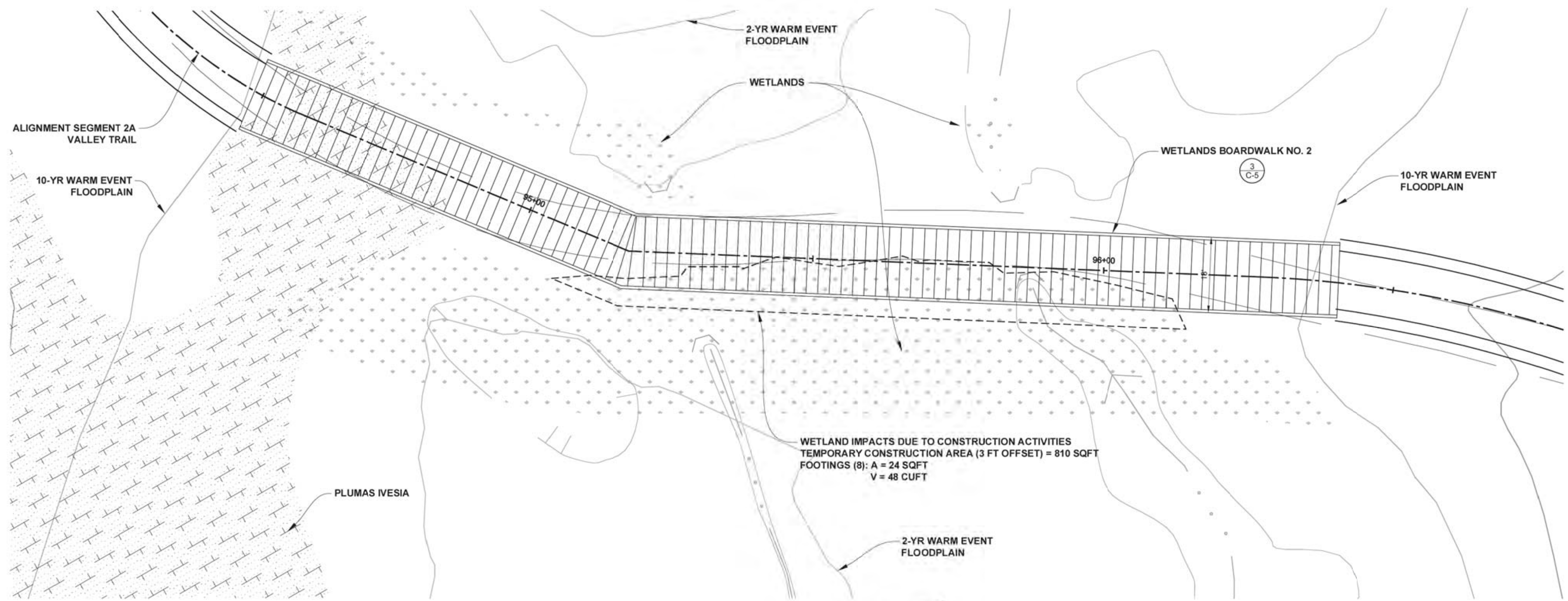
SCALES:
1" = 100' HORIZONTAL
N/A VERTICAL

SHEET C4AF
15 of 33



PROFILE

SCALE: 1"= 10'(H)
1" = 5'(V)



PLAN

SCALE: 1"=10'

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PRELIMINARY LAYOUT FOR
NORTHSTAR COMMUNITY SERVICES DISTRICT

MULTI-PURPOSE TRAIL

BOARDWALK NO.2 PLAN & PROFILE

TRUCKEE — PLACER COUNTY — CALIFORNIA

0 — 1
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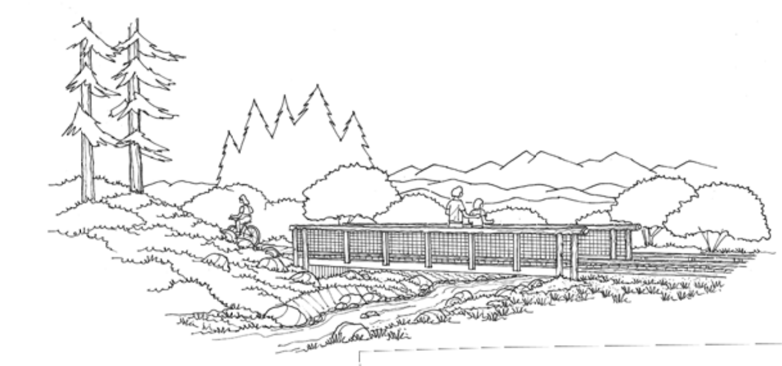
SCALES ACCORDINGLY

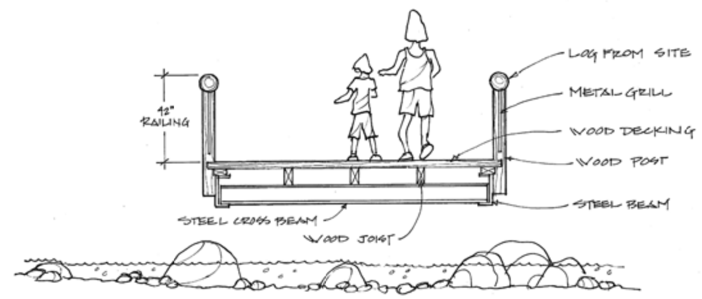
PROJECT NUMBER:	985.14B
SURVEY BY:	SBG
SURVEY DATE:	8/18/09
DESIGN BY:	NC/BC
DRAFTING BY:	LK/BC
CHECKED BY:	WRA
FILE PATH:	J:\985.14B\dwg\Final Sheets\EIR 985.14B_EIR-1.dwg
DATE:	APRIL 2, 2012

SCALES:
1" = 10' HORIZONTAL
AS SHOWN VERTICAL

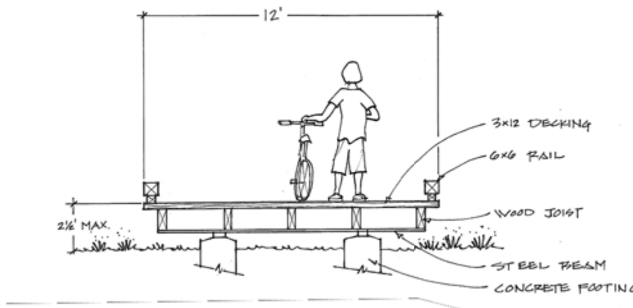
SHEET **P4**
16 of 33



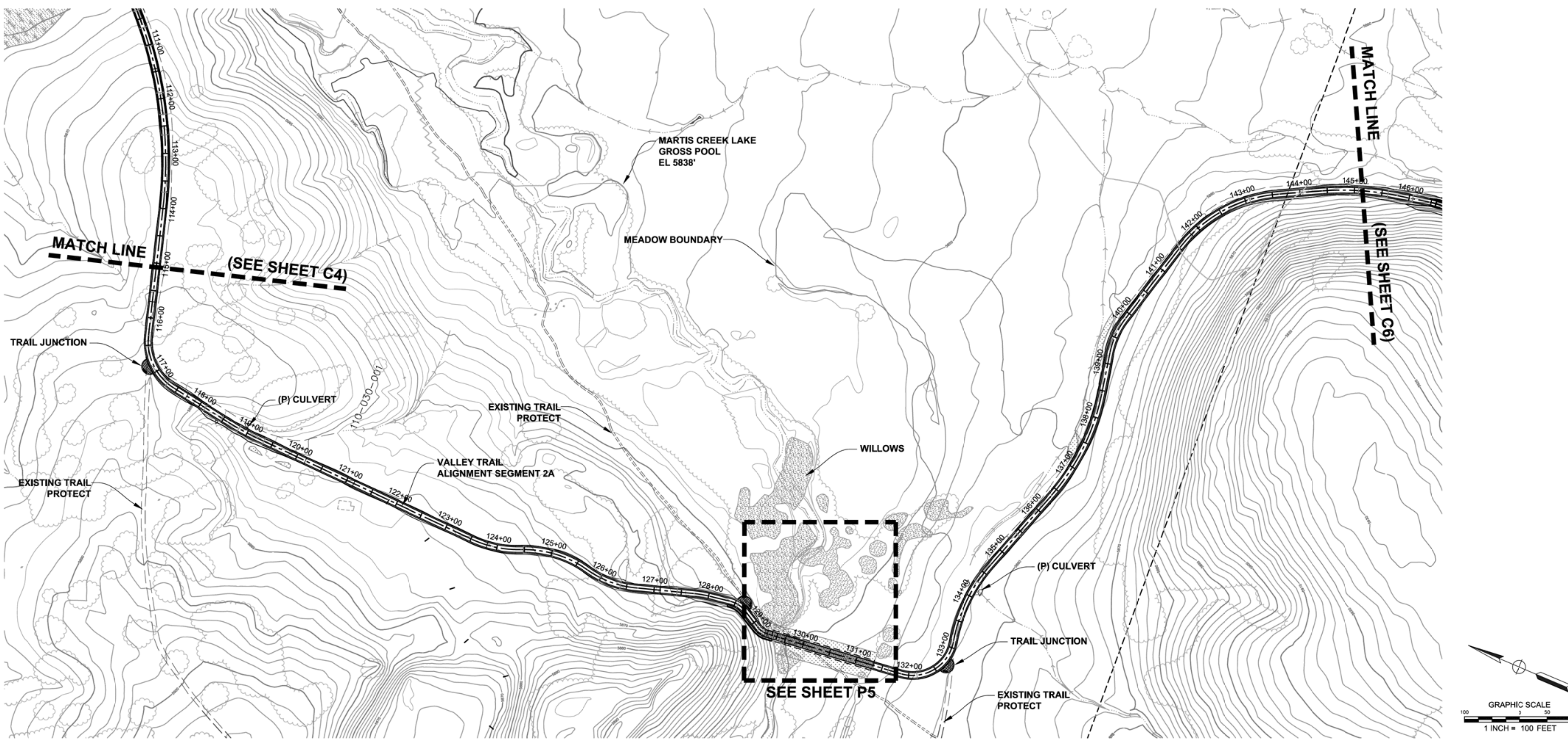
1 BRIDGE PERSPECTIVE



2 TYPICAL BRIDGE CROSS-SECTION



3 TYPICAL BOARDWALK CROSS-SECTION



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PRELIMINARY LAYOUT FOR
NORTHSTAR COMMUNITY SERVICES DISTRICT
MULTI-PURPOSE TRAIL

VALLEY TRAIL
PLAN

TRUCKEE PLACER COUNTY CALIFORNIA

0 1
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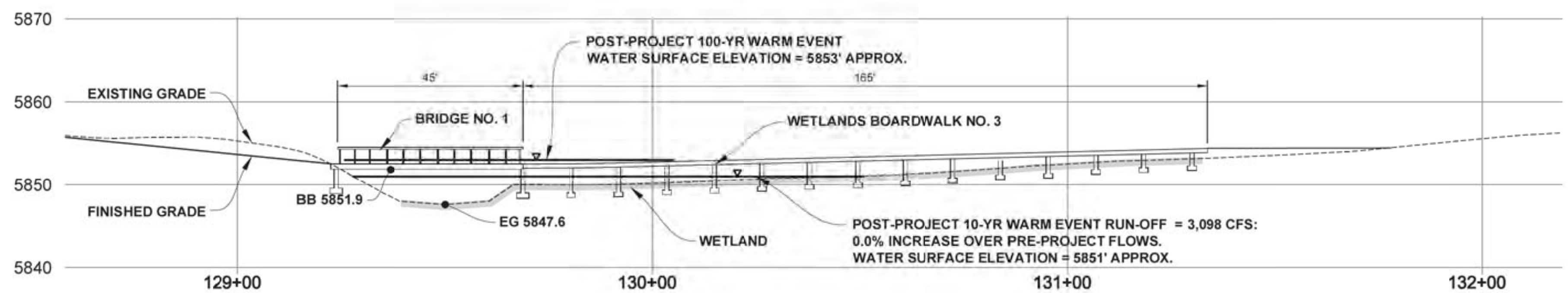
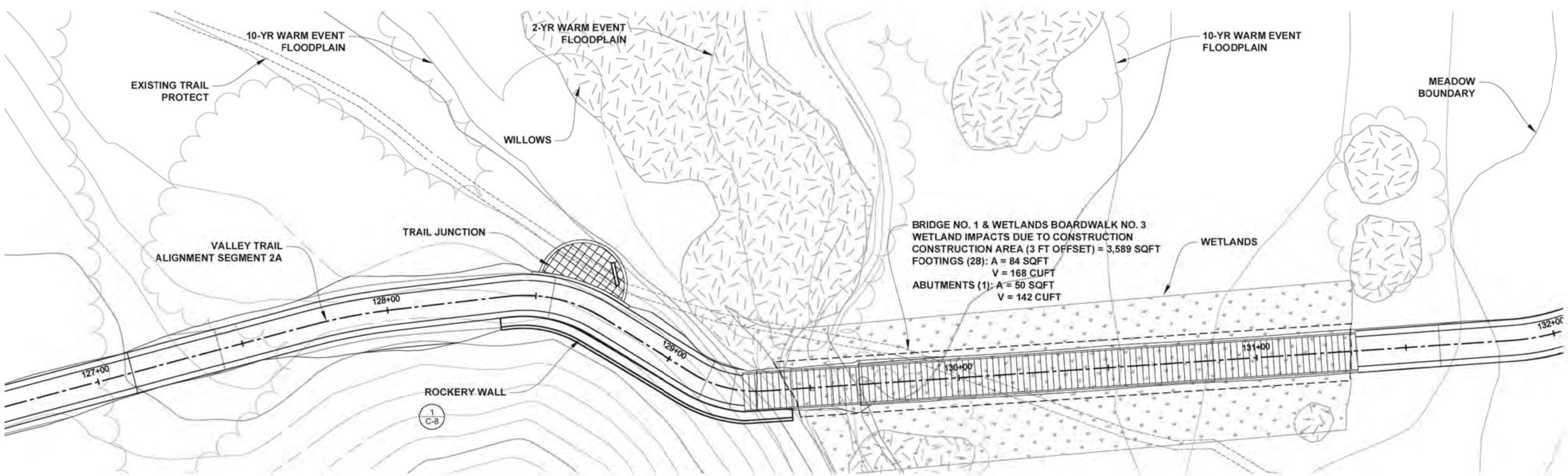
PROJECT NUMBER:	985.14B
SURVEY BY:	SBG
SURVEY DATE:	8/18/09
DESIGN BY:	NC/BC
DRAFTING BY:	LK/BC
CHECKED BY:	WRA
FILE PATH:	J:\985.14B\dwg\Final Sheets\EIR 985.14B_EIR-1.dwg
DATE:	APRIL 2, 2012
SCALES:	1" = 100' HORIZONTAL; N/A VERTICAL
SHEET:	C5



PROFILE

SCALE: 1"=20' (H)
1"=10' (V)



PLAN

SCALE: 1"=20'

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PRELIMINARY LAYOUT FOR
NORTHSTAR COMMUNITY SERVICES DISTRICT

MULTI-PURPOSE TRAIL

BRIDGE NO.2 & BOARDWALK NO. 3
PLAN & PROFILE

TRUCKEE PLACER COUNTY CALIFORNIA

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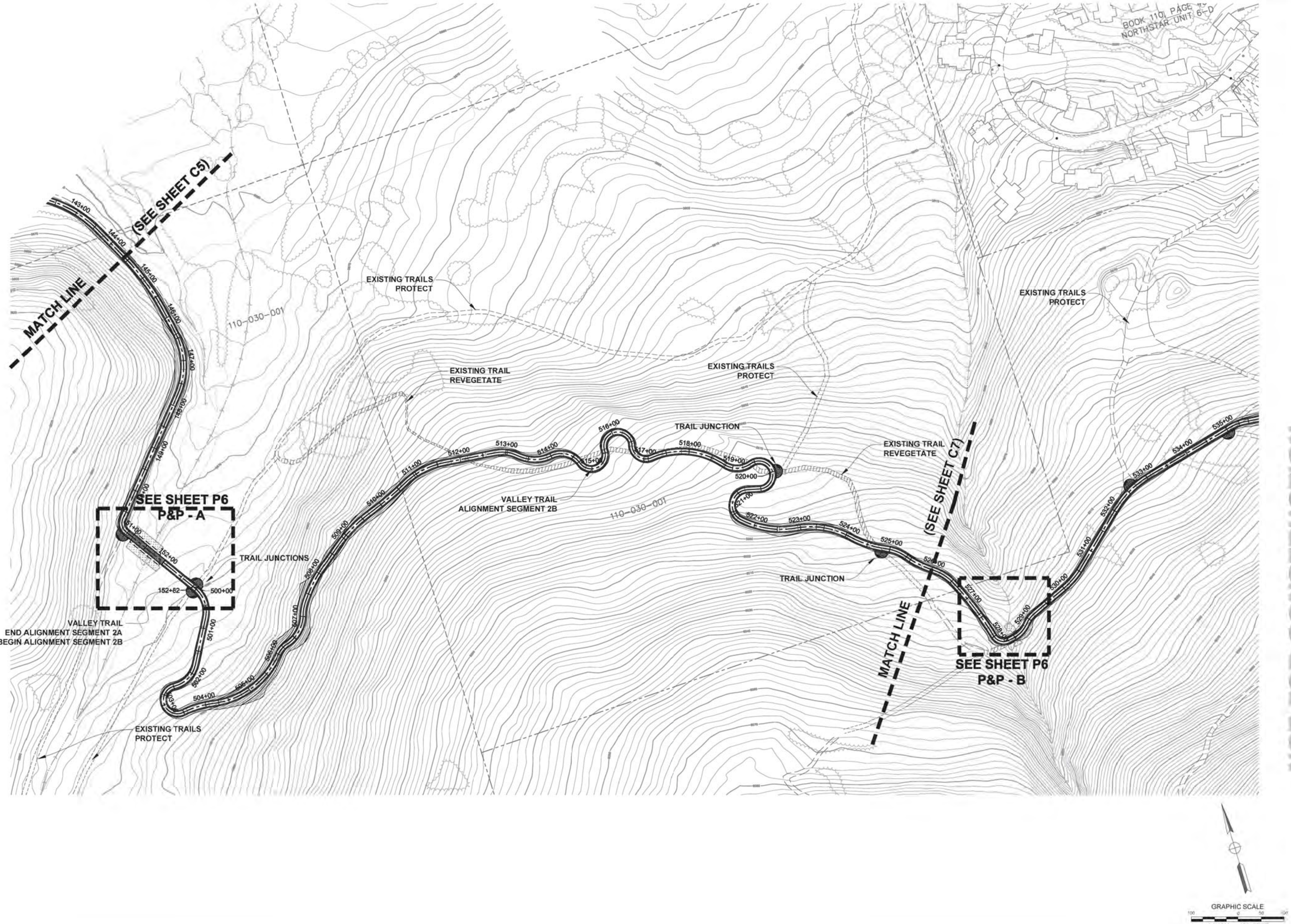
PROJECT NUMBER:	985.14B
SURVEY BY:	SBG
SURVEY DATE:	9/18/09
DESIGN BY:	NC/BC
DRAFTING BY:	LK/BC
CHECKED BY:	WRA
FILE PATH: J:\985.14B\dwg\Final Sheets\EIR	985.14B_EIR-1.dwg
DATE:	APRIL 2, 2012

SCALES:
1" = 20' HORIZONTAL
1" = 10' VERTICAL

SHEET **P5**
18 of 33



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PRELIMINARY LAYOUT FOR
NORTHSTAR COMMUNITY SERVICES DISTRICT

MULTI-PURPOSE TRAIL

VALLEY TRAIL
PLAN

TRUCKEE — PLACER COUNTY — CALIFORNIA

0 — 1
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SCALES ACCORDINGLY

PROJECT NUMBER:	985.14B
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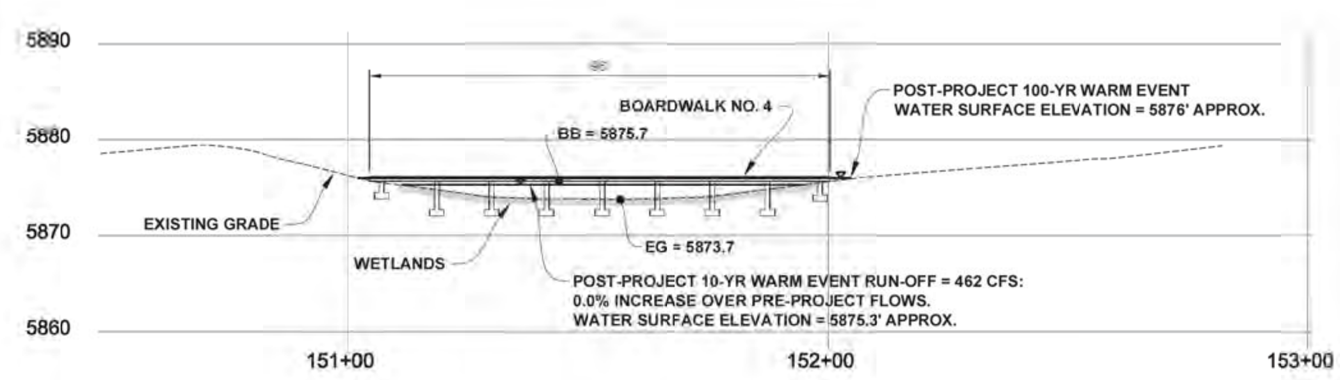
SURVEY DATE:	6/18/09
DESIGN BY:	NC/BC
DRAFTING BY:	LK/BC
CHECKED BY:	WRA

FILE PATH: J:\985.14B\dwg\Final Sheets\EIR 985.14B_EIR-2.dwg

DATE: APRIL 2, 2012

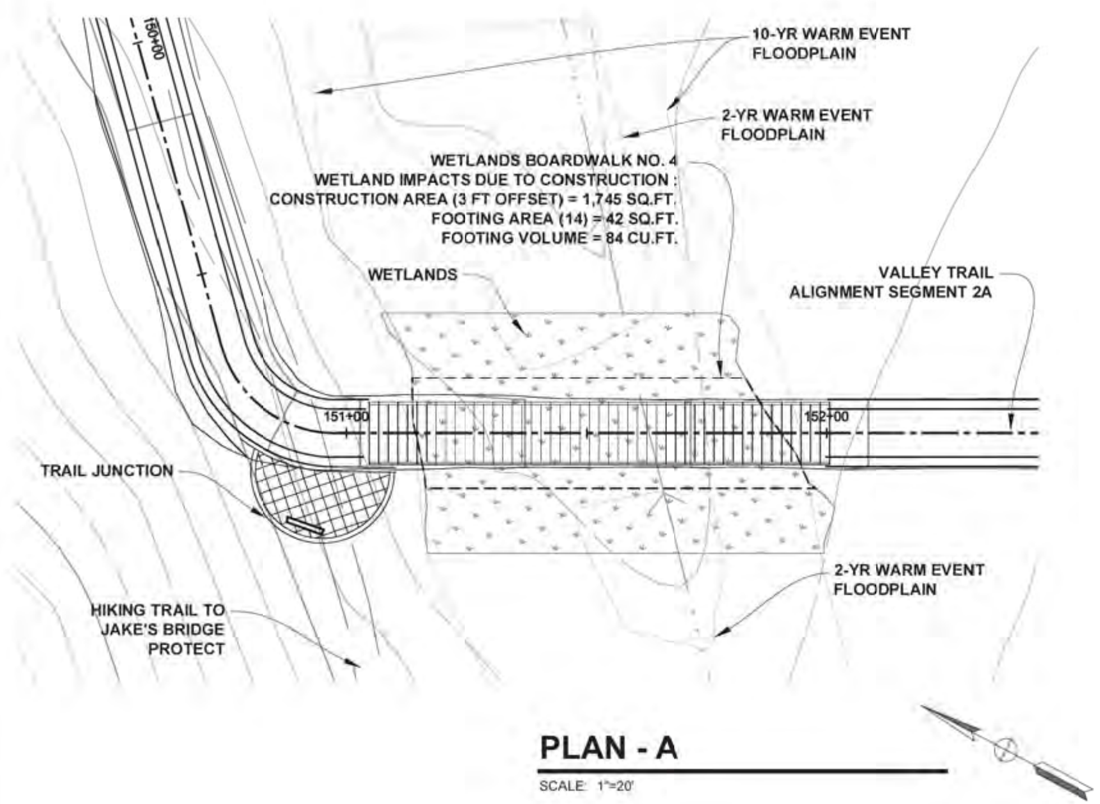
SCALES:
1" = 100' HORIZONTAL
N/A VERTICAL

SHEET: C6



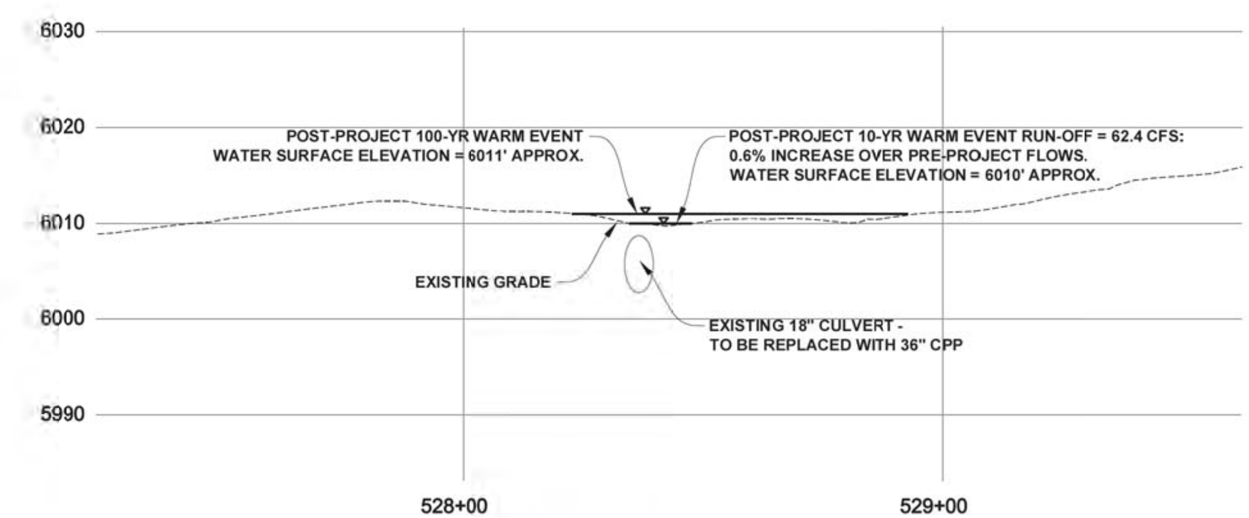
PROFILE - A

SCALE: 1"=20' (H)
1"=10' (V)



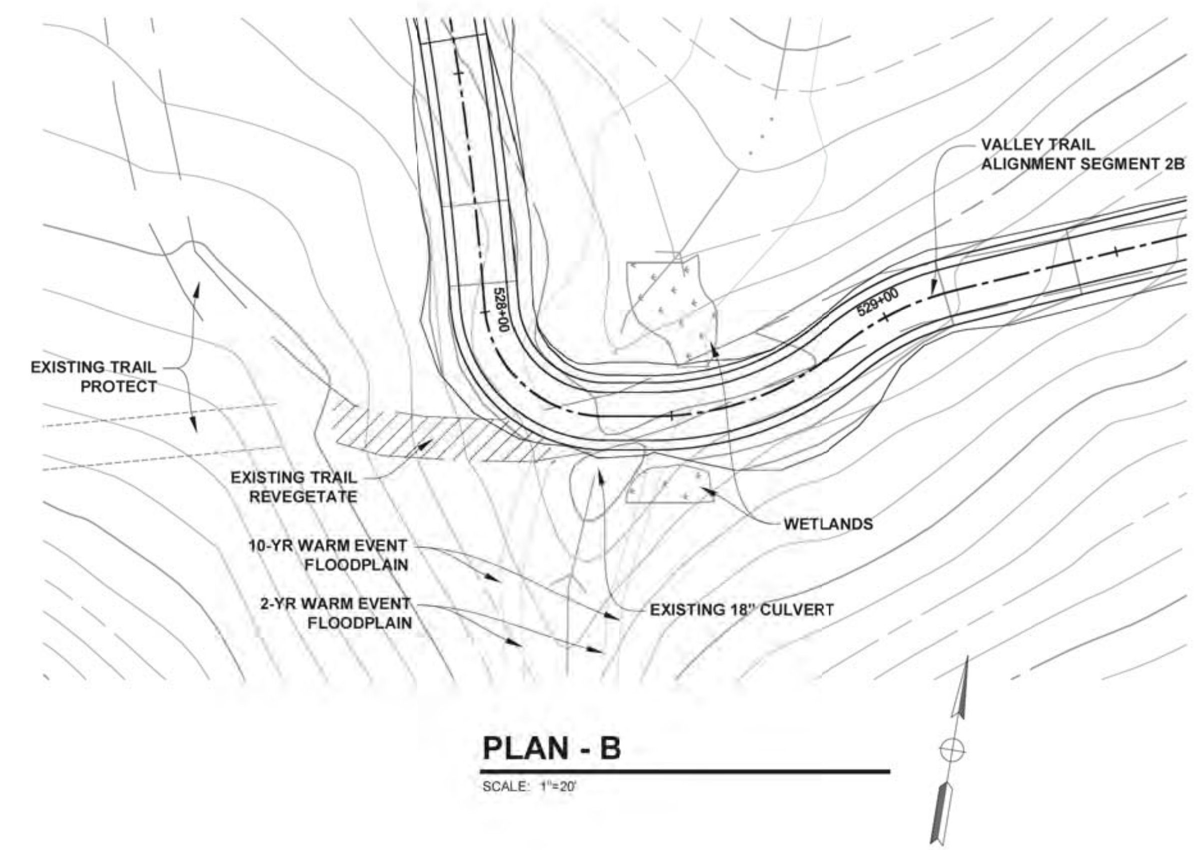
PLAN - A

SCALE: 1"=20'



PROFILE - B

SCALE: 1"=20' (H)
1"=10' (V)



PLAN - B

SCALE: 1"=20'

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PRELIMINARY LAYOUT FOR
NORTHSTAR COMMUNITY SERVICES DISTRICT

MULTI-PURPOSE TRAIL

BRIDGE NO.3
PLAN & PROFILE

TRUCKEE — PLACER COUNTY — CALIFORNIA

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SURVEY BY:	SBG
SURVEY DATE:	5/18/09
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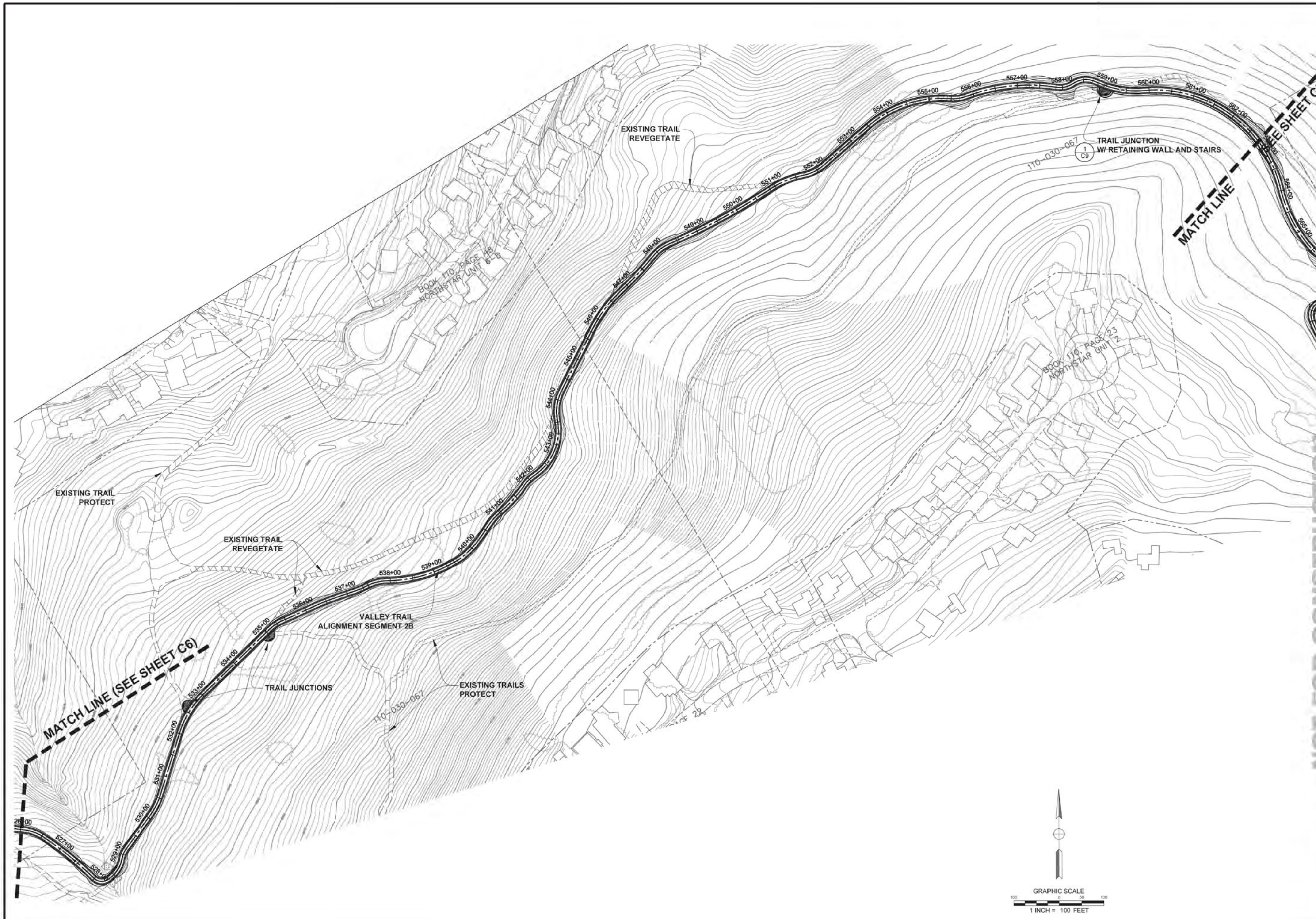
CHECKED BY:	WRA
FILE PATH:	J:\985.14B\dwg\Final Sheets\EIR 985.14B_EIR-2.dwg
DATE:	APRIL 2, 2012

SCALES:
1" = 20' HORIZONTAL
1" = 10' VERTICAL

SHEET **P6**
20 of 33



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REV	DATE	REVISIONS	INITIAL

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PRELIMINARY LAYOUT FOR
NORTHSTAR COMMUNITY SERVICES DISTRICT
MULTI-PURPOSE TRAIL
VALLEY TRAIL
PLAN
TRUCKEE PLACER COUNTY CALIFORNIA

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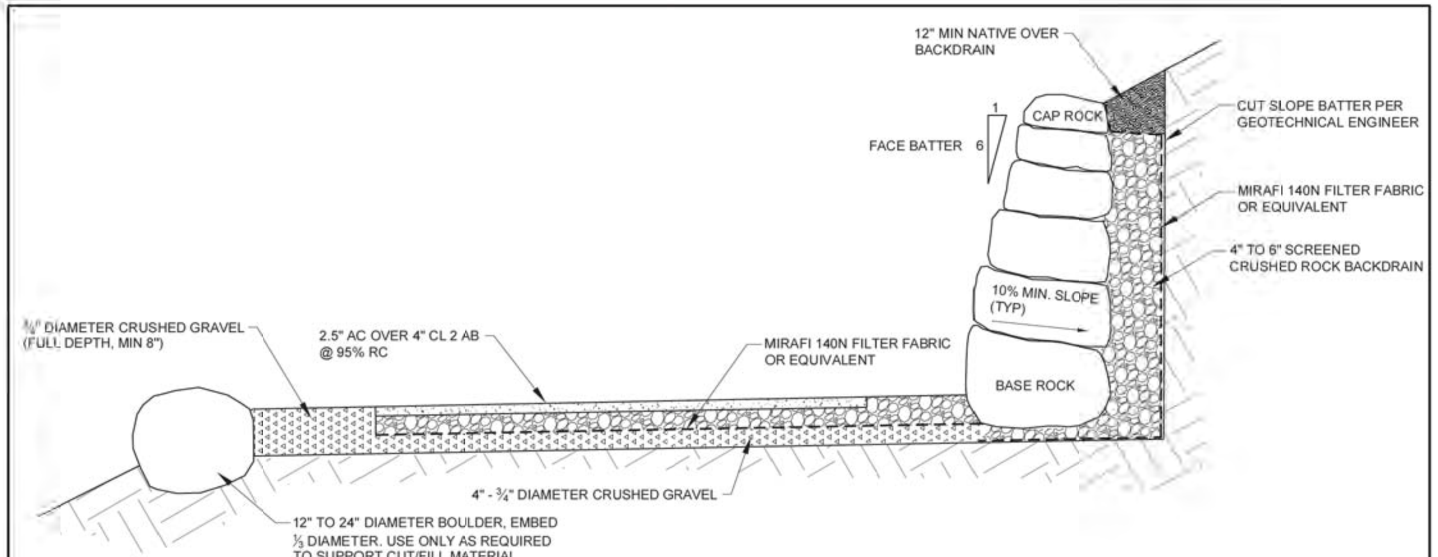
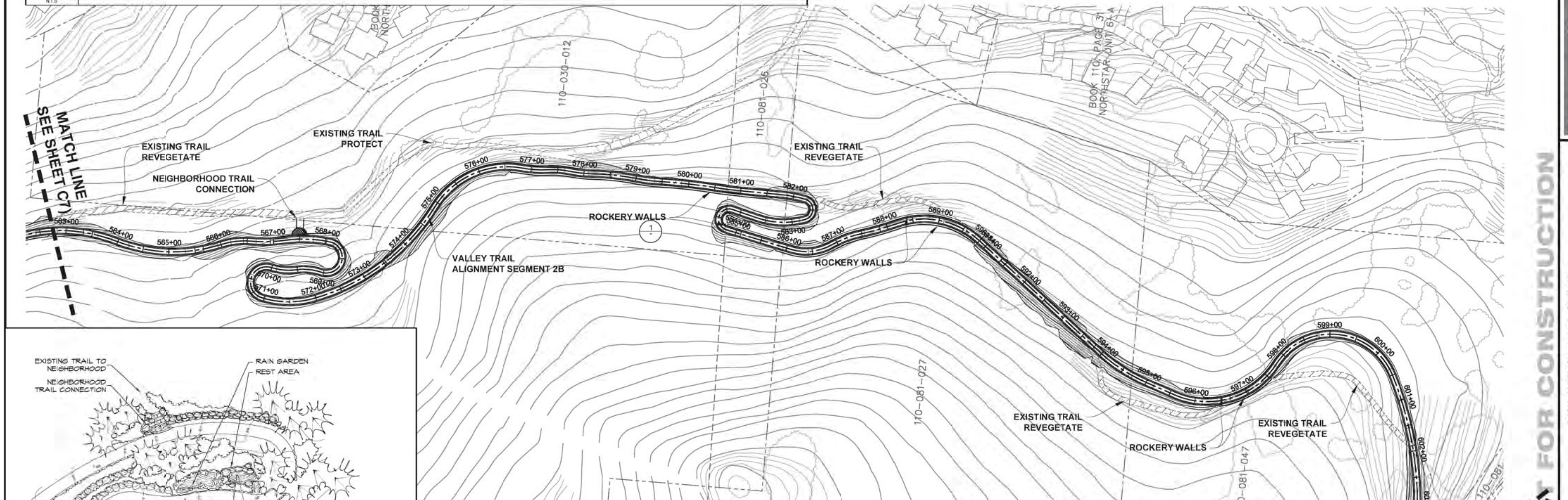
PROJECT NUMBER:	985.14B
SURVEY BY:	SBG
SURVEY DATE:	6/18/09
DESIGN BY:	NC/BC
DRAFTING BY:	LK/BC
CHECKED BY:	WRA
FILE PATH:	J:\985.14B\dwg\Final Sheets\EIR 985.14B_EIR-2.dwg
DATE:	APRIL 2, 2012
SCALES: 1" = 100' HORIZONTAL; N/A VERTICAL	SHEET: C7 21 of 33

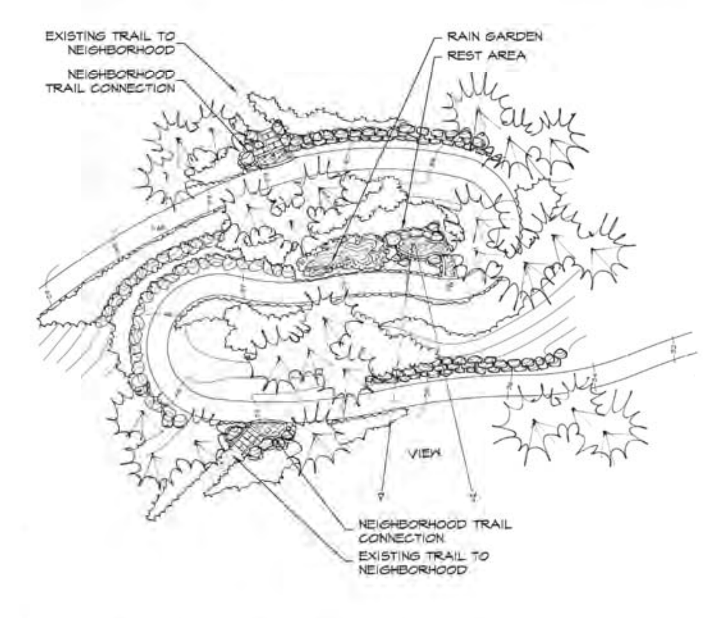


1 TYPICAL ROCKERY WALL CROSS-SECTION

N.T.S.



PLAN



3 SWITCHBACK DETAIL

N.T.S.

GRAPHIC SCALE

1 INCH = 100 FEET

REV	DATE	REVISIONS	INITIAL

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PRELIMINARY LAYOUT FOR
NORTHSTAR COMMUNITY SERVICES DISTRICT

MULTI-PURPOSE TRAIL

VALLEY TRAIL
PLAN

TRUCKEE PLACER COUNTY CALIFORNIA

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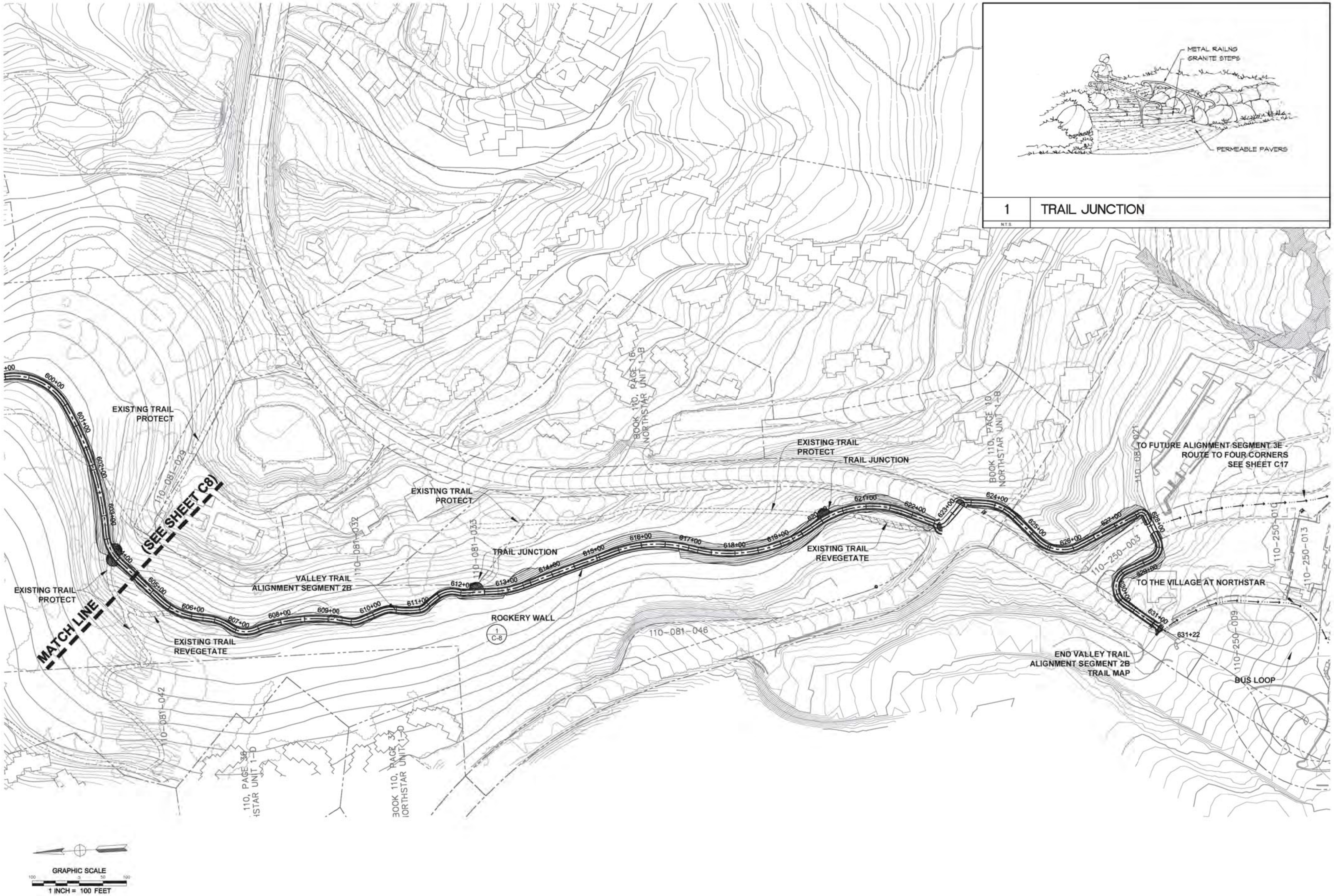

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PRELIMINARY LAYOUT FOR
NORTHSTAR COMMUNITY SERVICES DISTRICT

MULTI-PURPOSE TRAIL

VALLEY TRAIL
PLAN

TRUCKEE | PLACER COUNTY | CALIFORNIA

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DATE:	APRIL 2, 2012
SCALES: 1" = 100' HORIZONTAL; N/A VERTICAL	C9
SHEET:	23 of 33

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PRELIMINARY LAYOUT FOR
NORTHSTAR COMMUNITY SERVICES DISTRICT

MULTI-PURPOSE TRAIL

NOT USED

TRUCKEE PLACER COUNTY CALIFORNIA

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SURVEY DATE: 5/18/09
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DRAFTING BY: LK/BC
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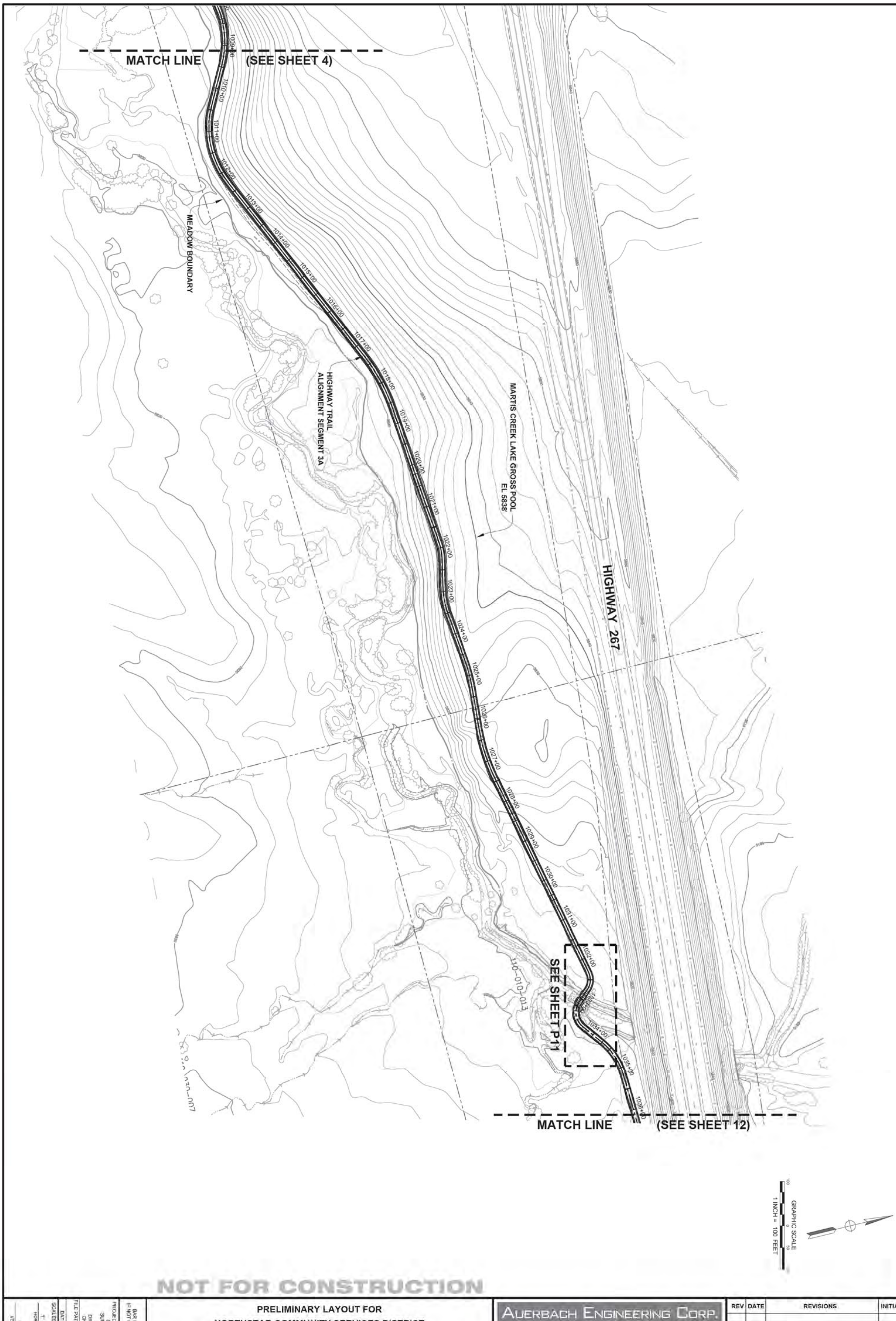

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PRELIMINARY LAYOUT FOR
NORTHSTAR COMMUNITY SERVICES DISTRICT

MULTI-PURPOSE TRAIL

HIGHWAY TRAIL
PLAN

TRUCKEE PLACER COUNTY CALIFORNIA

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C11
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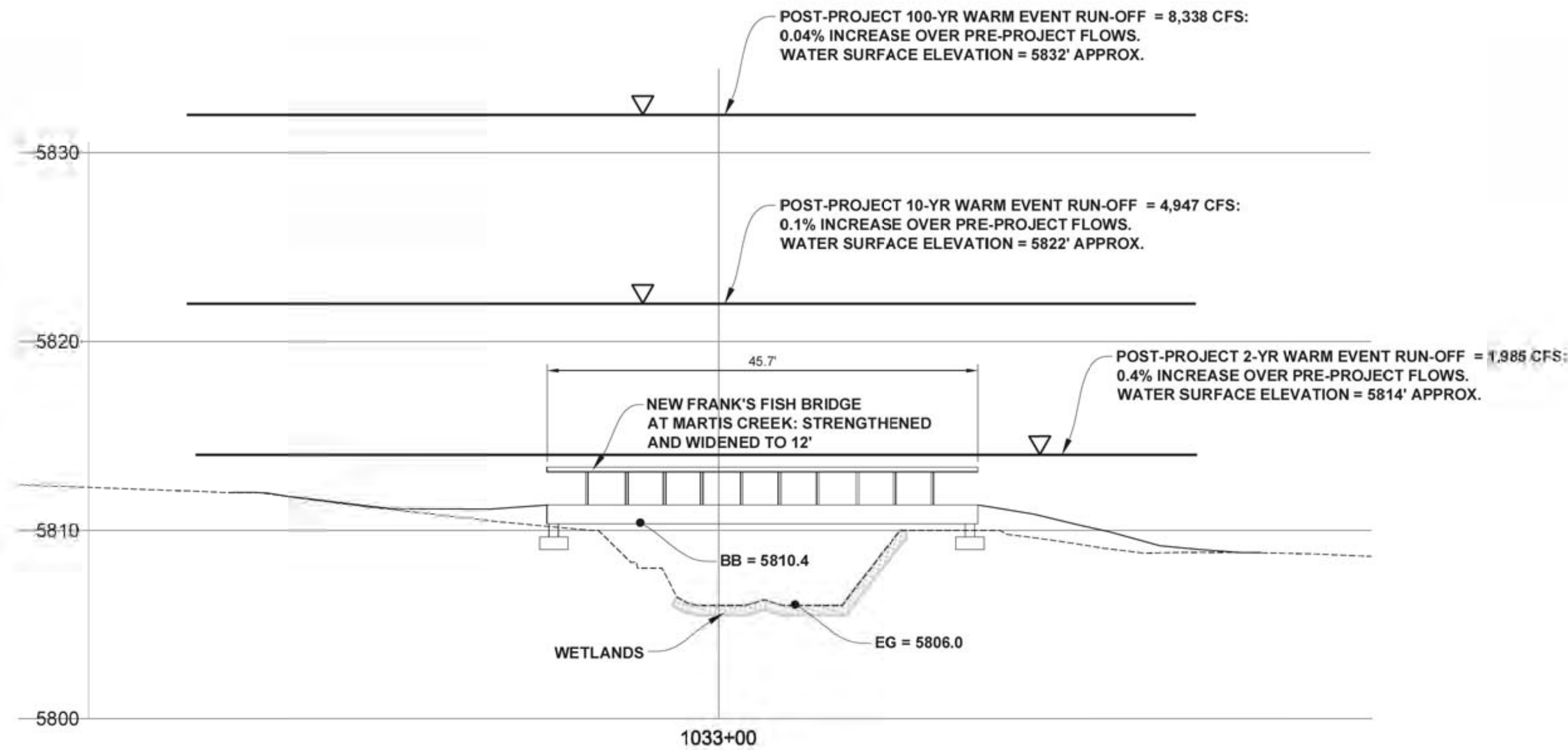

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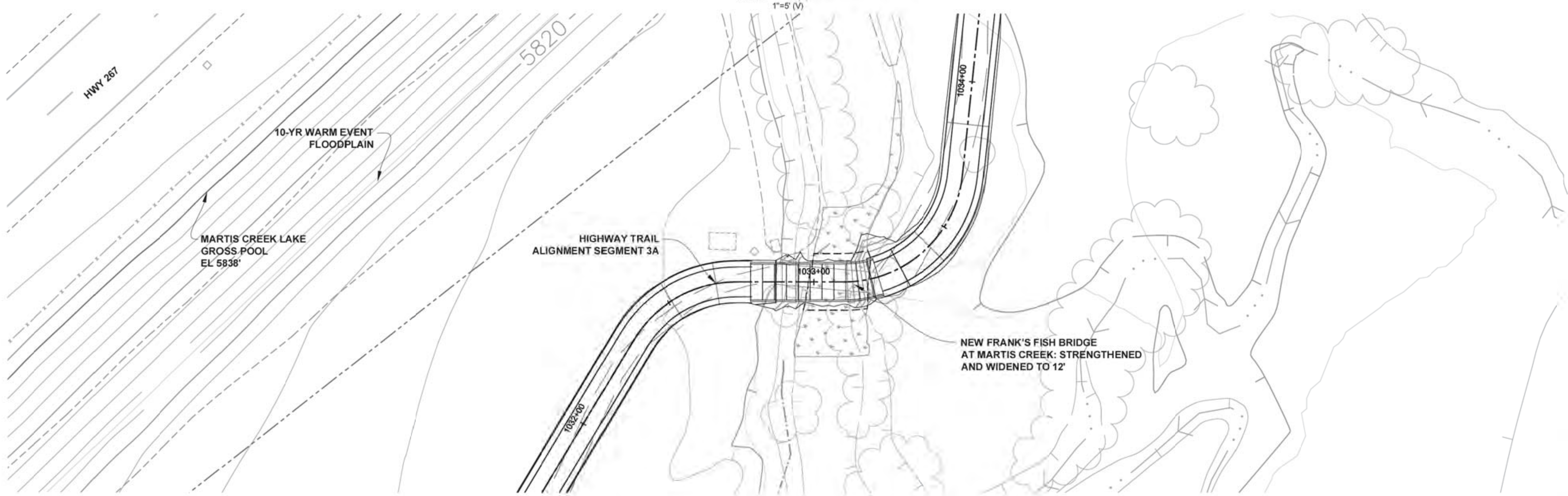

PLAN

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GRAPHIC SCALE
1 INCH = 20 FEET

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FRANK'S BRIDGE PLAN & PROFILE

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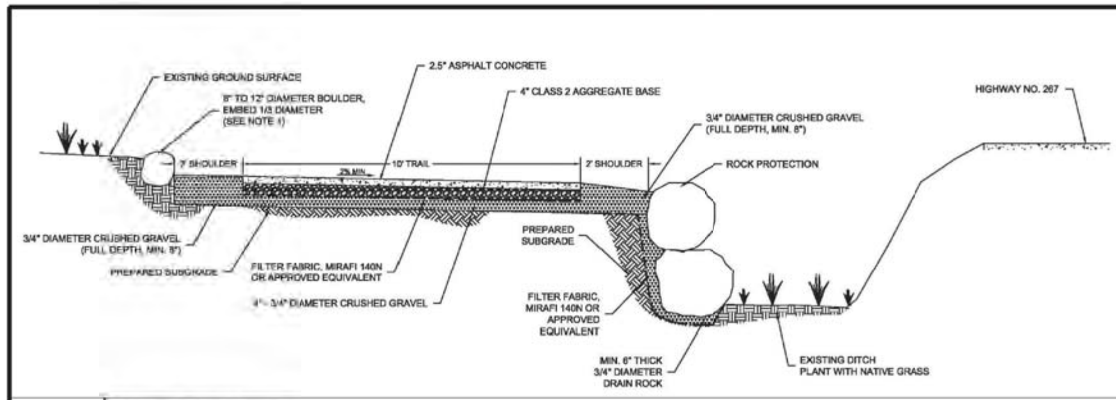

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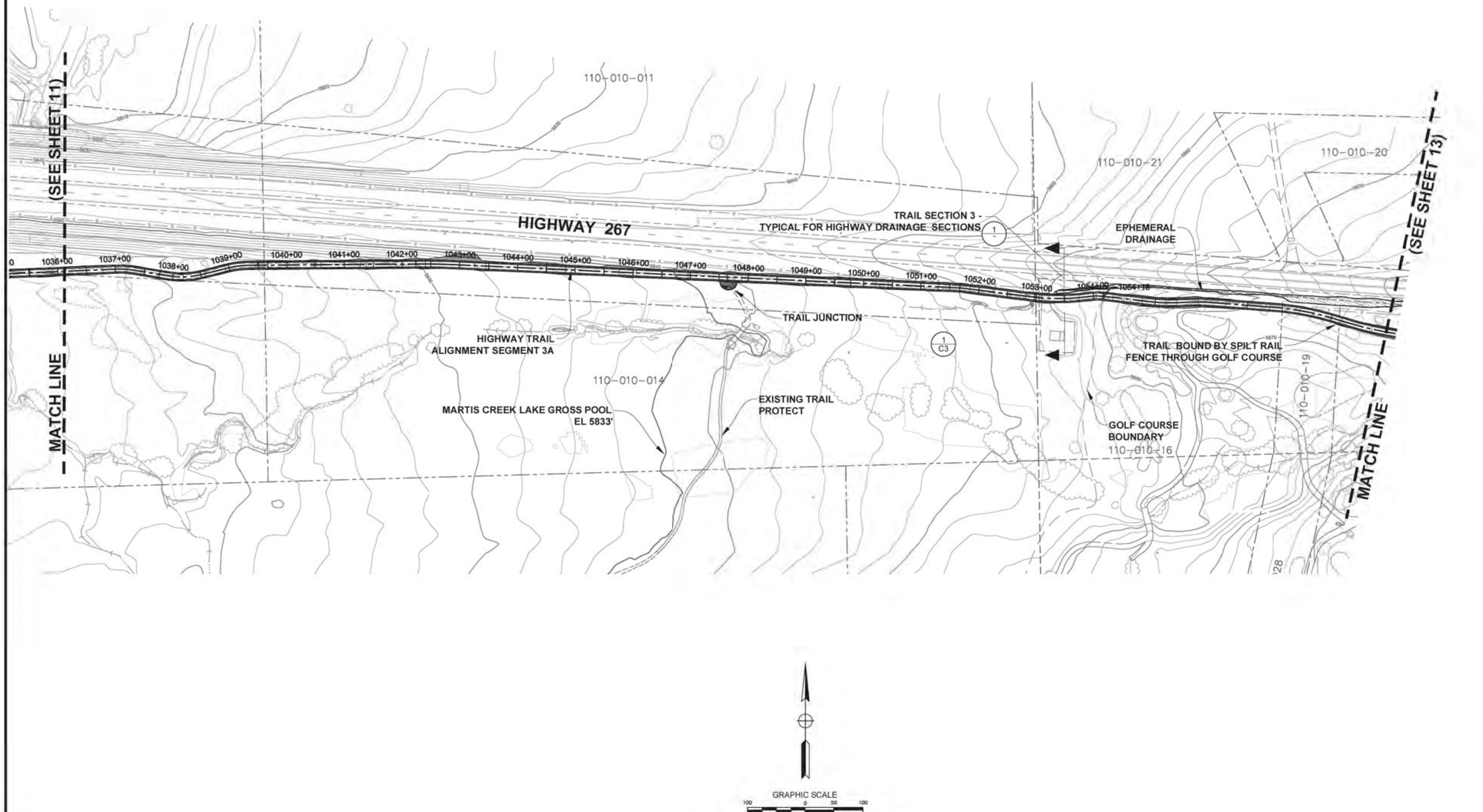

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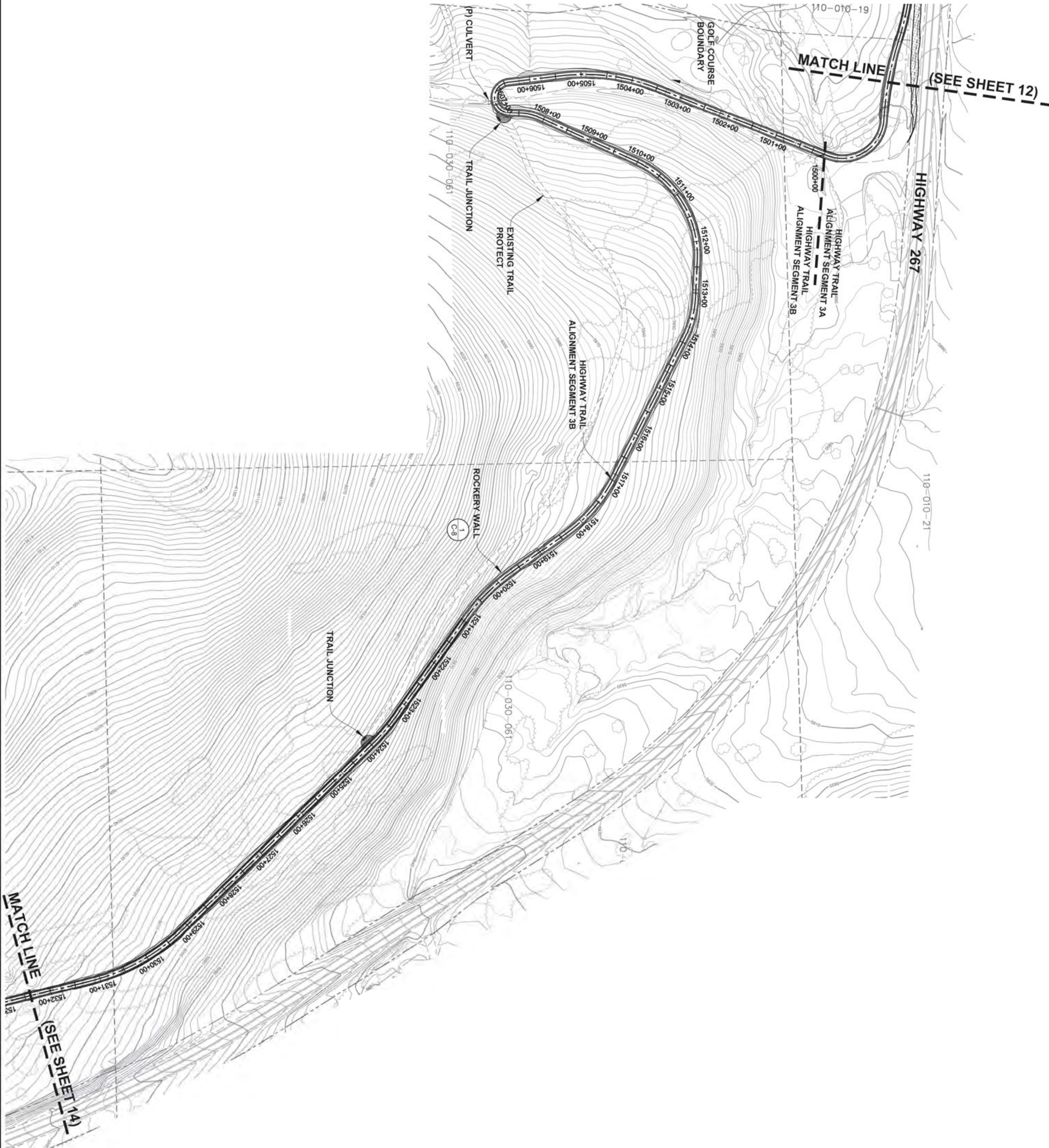

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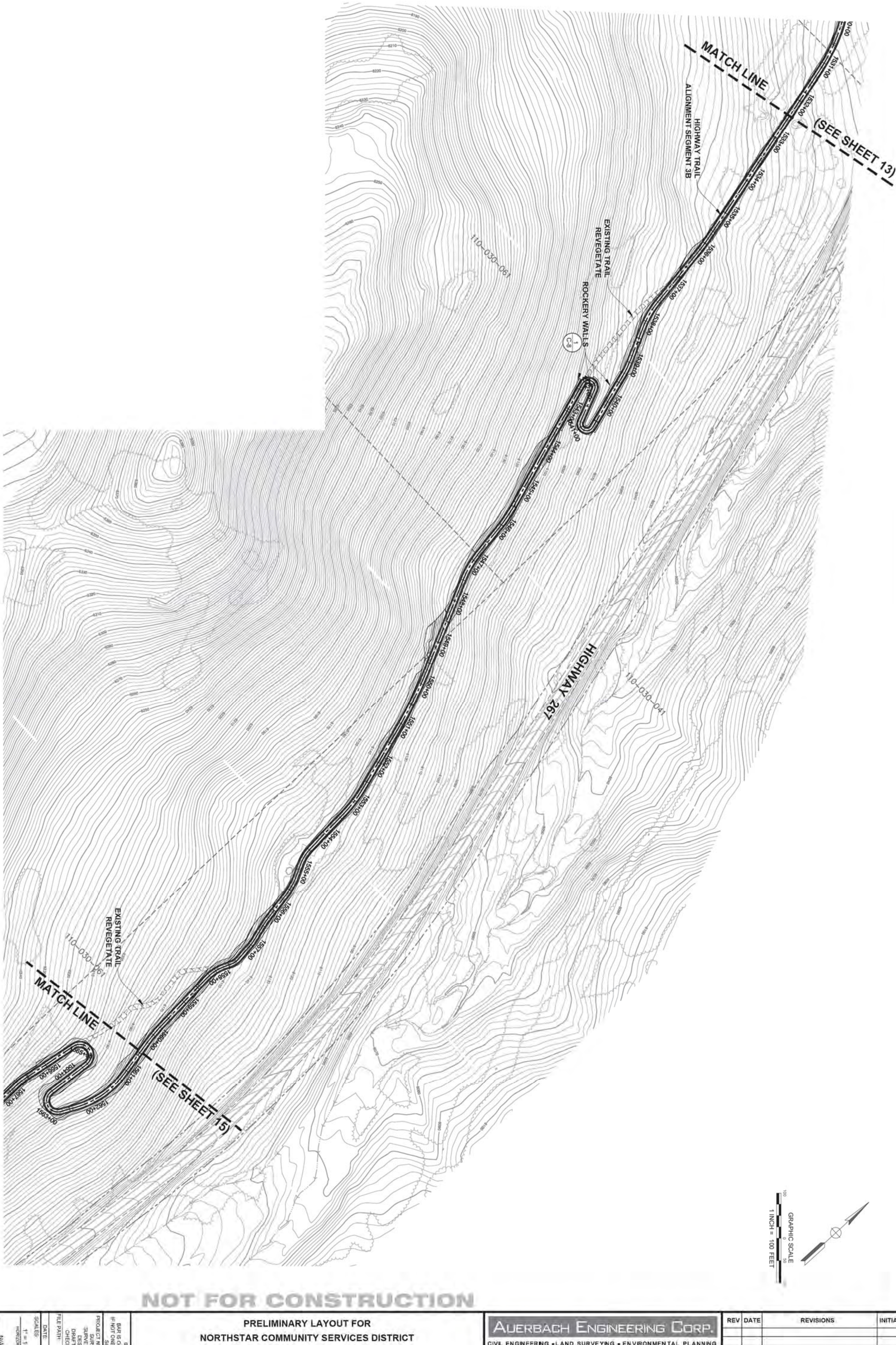

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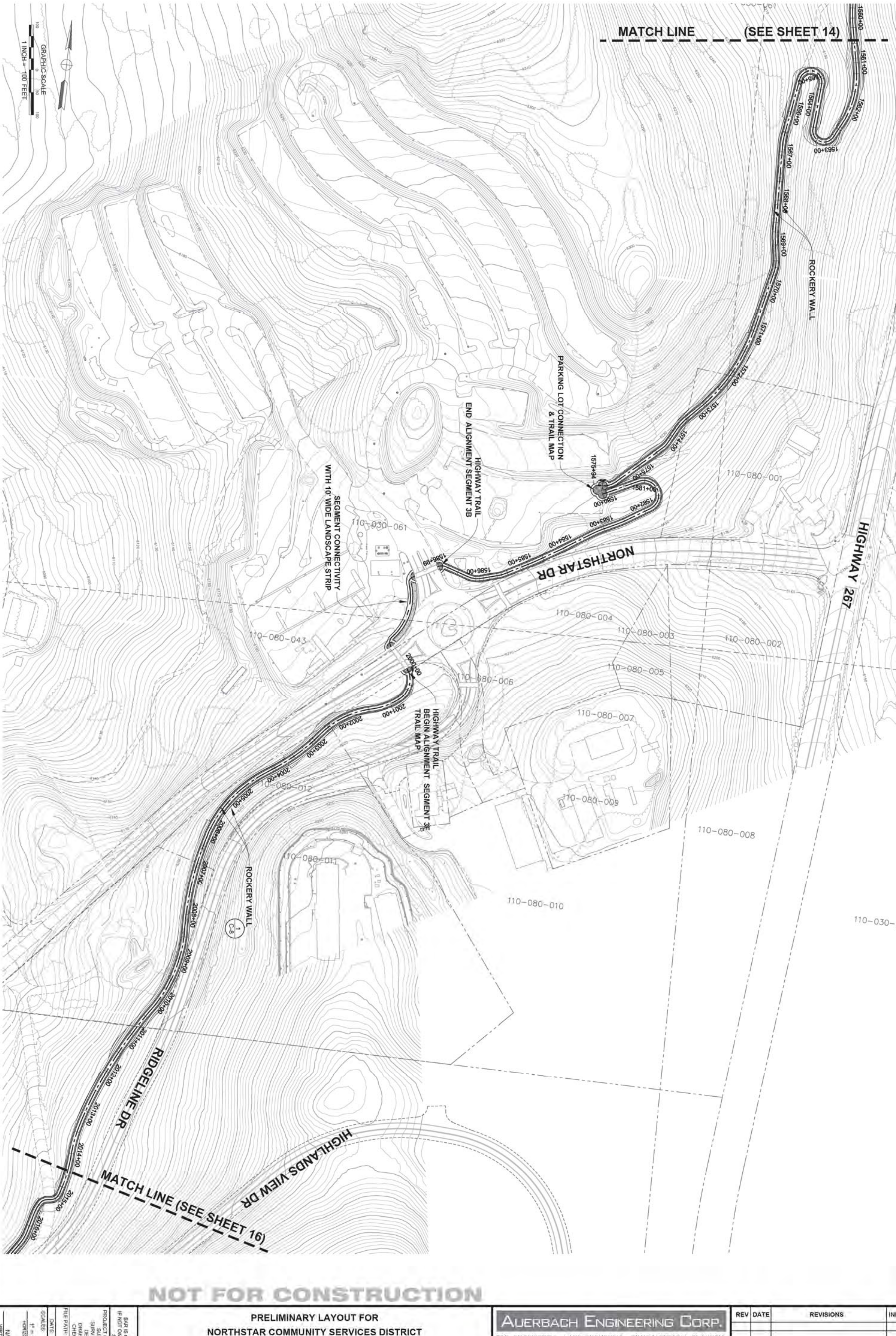

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PRELIMINARY LAYOUT FOR
NORTHSTAR COMMUNITY SERVICES DISTRICT

MULTI-PURPOSE TRAIL

HIGHWAY TRAIL

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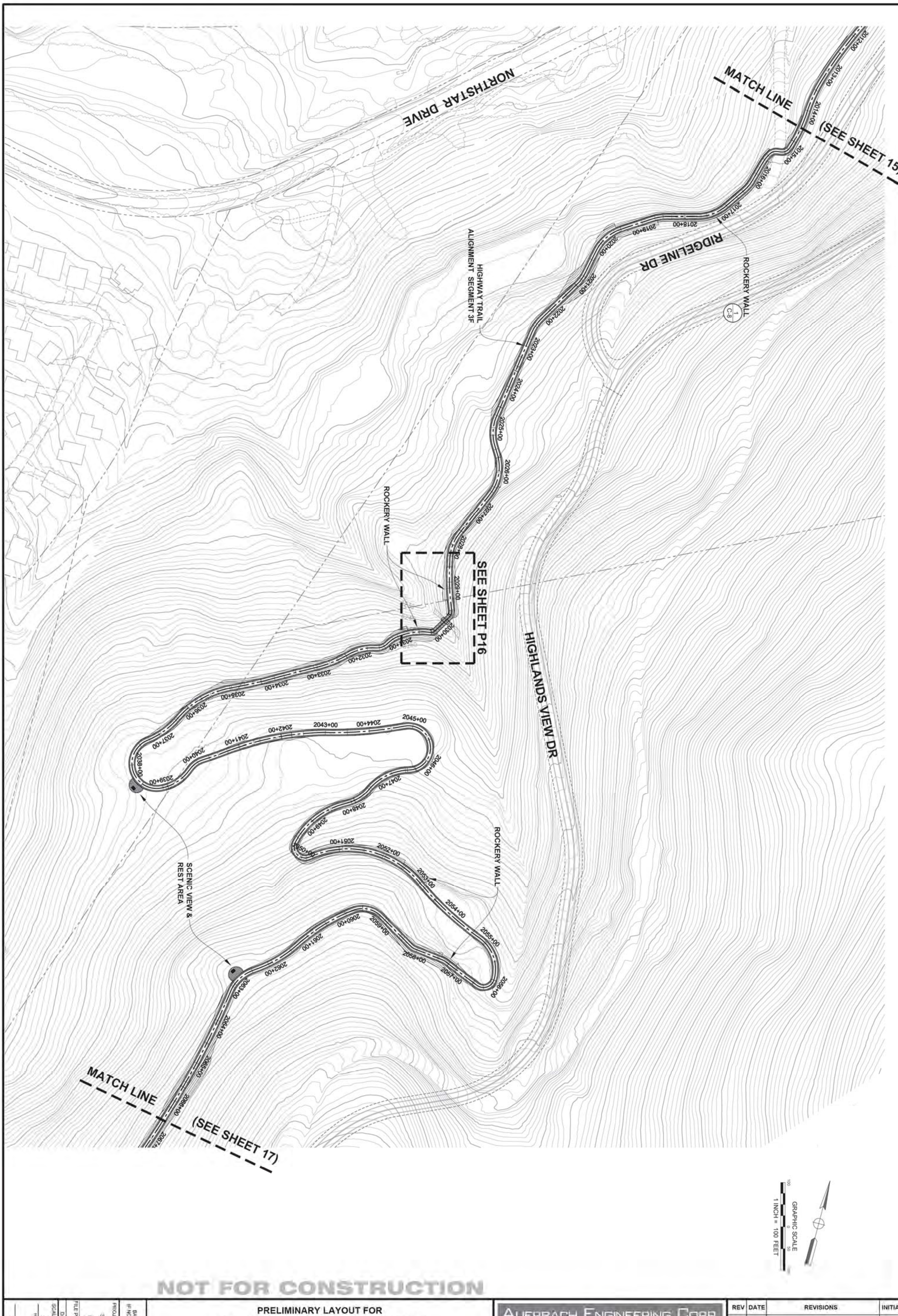

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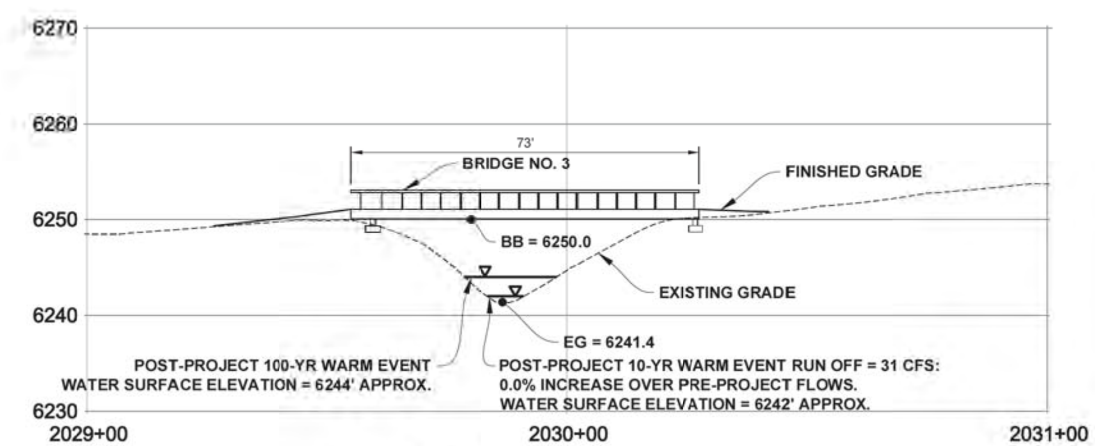

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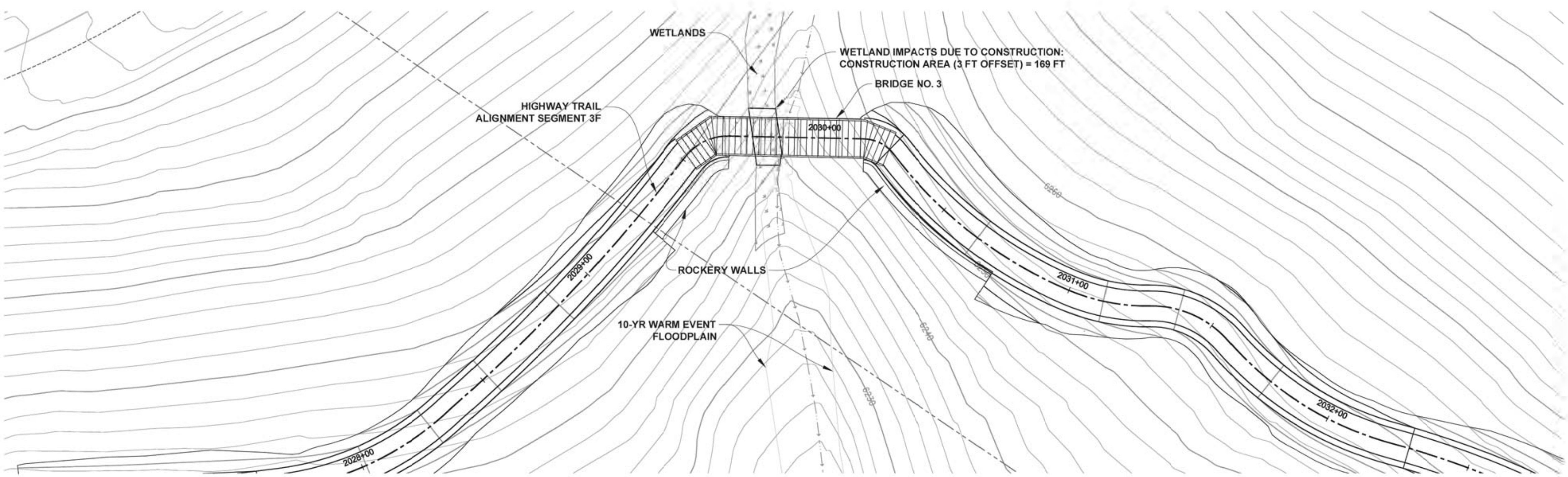

PLAN

SCALE: 1"=20'

GRAPHIC SCALE
1 INCH = 20 FEET

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PRELIMINARY LAYOUT FOR
NORTHSTAR COMMUNITY SERVICES DISTRICT

MULTI-PURPOSE TRAIL

BRIDGE NO.4 PLAN & PROFILE

TRUCKEE PLACER COUNTY CALIFORNIA

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PRELIMINARY LAYOUT FOR
NORTHSTAR COMMUNITY SERVICES DISTRICT

MULTI-PURPOSE TRAIL

HIGHWAY TRAIL
PLAN

TRUCKEE PLACER COUNTY CALIFORNIA

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SHEET: C17

APPENDIX B2

Martis Valley Trail Preliminary Environmental Impact Memorandum

PRELIMINARY ENVIRONMENTAL IMPACTS

Northstar Community Services District
Multi-Purpose Trail

MARTIS VALLEY, PLACER COUNTY, CALIFORNIA

Prepared for:

Northstar Community Services District
908 Northstar Drive
Northstar, CA 96161
Mike Staudenmayer
(530) 562-0747

Prepared by:

Walter Auerbach, P.E.
AUERBACH ENGINEERING CORPORATION
3092 NORTH LAKE BLVD.
TAHOE CITY, CA 96145
530-581-1116

March, 2012

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Introduction

Auerbach Engineering Corp. (AEC) staff has completed the preliminary civil design work for the Martis Valley Regional Trail Project (MVRT). This phase of work includes the preliminary design of both Highway and Valley Trail alignments to the degree necessary to determine and quantify the possible environmental impacts. The following is a tentative list of the environmental impacts by alignment segment. Vertical elements (specifically grading volumes and retaining walls) of the design are expected to change during final design phases. Horizontal elements (most of the environmental impacts) should have no significant changes.

Segment-1 (Highway and Valley Trails)

Segment-1 is approximately 9,150 feet in length. Grading includes approximately 1,000 cy of cut and 850 cy of fill. Finished grade of Segment-1 includes approximately 3.0 acres of impervious area. Segment-1 crosses approximately 0.3 acres of 100-yr Frozen Event floodplain beginning at Station 83+00. No inundation of Segment-1 is due to the 100-yr Warm Event floodplain. Wetlands are crossed with approximately 76 ft of boardwalk beginning at Station 57+81. The boardwalk will temporarily impact 936 sf of wetlands (this includes a 3 ft offset from the edge of the boardwalk for construction area). Boardwalk footings will require 30 sf of area and 60 cf of volume to be impacted. Segment-1 has one hydrologic crossing at Station 58+56. The post project 10-yr stormwater run-off at this crossing is 10 cfs which is a 1% increase over existing flows.

Additional impacts connected with Segment-1 include the trail head at Station 0+15, parking lot and trail head – four alternative locations discussed below, a rest area at Station10+25, a picnic area at Station 26+30, a wildlife viewing area at Station 42+50 and a Native American Interpretive Area at Station 91+00. The rest areas and trail heads each have an approximate area of 340 sf. The Wildlife Viewing Area has an area of 916 sf. These surfaces will be of permeable pavers and will be designed to have no significant increase to stormwater runoff. The Native American Interpretive Area has an area of 3,344 sf. The Interpretive Area will also utilize permeable pavers. Additional runoff will be routed to an adjacent rain garden.

Segment-2A (Valley Trail)

Segment-2A is approximately 6,132 feet in length. Grading includes approximately 810 cy of cut and 550 cy of fill. Finished grade of Segment-2A includes approximately 2.0 acres of impervious area. Segment-2A crosses approximately 0.4 acres of 100-yr Frozen Event floodplain and 0.3 acres of 100-yr Warm Event floodplain at various locations. Wetlands are crossed at three locations. Approximately 192 ft of boardwalk will be required beginning at

Station 94+50. The boardwalk will temporarily impact 810 sf wetlands (this includes a 3 ft offset from the edge of the boardwalk for construction area).
Boardwalk footings will require 24 sf of area and 48 cf of volume to be impacted. The post project10-yr stormwater run-off at this crossing is 500 cfs which is a 0.2% increase over existing flows.

Approximately 165 ft of boardwalk and 40 ft of bridge will be required beginning at Station 129+25. The wetlands will be temporarily impacted by an area of 3,589 sf (this includes a 3 ft offset from the edge of the boardwalk for construction area). Bridge and boardwalk footings will require 84 sf of area and 168 cf of volume to be impacted. Abutments will impact 50 sf and 142 cf. Approximately 177 linear feet of rockery wall will be required beginning at station 128+45. The post project 10-yr stormwater run-off at this crossing is 3,098 cfs which is not an increase over existing flows.

A 96 ft boardwalk will be required at 151+00. Approximately 1,743 sf of wetlands will be temporarily impacted during construction. Footings will impact an area of 42 sf and a volume of 84 cf. The post project 10-yr stormwater run-off at this crossing is 462 cfs which is not an increase over existing flows.

Additional impacts connected with Segment-2A include trail junctions to existing trails at Stations 117+00, 128+00, 133+00, 151+00 and two at 152+88.
These trails junction each have an approximate area of 340 sf. The surfaces will be of permeable pavers and will be designed to have no significant increase to stormwater runoff.

Segment-2B (Valley Trail)

Segment-2B is approximately 13,122 feet in length. Grading includes approximately 5,120 cy of cut and 5,010 cy of fill. Finished grade of Segment-2B includes approximately 4.2 acres of impervious area. Approximately 3,575 linear feet of rockery walls may be required for this segment. Approximate beginning stations for the individual walls are as follows: 546+50; 552+00; 559+00; 574+00; 588+00; 596+50; and 613+00. Placement of walls may change and the length of some walls may be reduced as ground surveys are accomplished and the final design is completed. There is an existing culvert at Station 528+00 that conveys approximately 62 cfs during the 10-yr storm event. No increase of flow at this location is expected due to this project.

Additional impacts connected with Segment-2B include trail junctions to existing trails at Stations 520+00, 525+00, 532+75, 535+00, 559+00, 567+00, two at 604+00, one at 612+00 and a final one at 620+00. These trails junction each have an approximate area of 340 sf. The surfaces will be of permeable pavers and will be designed to have no significant increase to stormwater runoff.

Segment-3A (Highway Trail)

Segment-3A is approximately 6,146 feet in length. Grading includes approximately 560 cy of cut and 520 cy of fill. Finished grade of Segment-3A includes approximately 2.0 acres of impervious area. Segment-3A crosses approximately 1.6 acres of 100-yr floodplain at Stations 1000+00 to 1051+00. Wetlands are crossed by an existing bridge at Station 1033+00. The bridge will be replaced and as a result 381 sf of temporary construction impacts to the wetlands will occur. The post project10-yr stormwater run-off at this crossing is 4,947cfs which is a 0.1% increase over existing flows.

Trail construction from Station 1053+35 to 1054+42 will result in 214 sf of temporary wetland impacts and 252 sf of permanent wetland impacts.

An additional impact connected with Segment-3A includes a trail junction to an existing trail at Station 1047+50. This trail junction has an approximate area of 340 sf. The surface will be of permeable pavers and will be designed to have no significant increase to stormwater runoff.
A 150 ft rockery wall will be required at Station 1054+34 and 25 ft retaining wall will be required at Station 1060+58.

Segment-3B (Highway Trail)

Segment-3B is approximately 8,699 feet in length. Grading includes approximately 3,695 cy of cut and 1,904 cy of fill. Finished grade of Segment-3B includes approximately 2.8 acres of impervious area. Approximately 2,142 linear feet of rockery walls may be required for this segment.
Approximate beginning stations for individual walls are as follows: 1519+00; 1539+50; and 1566+50. Placement of walls may change and the length of some walls may be reduced as ground surveys are accomplished and the final design is completed. Segment-3B crosses the Middle Fork of Martis Creek at Station 1500+00 at an existing crossing. No increase in flow due to the project is expected.

Additional impacts connected with Segment-3B include trail junctions to existing trails at Stations 1507+50 and 1524+25. These trails junction each have an approximate area of 340 sf. The surfaces will be of permeable pavers and will be designed to have no significant increase to stormwater runoff.

Segment-3F (Highway Trail)

Segment-3F is approximately 9,885 feet in length. Grading includes approximately 3,872 cy of cut and 76 cy of fill. Finished grade of Segment-3F includes approximately 3.2 acres of impervious area.
Approximately 1,728 linear feet of rockery walls may be required for this segment. Approximate beginning stations for individual walls are as follows: 2003+60; 2008+00; 2015+50; 2026+50 2029+00; 2052+50; 2057+00; and 2081+00. Placement of walls may change and the length of some walls may be reduced as ground surveys are accomplished and the final design is completed. A 72 ft bridge will be installed at Station 2030+00. The bridge will temporarily impact 169 sf of wetlands. Several narrow wetland bands are crossed with three separate boardwalks with a total length of approximately 147 ft (from Station 2083+00 to 2088+60). The boardwalks will impact 479 sf of wetlands (this includes a 3 ft offset from the edge of the boardwalk for construction area). Due to the narrow cross-section of these wetlands, no impact due to footings or abutments is expected. Segment-3F has three hydrologic crossings. The crossing at Station 2030+00 has an existing 10-yr storm run-off of 31 cfs. No increase in flow is expected at this location due to this project. The crossing at Station 2088+60 has an existing 10-yr storm run-off of 199 cfs. No increase in flow is expected at this location due to this project. The crossing at Station 2097+50 has an existing 10-yr storm run-off of 12 cfs. No increase in flow at this location is expected due to this project. The crossing at 2097+50 will include a new bridge to replace the existing bridge. Potential temporary stream/wetland impacts due to construction would be 214 sf.

Additional impacts connected with Segment-3F include rest areas at Stations 2038+00 and 2062+75. Each rest area has an approximate area of 340 sf. The surfaces will be of permeable pavers and will be designed to have no significant increase to stormwater runoff.

Parking Alternatives

Four locations have been equally studied and preliminary designs have been developed for each location. Numbering of the alternatives is based on location in regard to the start of trail Segment-1 and is not meant to imply preference. All alternatives require an area of approximately 0.5 acres plus the area for connection to the trail system unless specified below.

Parking Alternative-1 ties into Trail Segment-1 at Station 8+00. Access to the parking area is through the existing parking lot for the Donner-Truckee Veterinary Hospital located on Highway 267, approximately 1,000 ft northwest of Schaffer Mill Rd. Grading impacts include 50 cy of cut and 50 cy of fill material. Minimal grading is required due to existing access and gentle grades. The distance to the main trail is 50 ft with a corresponding connection trail area of 600 sf. Grading volumes for the connection trail is included in the volume for the parking area grading.

Parking Alternative-2 ties into Trail Segment-1 at Station 13+20. Access to the parking area is located on Schaffer Mill Rd., approximately 875 ft south of Highway 267, at an existing county

access road. Grading impacts include 90 cy of cut and 350 cy of fill material. Grading is required to minimize the slopes to access the area. The distance to the main trail is 520 ft with a corresponding connection trail area of 7,124 sf.
Grading of the connective trail will required 30 cy of cut and 30 cy of fill. The connective trail will cross a perennial stream and wetlands. Approximately 80 ft of boardwalk will be required to cross the wetlands. Approximately 360 sf of wetlands will be temporarily impacted during construction. Footings will impact an area of 12 sf and a volume of 24 cf.

Parking Alternative-3 ties into Trail Segment-1 at Station 17+25. Access to the parking area is located on Schaffer Mill Rd. approximately 275 ft south of the intersection with Highway 267. Grading impacts include 1,150 cy of cut and requires no fill material. Substantial grading is due to minimizing the slope required to reach the top of the knoll as well as to provide for the required line of sight for oncoming traffic from the intersection of Highway 267. The distance to the main trail is 28 ft. Connection trail area for this alternative is included in the parking lot area. Grading volumes for the connection trail is included in the volume for this parking area.

Parking Alternative-4 ties into Trail Segment-1 at Station 68+25. Access to the parking area is located on Highway 267, approximately 400 ft southeast of Martis Creek Rd. Grading impacts include 30 cy of cut and 160 cy of fill material. Grading is required to minimize the slopes to access the area. The distance to the main trail is 220 ft with a corresponding connection trail area of 2,640 sf. Grading of the connective trail will required 20 cy of cut and 4 cy of fill.

Each parking area alternative will be designed to release 90% of pre-project stormwater runoff. Stormwater runoff will be routed to the downslope edge of the parking area where the runoff will enter a rain garden to maximize on-site infiltration and pollution mitigation. Release from the rain garden will emit to the surrounding area as sheet flow. Additionally, bioswales as well as parking stalls utilizing permeable pavers will contribute to onsite infiltration and pollutant mitigation.

Existing Trails

Much of the proposed alignments follow existing trails to minimize impacts. However, many existing trails shall remain and access points (trail junctions) shall be built to encourage continued use of these hiking trails. Portions of the existing trails will be “cut-off” by the proposed alignments. These portions shall be revegetated. Approximately 4,484 linear feet of existing trails shall be revegetated as part of this project. Approximate areas cannot be calculated at this point due to lack of survey of these trails.

APPENDIX C

BIOLOGICAL RESOURCES REPORTS

APPENDIX C1

Biological Resources Assessment

BIOLOGICAL RESOURCES ASSESSMENT
FOR THE

MARTIS VALLEY REGIONAL TRAIL STUDY CORRIDOR

PLACER COUNTY, CALIFORNIA

Prepared for:

NORTHSTAR COMMUNITY SERVICES DISTRICT
908 Northstar Drive
Northstar, CA 96161
Contact: Mike Staudenmayer
General Manager

Prepared by:

north fork associates
110 Maple Street, Auburn, California 95603
(530) 887-8500

OCTOBER 15, 2009

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BIOLOGICAL RESOURCES ASSESSMENT FOR THE MARTIS VALLEY REGIONAL TRAIL STUDY CORRIDOR

INTRODUCTION

Project Location

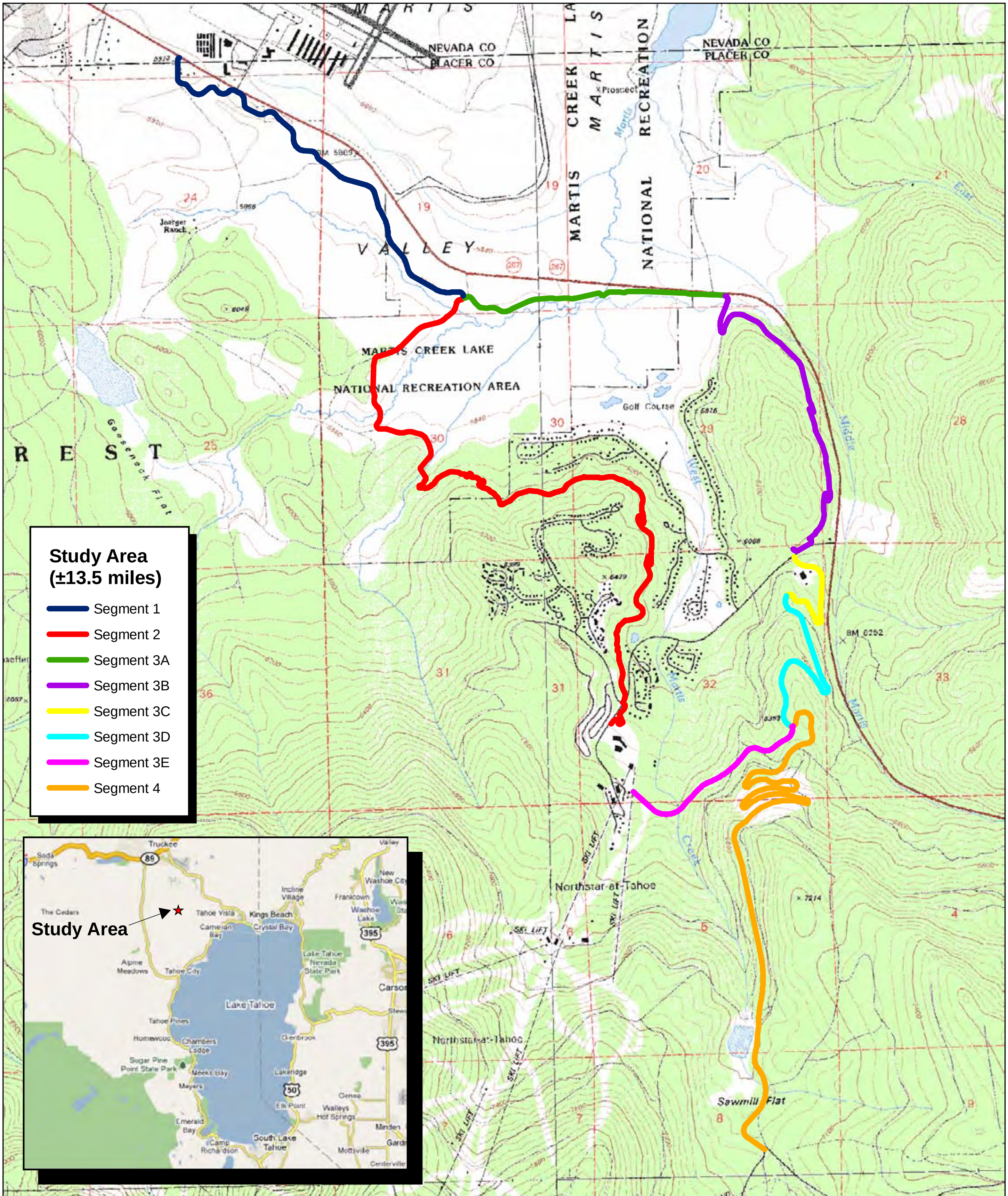
The Martis Valley Regional Trail study corridor is located generally between the southern limits of the Town of Truckee and the Four Corners area at Brockway Summit in Placer County. The study corridor is 50 feet wide and occurs mostly along existing trails. An alternative trail alignment for a portion of the route is also included in this assessment. The proposed trail alignment originates south of Highway 267, north of Schaffer Mill Road, and heads east, keeping just south of Highway 267 through Martis Valley to the wildlife viewing area parking lot off of Highway 267. The proposed alignment extends from the parking area to the south and southeast, crossing Martis Valley before heading up to Northstar and ending before Northstar Drive. The alternative trail alignment extends from the parking area to the east and southeast, climbing in elevation up to Northstar and ending near Northstar Drive and State Route 267. Segments of the trail proposed to be constructed in future phases would continue south of Northstar Drive to connect to the Four Corners area near Brockway Summit; the ridge between Martis Valley and the Lake Tahoe Basin. The trail corridor is located within Townships 16N and 17N and Ranges 16E and 17E of the Truckee and Martis Peak U.S. Geological Survey 7.5 minute quadrangles. The proposed trail alignment crosses through Sections 5, 8, 13, 19, 24, 29, 30, and 32 of these quadrangles (Figure 1).

Setting

The study area is set on the eastern side of the Sierra Nevada Mountains, north of Lake Tahoe and southeast of the Town of Truckee, at elevations between approximately 5,880 and 6,200 feet. The topography is gently rolling to generally flat within Martis Valley, and steep outside of the valley towards Northstar. Habitat types found onsite include coniferous forest, sagebrush scrub, wet and dry meadow, riparian, and ruderal. Adjacent land uses include the Northstar Community (including Northstar at Tahoe golf course), Lahontan Golf Club, Truckee-Tahoe Airport, Martis Creek Lake, and undeveloped areas of Tahoe National Forest (Figure 2).

Proposed Project Description

The Martis Valley Regional Trail is a multiple-use trail proposed by the Northstar Community Services District (CSD). The proposed and alternative trail alignments generally follow the existing Tomkins Memorial Trail through the Martis Valley and up to the Northstar at Tahoe property. Constructing the Martis Valley Regional Trail will entail widening and paving the existing Tomkins Memorial Trail alignment, as well as constructing new trail alignments. The trail alignment runs through private property and property under the jurisdiction of the U.S. Army Corps of Engineers. Figure 1 shows the segments of the proposed trail alignment (Segments 1 and 2) and the alternative alignment (Segments 3A and 3B). Segments 3C, 3D, 3E and 4, south of Northstar Drive, are possible future phases of the trail. The total study corridor length is ±13.5 miles.



N

0 750 1,500 3,000

Scale in Feet

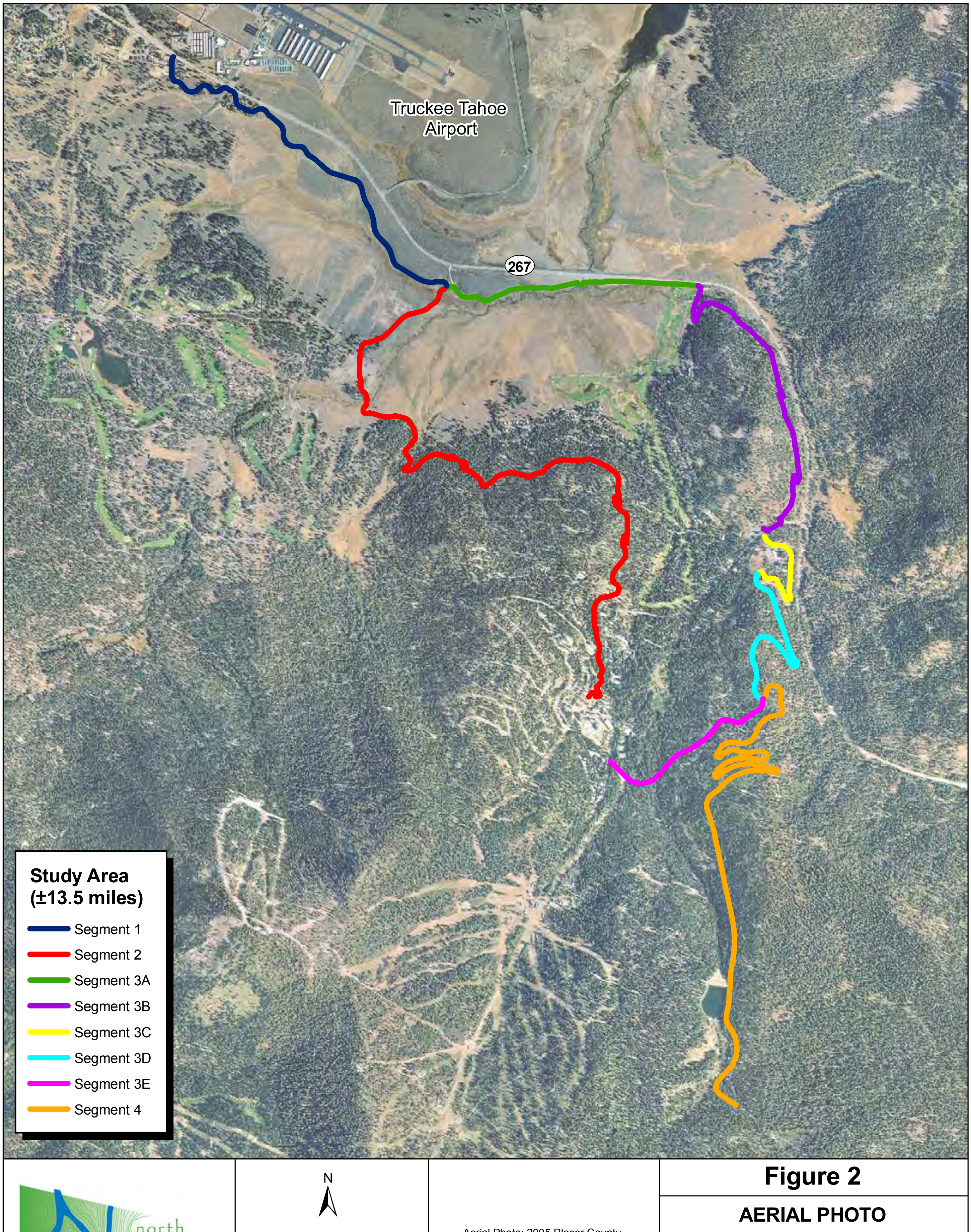
USGS Base Map:
Truckee & Martis Peak, CA
7.5 minute topographic quadrangle
Sections:
5,8,13,19,20,24,28,29,30,32,33
Township: 16N,17N
Range: 16E,17E

Figure 1

SITE & VICINITY MAP

Martis Valley Regional Trail

Placer County, California



Aerial Photo: 2005 Placer County.

Figure 2

AERIAL PHOTO

Martis Valley Regional Trail

Placer County, California

Objectives of Biological Resources Assessment

- Identify and describe the biological communities present in the study corridor
- Record plant and animal species observed in the study corridor
- Evaluate and identify sensitive resources and special-status plant and animal species that could be affected by project activities
- Provide conclusions and recommendations

METHODS

Data Sources

For this assessment, Auerbach Engineering Corporation provided digital base files of the trail alignment. Aerial photographs were obtained from Environmental Systems Research Institute (ESRI) (2005, 2007) and Placer County (2005). Soils information was obtained from the United States Department of Agriculture, Natural Resources Conservation Service, and geological information was taken from the *Geologic Map of the Sacramento Quadrangle* (California Department of Conservation 1987).

Special-Status Species Reports

North Fork Associates queried the California Natural Diversity Data Base (CNDDB) for location records for special-status species known to occur in the region surrounding the project site. Quadrangles included in the query were Independence Lake, Hobart Mills, Boca, Mount Rose Northwest, Mount Rose, Marlette Lake, Kings Beach, Tahoe City, Granite Chief, Norden, Truckee, and Martis Peak. North Fork Associates biologists also reviewed the special-status species lists for the Truckee and Martis Peak USGS quadrangles and Placer County created by the U.S. Fish and Wildlife Service (USFWS). The California Native Plant Society (CNPS) Inventory was checked for special-status plants occurring in the area.

For the purposes of this report, special-status species are those that fall into one or more of the following categories, including those:

- listed as endangered or threatened under the federal Endangered Species Act (including candidates and species proposed for listing),
- listed as endangered or threatened under the California Endangered Species Act (including candidates and species proposed for listing),
- designated as rare, protected, or fully protected pursuant to California Fish and Game Code,
- designated a Species of Concern by the California Department of Fish and Game (CDFG),
- defined as rare or endangered under Section 15380 of the California Environmental Quality Act (CEQA), or
- occurring on List 1, 2, or 3 maintained by the CNPS.

Field Surveys

The field assessment of Segments 1, 2, 3A and 3B was conducted on June 25, July 9, July 23, and July 29, 2009 by Jeff Glazner and Erin Gottschalk Fisher (botany), and on July 29, 2009 by Gaylene Tupen (wildlife). A wetland delineation was conducted in tandem with this study and a report has been produced under separate cover. For the biological resource assessment, site surveys were conducted to assess habitat conditions and determine the potential for occurrence of special-status plant and wildlife species. The surveys consisted of walking the site, recording notes of species observed or their respective sign (nests, burrows, tracks, scat), and assessing habitat conditions. A less intensive reconnaissance-level survey of Segments 3C, 3D, 3E and 4 was conducted on August 20, 2009 by Jeff Glazner and Matt Fremont. A less intensive survey was performed on these sections since these segment south of Northstar Drive are not being pursued as part of Phase 1 of the trail project. Appendix A is a list of plants observed, and Appendix B is a list of wildlife observed onsite. Plant names are according to *The Jepson Manual* (Hickman 1993), except for changes obtained from the Jepson Interchange, an online database maintained by the University of California and Jepson Herbaria.

SURVEY AND LITERATURE SEARCH RESULTS

Hydrology

The study area region slopes toward Martis Valley, which is drained by Martis Creek, the main hydrological feature throughout the study area. Martis Creek flows in a northeasterly direction and crosses the study corridor in the northern portion of Segment 2 of the proposed alignment and in the middle of Segment 3A of the alternative alignment. Three tributaries to Martis Creek (including Middle Martis Creek) also cross the study corridor, with two unnamed tributaries crossing Segment 2 of the proposed alignment and Middle Martis Creek crossing the northern portion of Segment 3B of the alternative alignment. Martis Creek and its tributaries are represented as solid blue line features on the USGS map. After crossing the study corridor in Segment 3A of the alternative alignment near Highway 267, Martis Creek crosses under Highway 267 in a culvert. On the north side of Highway 267, Martis Creek drains into Martis Creek Lake. Martis Creek continues below the dam, draining into the Truckee River south of Interstate 80. The Truckee River empties into Pyramid Lake in the Great Basin in Nevada.

Other hydrological features within the study corridor include wetland swales, wetland meadows, and ephemeral and intermittent streams.

Biological Communities

Five habitat types were observed along the Martis Valley Regional Trail corridor: coniferous forest, sagebrush scrub, wet meadow, dry meadow, and riparian. The proposed and alternative trail alignments generally follow the alignment of the existing Tomkins Memorial Trail from the wildlife viewing area parking lot south and east to Northstar, although the alignments depart from the existing trail substantially in some areas. The existing trail is generally three to ten feet wide through Martis Valley and into Northstar. No trail presently exists along the proposed trail alignment west of the wildlife viewing area parking lot.

Figure 3 is a habitat map and Table 1 provides the linear distance the trail corridor passes through each habitat type. Figures 4 and 5 contain photographs of the study corridor. Each of the biological communities is described below. A complete list of species observed during the site visits is provided in Appendices A and B.

Table 1.
Biological Communities Present Within the Martis Valley Regional Trail Study Corridor

Biological Community	Approximate Length
Coniferous Forest	10.23
Sagebrush Scrub	3.17
Wet Meadow	0.05
Dry Meadow	0.08
Riparian	0.06
Total	**13.59 miles[1]**

Plants

Coniferous Forest

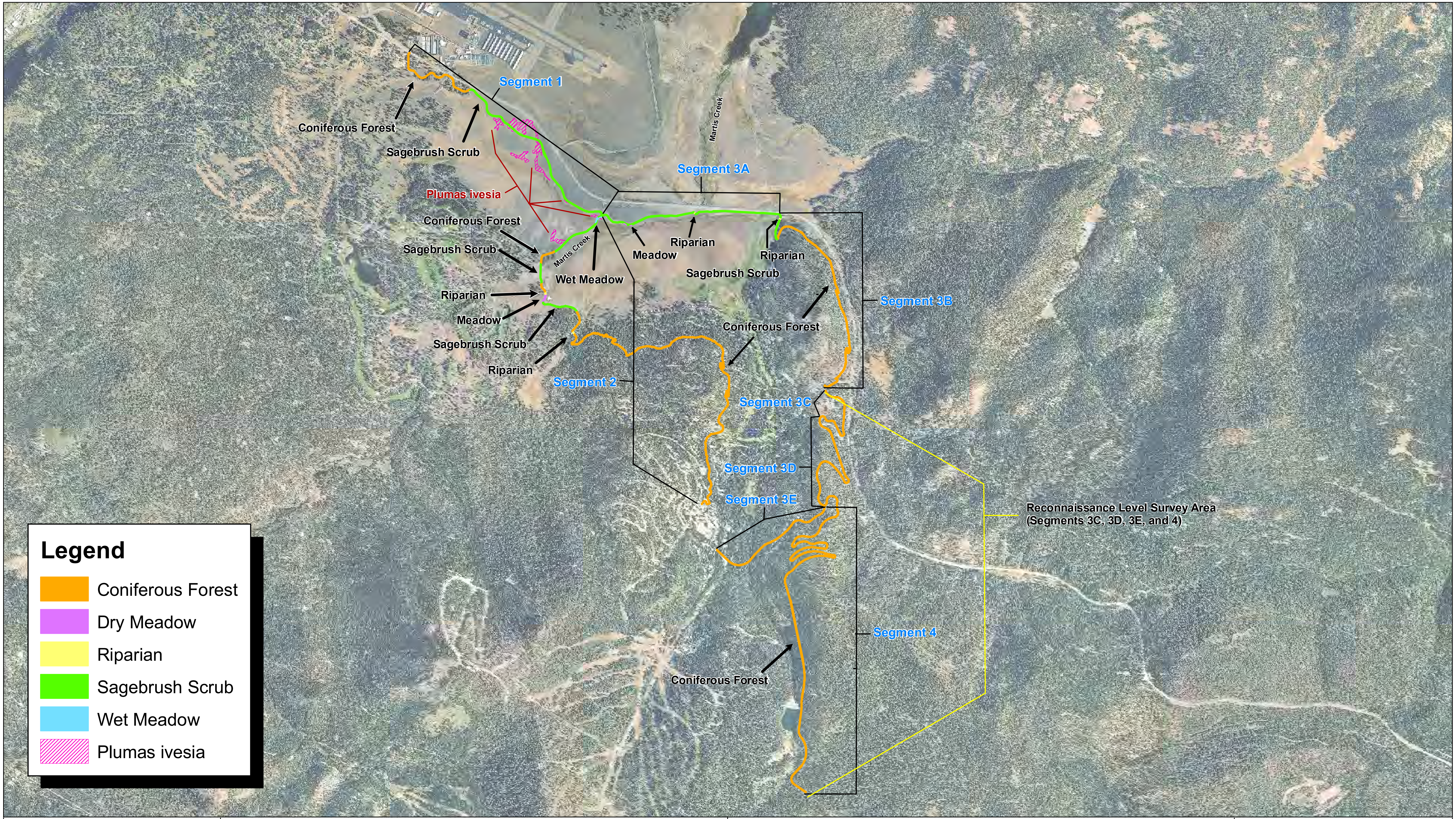
Approximately 10.23 miles of the study area support coniferous forest habitat. Coniferous forest occurs at elevations slightly higher than the floor of Martis Valley and is the dominant habitat on the slopes ascending from the valley to Northstar and Brockway Summit. The southeastern portion of the study corridor, including Segments 3B – 3D of the alternative trail alignment and Segment 4 and the southeastern portion of Segment 2 of the proposed trail alignment, is within coniferous forest habitat (Figures 4a and 4b). The upper slopes above Northstar support dense forests with red and white fir, western white pine, Jeffrey pine and lodgepole pine. On the lower slopes near Martis Valley, the coniferous forest areas support mostly Jeffrey pine and white fir. In areas with more moisture, particularly in the lower landscape positions of Martis Valley, lodgepole pine is the dominant species. Understory shrubs include greenleaf manzanita, mahala mat, tobacco brush, big sagebrush, and antelope brush. The herbaceous cover is relatively light and includes bitter dogbane, mountain mule's-ears, phacelia, campion, blue wildrye, quackgrass, and orchard grass.

In the southeastern portion of the study corridor, the proposed trail alignment meanders through existing residential development and the alternative trail alignment runs close to Highway 267. These areas of conifer forest habitat have been thinned, presumably for fire fuels management. Evidence of recent thinning operations along the trail alignment includes slash piles and tree stumps.

Sagebrush Scrub

Approximately 3.17 miles of the study corridor pass through sagebrush scrub habitat (Figure 4c). This habitat occurs at a lower elevation generally than the coniferous forest and is the dominant habitat type along Segments 1 and 3A of the proposed and alternative trail alignments. Areas of sagebrush scrub habitat also occur along the northern portion of Segment 2 of the proposed alignment and the northernmost portion of Segment 3B of the

[1] The cumulative length of biological communities is slightly longer than the trail length due to short reaches of overlapping biological communities.



north fork associates

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0 750 1,500 3,000

Scale in Feet

Aerial Photo: Placer County, 2005

Figure 3

HABITAT MAP

Martis Valley Regional Trail

Placer County, California

alternative alignment. This habitat type is dominated by big sagebrush; secondary shrub dominants include antelope brush and rubber rabbitbrush. The sagebrush scrub varies from dense intertwining branches of big sagebrush and antelope brush to more open areas that also support herbaceous vegetation, such as Parish's yampah, thickstem aster, mountain tarweed, cryptantha, locoweed, dwarf lupine, clustered broom-rape, blue-eyed Mary, sulfer flower, navarretia, onion, cheat grass, bulbous bluegrass, and squirreltail. Embedded within the sagebrush scrub are areas dominated by low sagebrush. This lower-stature shrub is the sole shrub in these areas which support unique plant species, including Plumas ivesia (see Special-Status Species section below).

Wet Meadow

The wet meadow habitat occurs in a large area in the Martis Valley that supports wetland vegetation due to hydrological influences from Martis Creek (and tributaries) and/or a seasonally high water table. Approximately 0.05 mile of wet meadow occurs within the study corridor, the largest portion occurring just south of the wildlife viewing area parking lot at the north end of Segment 2 (Figure 4d). This wet meadow habitat is dominated by herbaceous wetland species such as Ryberg's beardtongue, long-stalk clover, dense-flower spike-primrose, western mountain aster, dwarf woolly-heads, water speedwell, Great Basin navarretia, long-stalk starwort, glandular cinquefoil, western buttercup, sedges, rushes, meadow barley, and tufted hairgrass. Some marginal wetland species, such as Parry's arnica, Kentucky blue grass, and common timothy also occur in the wet meadow.

Dry Meadow

The dry meadow habitat type is typically found in the transition zone between wet meadow or riparian and upland sage scrub and coniferous forest habitat types. The study corridor runs through dry meadow habitat for approximately 0.08 mile. Dry meadow habitat occurs within Segment 2 of the proposed alignment, south of the proposed crossing of Martis Creek, and within Segment 3A of the alternative alignment (Figure 5a). Dry meadow habitat type is dominated by many of the same species as found in the wet meadow (a wetland flora) but trending towards species that are more tolerant of dryer conditions. Perennial species of sedges, rushes, and grasses are the primary occupants of these areas.

Riparian

Approximately 0.06 mile of the study corridor supports riparian shrub habitat associated with Martis Creek and its tributaries (Figures 5b). The riparian habitat is generally a patchy band approximately 10 to 20 feet wide along each bank of the creek, and is dominated by compacted, rounded willow shrub species 10 to 15 feet high. Small lodgepole pine trees also occur throughout the riparian habitat. Other associated plant species are similar to the species found in the wet meadow, along with mountain alder, wild rose, mountain timothy, willow dock, common monkeyflower, and stemless thistle. Riparian habitat occurs near drainages along Segment 2 of the proposed alignment and in areas within Segments 3A and 3B of the alternative alignment.

4a. – Coniferous Forest in the vicinity of Northstar.

4b. – Coniferous Forest canopy as viewed from Segment 4 of the proposed alignment.

4c. – Existing trail through Sagebrush Scrub.

4d. – Wet Meadow with Martis Creek and Riparian Habitat in background.

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Photo Dates: July 9, 2009; July 23, 2009; August 20, 2009

Figure 4

SITE PHOTOS

Martis Valley Regional Trail

Placer County, California

5a. – Dry meadow vegetation along Segment 2 south of Martis Creek.

5b. – Bridge crossing of Martis Creek (with riparian shrub vegetation) near Highway 267.

5c. – Large population of Plumas ivesia.

5d. – Plumas ivesia.

north fork associates

Photo Dates: June 25, 2009; July 9, 2009; August 20, 2009

Figure 5

SITE PHOTOS

Martis Valley Regional Trail

Placer County, California

Wildlife

The Martis Valley Regional Trail study area supports a wide diversity of wildlife due to the availability of important habitat features including: nesting sites, escape and thermal cover, and abundant food sources. Aquatic habitats in the area, including Martis Creek and its tributaries, provide year-round and seasonal sources of water for wildlife of the area and habitat for various aquatic and semi-aquatic species. Forest communities, such as those located throughout much of the study corridor, are important for animal cover, and provide high quality roosting and nesting opportunities for songbirds and shelter for numerous mammals. Snags located within and adjacent to forested areas of the study corridor provide nesting cavities for birds such as owls and woodpeckers. Taller trees located on hillsides overlooking foraging areas provide good nesting habitat for raptors such as great horned owl and red-tailed hawk.

During the field survey conducted on July 29, 2009 a variety of birds were observed throughout both forested and open habitats of the study corridor. Because of the elevation of the study area, many species are only expected to occur on site seasonally either for nesting purposes or during migration. Many of the birds observed during the field survey are known to nest in coniferous forest habitats such as those present onsite. The following birds are a representative sample of those observed throughout forested habitats of the study corridor: mountain chickadee, brown creeper, dusky flycatcher, western wood pewee, northern flicker, dark-eyed junco, western tanager, yellow-rumped warbler and red-breasted nuthatch. Fewer species were observed within more open communities such as sagebrush scrub. These primarily included Brewer's sparrow, cliff swallow, and chipping sparrow. Riparian communities associated with the various drainages crossing the study corridor are expected to provide important seasonal nesting habitat for numerous migratory songbirds, including a variety of special-status species.

During the field survey, two American kestrels were observed emerging from a cavity in a snag located just up-slope of Martis Creek and foraging in adjacent sagebrush scrub. It is expected that the pair of kestrels had been recently, or were currently, using the snag for nesting purposes. The only other raptor detected within the study area during the field survey was a solitary osprey observed flying over Martis Creek in the western end of the study area.

Various small mammals either observed or detected throughout the study corridor included: mountain pocket gopher, Douglas' squirrel, and golden-mantled ground squirrel. Tracks, scat, or other sign of mule deer, coyote, and raccoon were found in various locations throughout both forest and sagebrush communities of the study area. Deer occurring within the Martis Valley, including the study corridor, are part of the Loyalton-Truckee Deer Herd. The study corridor occurs within the summer range for the Loyalton-Truckee Deer Herd (Kahre and Fowler, 1982).

Martis Creek and associated tributaries are expected to provide important habitat for a variety of aquatic and semi-aquatic species. During the field survey numerous small trout were observed in pools located along Martis Creek, just upstream of the Highway 267 crossing, and along the unnamed drainage located east of Martis Creek in the southern portion of the study corridor.

Special-Status Species

Appendix C is a list of potentially occurring special-status plants, and Appendix D is a similar list of special-status wildlife compiled from our queries as described in the Methods section above. The USFWS list for Placer County includes species from the Central Valley to the east side of the Sierra Nevada. Species requiring habitats not occurring in or around the study area and species occurring far outside the study area are not considered in Appendices C or D. Field surveys and the best professional judgment of North Fork Associates biologists were used to further refine the tables in Appendices C and D. Plants species found on the CNPS Lists 3 and 4, as well as mosses and moonworts, are included in the Appendices but are not considered further in the document. Nevertheless, floristic surveys conducted according to CDFG guidelines for rare plant surveys would detect these species where they are present, so that these species are not ignored.

This refined list of special-status species in the region of the project site includes 22 plants and 16 animals (Appendix C and Appendix D, respectively). Of the 22 plant species in Appendix C and 16 animal species in Appendix D, six plants and eight animals either **occur** within the study corridor or they are rated **likely** or **possible** to occur because the corridor has some areas of suitable habitat or they are known from nearby locations. Table 2 is a summary of those species, and they are discussed in more detail in the paragraphs following the table.

Table 2.
Special-Status Species That Could Occur Within the Martis Valley Regional Trail Study Corridor

Species	Status* Federal	State	Other	Habitat	Potential for Occurrence**
Plants					
Constance sedge *Carex constanceana*	-	-	List 1B.1	Subalpine coniferous forest (sandy, mesic)	Possible. Suitable habitat occurs in onsite streams and wetlands.
Mud sedge *Carex limosa*	-	-	List 2.2	Bogs and fens in upper montane coniferous forest	Possible. Suitable habitat occurs in onsite streams and wetlands.
American mannagrass *Glyceria grandis*	-	-	List 2.3	Bogs, fens, meadows, streambanks and lake margins	Possible. Suitable habitat occurs in onsite streams and wetlands.
Slender-leaved pondweed *Potamogeton filiformis*	-	-	List 2.2	Marshes and swamps, moving water (assorted shallow freshwater).	Possible. Suitable habitat in onsite perennial creeks.

Species	Status* Federal	State	Other	Habitat	Potential for Occurrence**
Alder buckthorn *Rhamnus alnifolia*	-	-	List 2.2	Upper and lower montane coniferous forests; meadows and seeps; riparian scrub.	Possible. Suitable habitat onsite in riparian scrub.
Plumas ivesia *Ivesia sericoleuca*	-	-	List 1B.2	Great Basin scrub; lower montane coniferous forest; meadows and seeps; vernal pools; [vernally mesic, usually volcanic].	Occurs. Observed in sagebrush scrub habitat onsite.
Fish					
Lahontan cutthroat trout *Oncorhynchus clarki henshawi*	FT	-	-	Endemic to streams of Lahontan Basin of northern Nevada, eastern California, and southern Oregon.	Possible. Previously documented in Martis Creek and tributaries but likely extirpated.
Amphibians					
Northern leopard frog *Rana pipiens*	-	CSC		Known from a variety of aquatic habitats. Endemic populations potentially occur in Truckee River drainage.	Possible. Potential habitat in Martis Creek and perennial tributaries. Rare in project region.
Sierra Nevada yellow-legged frog *Rana sierrae*	FC	CSC		Streams, lakes, and ponds in montane habitats.	Possible. Marginal-quality habitat in Martis Creek and perennial tributaries.
Birds					
Northern goshawk *Accipiter gentilis*	-	CSC	-	Mature and old-growth stands of conifer and deciduous forests.	Possible. Potential nesting habitat onsite. Known nesting in project vicinity.
Yellow warbler *Dendroica petechia brewsteri*	-	CSC	-	Breeds in riparian deciduous habitats or open conifer forest with shrub cover.	Possible. Suitable nesting habitat available throughout corridor.

Species	Status* Federal	State	Other	Habitat	Potential for Occurrence**
Willow flycatcher *Empidonax traillii*	-	CE	-	Breeds in extensive willow thickets on edge of wet meadows, ponds, or streams.	Likely. Suitable nesting habitat in onsite riparian scrub. Previous nesting along Martis Creek.
Mammals					
Sierra Nevada snowshoe hare *Lepus americanus tahoensis*	-	CSC	-	Montane riparian habitats, with dense thickets of young trees and shrubs.	Possible. Suitable habitat occurs in association with onsite dense riparian scrub communities. Rare in project region.
Sierra Nevada mountain beaver *Aplodontia rufa californica*	-	CSC	-	Aquatic habitats with adjacent shrubs and deciduous trees.	Possible. Suitable habitat in scattered locations along drainages of study corridor with dense riparian cover.

*Status Codes:

Federal

FE Federal Endangered
FT Federal Threatened
FP Federal Proposed Species

State

CE California Endangered
CT California Threatened
CR California Rare (plants only)
CSC California Species of Concern
CFP California Fully Protected

CNPS

List 1B Rare, Threatened, or Endangered in California
List 2 R, T, or E in California, more common elsewhere
1- Seriously threatened in California
2- Fairly threatened in California
3- Not very threatened in California

**Definitions for the Potential to Occur:

- **None.** Habitat does not occur.
- **Unlikely.** Some habitat may occur, but disturbance or other activities may restrict or eliminate the possibility of the species occurring. Habitat may be very marginal, or the study area may be outside the range of the species.
- **Possible.** Marginal to suitable habitat occurs, and the study area occurs within the range of the species.
- **Likely.** Good habitat occurs, but the species was not observed during surveys.
- **Occurs:** Species was observed during surveys.

Plants

Due to the previously known occurrences of Plumas ivesia within the study area, our corridor field surveys included focused surveys for Plumas ivesia. However, our assessment did not include conducting floristic, special-status plant surveys to agency guidelines, which would have included a comprehensive botanical survey and identification of each plant species to determine any listing/rarity status. Nevertheless, our surveys in June and July covered the blooming times of many special-status species and we attempted to determine the presence or absence of rare plant species. We also did a thorough survey in the sagebrush scrub habitat during our focused surveys for Plumas ivesia. Other habitats, such as the riparian and stream areas, were not as thoroughly surveyed.

Constance's sedge (*Carex constanceana*) is a medium to tall (1 ½ to 2 feet) member of the sedge family (Cyperaceae) that grows in dense clumps. Several technical characteristics separate it from other members of this large genus. Constance's sedge has no state or federal status, but it is on the CNPS List 1B.1. Constance's sedge occurs in Oregon and Washington. In California it is known to occur at the Sagehen Reserve in Nevada County. Constance's sedge is not recognized in the current *Jepson Manual*. It blooms in August. Suitable habitat for Constance's sedge occurs in the wetland meadow and stream habitats onsite. *Carex* species were observed in the study area during the 2009 field surveys.

Mud sedge (*Carex limosa*) is a spreading perennial member of the sedge family (Cyperaceae). It has no state or federal status. It is on the CNPS List 2.2, meaning that it is relatively uncommon in California, but more common elsewhere. Mud sedge has long rhizomes and roots that are conspicuously hairy. The style is exerted from the perigynium and has a thick blackened base. Mud sedge grows in soggy meadows and sphagnum bogs and other very wet scattered locations in the Cascades and Sierra Nevada from Siskiyou County to Fresno County. It is very widespread in other portions of the Northern Hemisphere, occurring north to Alaska and Canada, and extending to the mountains of Europe and Asia. It blooms from June to August. Suitable habitat for mud sedge occurs in the wetter areas of meadow adjacent to Martis Creek, particularly along the proposed trail alignment. *Carex* species were observed in the study area during the 2009 field surveys.

Slender-leaved pondweed (*Potamogeton filiformis)* is perennial member of the pondweed family (Potamogetonaceae). It has no state or federal status, but is on the CNPS List 2.2. It occurs in assorted shallow freshwater habitats such as marshes, swamps, and moving water. It blooms between May and July. Slender-leaved pondweed can be distinguished from other pondweeds by having leaves that are linear and not floating, with fused stipules. Suitable onsite habitat occurs in the perennial streams onsite, including Martis Creek. No species of *Potamogeton* were recorded during the 2009 field surveys.

Alder buckthorn (*Rhamnus alnifolia*) is shrub member of the buckthorn family (Rhamnaceae). It has no state or federal status, but is on the CNPS List 2.2. It occurs in meadows, seeps, and riparian scrub habitats within montane coniferous forests. It blooms between May and July. Alder buckthorn can be distinguished from other *Rhamnus* species by having both terminal buds covered with scales and deciduous leaves. Suitable habitat onsite occurs in the riparian scrub habitats. No species of *Rhamnus* were recorded during the 2009 field surveys.

American mannagrass (*Glyceria grandis*) is a perennial member of the grass family (Poaceae). It lacks state and federal status and is on the CNPS List 2.3. It occurs in bogs and fens, and in montane streams and lake margins. It blooms between June and August. Suitable habitat occurs within and adjacent to the onsite perennial streams. No *Glyceria* species were recorded during the 2009 field surveys.

Plumas ivesia (*Ivesia sericoleuca*) is a perennial member of the rose family (Rosaceae). It is a CNPS List 1B.2 status. Plumas ivesia has a more-or-less cylindrical leaf with many leaflets and numerous white flowers. It grows in dry to moist meadows in Great Basin scrub and coniferous forests. It occurs in the northern Sierra Nevada to the Modoc Plateau, and blooms from May to September.

Due to the previous known occurrences of Plumas ivesia within the study area, our assessment included focused surveys for Plumas ivesia. During our focused surveys, we mapped and estimated numbers for Plumas ivesia populations within and adjacent to the study corridor (Figures 5c and 5d). Plumas ivesia was observed at several locations within the sagebrush scrub habitat along the proposed and alternative trail alignments north of Martis Valley Creek (refer to Figure 3, Habitat Map). Plumas ivesia is located in areas in the sagebrush scrub that are dominated by low sagebrush, where antelope brush and big sagebrush are absent. Other plant species associated with Plumas ivesia include flat-scale balsam-root, capitate sandwort, dwarf lupine, Indian paintbrush, navarretia, onion, and Bloomer's fleabane.

As shown on Figure 3, the study corridor runs through large populations of Plumas ivesia. Along the proposed trail alignment (Segments 1 and 2), there are an estimated 1,100 Plumas ivesia plants within the study corridor and an estimated 196,000 Plumas ivesia plants total in the areas shown on the map.

Wildlife

Lahontan cutthroat trout (*Oncorhynchus clarkia henshawi*) is found in a wide variety of cold-water habitats throughout the Lahontan Basin of northern Nevada, eastern California, and southern Oregon. It generally occurs in cold, clear flowing water with adjacent well-vegetated and stable stream banks (USFWS 2009). A segment of the population in the Truckee River basin also occurs in large lakes. Lahontan cutthroat trout (LCT) spawn in streams, between February and July, depending on local water conditions.

LCT were once abundant in the Truckee River basin, but populations have been significantly reduced due to a variety of factors including: habitat loss, development, water diversions, poor water quality, and competition with introduced fish species. In 1960, LCT populations in the Truckee River basin were limited to Pole Creek, Pyramid Lake, Independence Lake, and its tributary Independence Creek. Stream populations in a variety of streams and rivers in the Truckee River basin were later started through stocking in the 1980's and early 1990's. Currently, seven stream populations occupy about 8 miles of habitat comprising 2.2 percent of the historic stream distribution (Coffin and Cowan 1995).

The CNDDB lists two documented historic occurrences of LCT in the study area. These include occurrences along the mainstem of Martis Creek (occurrence no. 13) and in Middle Martis Creek (occurrence no. 11) to the east. The presence of LCT was confirmed in 1983 in the mainsteam of Martis Creek (CNDDB 2009). However, during a follow-up visit in 1993, the population was determined to likely have been extirpated. LCT was also determined to no longer be present in middle Martis Creek. Although existing literature indicates that LCT no longer exists in the drainages in the study corridor, there may be some limited potential for LCT to occur in suitable habitat areas located along Martis Creek in the future.

Sierra Nevada Yellow-legged Frog (*Rana sierrae*) occurs primarily at higher elevations of the Sierra Nevada from Plumas County to southern Tulare County (Zeiner et al., 1998). In the Sierra Nevada this species is associated with streams, lakes and ponds in montane riparian, lodgepole pine, subalpine conifer, and wet meadow habitat types. It is never encountered far from water. The Sierra Nevada yellow-legged frog (SNYLF) feeds primarily on aquatic and terrestrial invertebrates, but favors terrestrial insects. Tadpoles graze on algae and diatoms along rocky bottoms in shallow waters. Breeding and egg-laying at higher elevations usually occurs from June to August depending on local conditions. Clusters of 200 to 300 eggs are deposited in shallow water and attached to gravel or submerged rocks. Tadpoles may require up to two over-wintering periods to complete metamorphosis. Adults are commonly preyed upon by garter snakes and introduced trout.

The CNDDB (2009) documents nine occurrences of SNYLF within the project region. Many of these occurrences are associated with higher elevation lakes and streams located northwest and southeast of the study area. The closest previously documented occurrence of SNYLF is from Gray Creek, approximately 8 miles northeast of the study corridor. Within the study corridor, potential habitat occurs in association with portions of Martis Creek and its tributaries. Portions of these drainages that typically retain surface water throughout the dry season and have open, sunny embankments may provide suitable habitat for the species.

Northern leopard frog (*Lithobates pipiens*) is widely distributed across North America from the Atlantic coast to the western edge of the Great Basin (Stebbins 1985). This species is uncommon and localized in California and many populations appear to be introduced. The preferred elevation range extends from sea level to 7,000 feet (Zeiner et al., 1988). The northern leopard frog (NLF) is a highly aquatic species typically found in springs, slow flowing streams, marshes, bogs, ponds, canals, and reservoirs, usually in permanent and semi-permanent water in many habitat types (Stebbins 1985). Permanent aquatic habitat is required for NLF to breed, feed, and overwinter. In California, NLF breed and lay eggs from December through June depending on local water conditions. Females deposit clusters of eggs which attach to vegetation in shallow water. Eggs hatch within three weeks and tadpoles metamorphose in two to four months.

The CNDDB documents one occurrence of NLF in the project region. This occurrence is from a stream located approximately six to seven miles southeast of the study corridor, in the vicinity of Kings Beach (CNDDB 2009). Although NLF is considered rare within the project region, there is some limited potential for individuals to occur within the study corridor due to the presence of suitable habitat.

Northern goshawk (*Accipiter gentilis*) occurs in dense, mature conifer and deciduous forest habitats interspersed with meadows or other openings. It typically breeds in mature old-growth stands of conifer and deciduous habitats, at mid to high elevations. Nesting habitat generally includes north-facing slopes located near water. Nests are usually located in the fork of a large, horizontal limb close to the trunk, approximately 19 to 82 feet above the ground. This species often uses old nests, and will maintain alternate sites. Breeding generally begins in mid-June, with eggs being incubated approximately 36 to 41 days. Young usually fledge at about 45 days following hatching and are typically independent by 70 days.

The CNDDB (2009) reports 12 documented occurrences of northern goshawk in the project region. The closest documented nesting activity (occurrence no. 305) was reported from approximately two miles east of the study corridor, in a Jeffrey pine located just east of Monte Carlo Meadows. Based on the presence of suitable habitat and proximity to previously documented nesting activity, there is some limited potential for northern goshawk to nest in portions of the study corridor. Potential nesting habitat is likely limited to forested areas located near open areas and away from development.

Yellow warbler (*Dendoica petechia*) is an uncommon to common, summer resident in the northern Sierra Nevada. It primarily breeds in riparian woodlands up to 8,000 feet, but is also known to breed in montane chaparral, open ponderosa pine and mixed conifer habitats with substantial amounts of shrub cover. During migration, this species is found in a variety of forest and woodland habitats. Nests consist of an open cup placed approximately 2 to 16 feet above the ground in a deciduous tree or shrub. Breeding generally takes place from mid-April to early-August with peak activity occurring in June. Incubation is approximately 11 days. Young fledge at about 9 to 12 days following hatching. Young yellow warblers breed the following year after hatching.

The CNDDB documents three known occurrences of yellow warbler within the project region. The closest documented occurrences relative to the study corridor are from Burton Creek State Park to the south and Donner Lake to the west (CNDDB 2009). Suitable nesting habitat for the yellow warbler occurs in association with riparian habitats of Martis Creek and its tributaries throughout the study corridor, as well as in adjacent upland habitats with dense shrubby vegetation. Based on the presence of suitable habitat, and proximity to previously documented nesting activity, it is expected that yellow warbler has a reasonable potential for nesting within the study corridor.

Willow Flycatcher *(Empidonax trailii),* a state-listed endangered species, is a rare to locally uncommon summer resident in the Sierra Nevada. Willow flycatcher breeds from Tulare County north, along the western front of the Sierra Nevada and Cascade mountain ranges, extending to the coast in northern California. This species resides in wet meadows and montane riparian habitats, up to 8,000 feet in elevation, and most often occurs in broad, open river valleys or large mountain meadows with large areas of shrubby willows (Zeiner et al. 1990). Preferred nesting habitat for willow flycatcher consists of extensive thickets of low, dense willows located along the edges of wet meadows, ponds, or backwater areas. While territories as small as one acre in size have been documented in riparian patches, suitable nesting habitat is generally greater than 10 acres in size. The nest consists of an open cup constructed in an upright fork of a willow or other shrub, approximately 1.5 to 10 feet above the ground. Individual birds arrive from Central and South American wintering grounds in May through June. Peak egg-laying of willow flycatcher is during June. Incubation occurs for 12 to 13 days, and young fledge approximately 13 to 14 days after hatching.

The CNDDB (2009) documents numerous previous sightings of willow flycatcher throughout the project region. One documented occurrence is from a portion of Martis Creek located within the study area. This CNDDB record (occurrence No. 111) included sightings of breeding adults on several occasions between 1996 and 2004 along Martis Creek, approximately 0.5 miles upstream from the Highway 267 crossing. Habitat in the vicinity of the willow flycatcher sightings consisted of a shallow gradient channel bordered primarily by a band of willows approximately 15 to 20 feet wide. Potential nesting habitat for willow flycatcher within the study area includes scattered areas of dense willow scrub located along Martis Creek and its tributaries. Based on the presence of suitable habitat and previously documented nesting activity along Martis Creek, willow flycatcher has a reasonable potential for occurring within the study corridor on a seasonal basis.

Sierra Nevada Snowshoe hare *(Lepus americanus tahoensis)* is an uncommon resident at upper elevations of the Sierra Nevada. This subspecies of snowshoe hare is primarily found in montane riparian habitats with thickets of alders and willows, and in stands of young conifers mixed with chaparral. It prefers the younger stages of a variety of coniferous forest habitats, primarily occurring along the edges, adjacent to meadows. Individuals seek cover in dense tree or shrub thickets, where they create a shallow bowllike depression. Breeding takes place from mid-February to June or July, with a gestation period of 35 to 37 days. Two to three litters are generally produced. Diet consists of grasses, forbs, sedges, and low shrubs during the summer. In winter, they eat the needles and bark of young conifers, and leaves and twigs of willow and alder (Zeiner et al., 1990).

A few occurrences of the Sierra Nevada snowshoe hare (SNSH) have been documented in the broader region around the study area. The closest documented occurrence relative to the study area was from 1915 near the town of Truckee. The most recent occurrence, reported from 1969, was from Sagehen Creek, approximately 11 to 12 miles north/northwest of the study corridor. Within the study area, suitable habitat occurs in association with the meadows and thickets associated with portions of Martis Creek and the unnamed tributary to the east. Based on the presence of suitable habitat, the SNSH may have some limited potential for occurring within the study corridor.

Sierra Nevada Mountain Beaver (*Aplodontia rufa californica*) occurs throughout the Sierra Nevada in montane riparian habitats, consisting of dense riparian-deciduous vegetation. This mostly nocturnal species also frequents forested areas with a dense understory near water. Cool, moist microclimates are required, along with deep, friable soils for burrowing. Burrows are excavated in deep soils in dense thickets, near streams or springs. Breeding takes place from December through March, with peak activity in February. Young are born from February through June, with one litter being produced each year. Young are weaned at about 60 days. The diet of the Sierra Nevada mountain beaver (SNMB) consists of the vegetative parts of plants, including dogwood, blackberry, ferns, willows, and grasses (Zeiner et al., 1990).

The CNDDB (2009) lists 11 previously documented occurrences of the SNMB within the project region, including several occurrences in the Truckee area and along tributaries to the Truckee River. Based on the close proximity to other known occurrence and the presence of suitable habitat, it is expected that the SNMB has some limited potential for occurring within the study corridor. Suitable habitat primarily occurs along portions of Martis Creek and the unnamed tributary to the east containing dense riparian vegetation and moist, friable soils.

RECOMMENDATIONS

Waters of the United States

The study area has areas considered waters of the United States. Activities that affect these areas would require a permit from the U.S. Army Corps of Engineers pursuant to Section 404 of the federal Clean Water Act. The project would also need to obtain a water quality certification from the Regional Water Quality Control Board pursuant to Section 401 of the federal Clean Water Act. The Corps and the Regional Board would add conditions to the permits that would stipulate the appropriate mitigation, which could include one or more of the following: onsite creation, offsite creation, purchase of credits in a mitigation bank, or payments to an in-lieu fund. The precise mitigation and monitoring requirements would depend on the extent of impacts.

Streams, Pond, and Riparian Habitat

Impacts to the bed, bank, or channel of Martis Creek the minor creeks that cross the study area would require a Streambed Alteration Agreement with the CDFG. Impacts to the riparian habitat may require a Streambed Alteration Agreement with the CDFG.

Special-Status Plants

1) Due to the focused surveys for Plumas ivesia, the onsite sagebrush scrub habitat was thoroughly surveyed during the 2009 field surveys. However, in the less thoroughly surveyed habitats onsite, such as the riparian and stream habitats, moderate potential for several special-status plant species remains. Therefore, floristic rare plant survey should be conducted (according to current agency guidelines) within the wetland, riparian, and stream habitats (within the areas of potential effect) prior to construction. The floristic survey should occur in June/July and August during the possible overlap in blooming times of potentially occurring special-status species. Should any individual special-status plant species be located, the applicant shall retain a qualified botanist to develop and implement a mitigation plan in coordination with USFWS and/or CDFG; appropriate measures may include transplanting for non-federal or state listed species (such as CNPS List 1 or 2 species).

2) An estimated 1,100 Plumas ivesia plants are located in the study corridor, individuals that are part of a population of an estimated 196,000 plants in the vicinity of the trail corridor. Due to the relatively small percentage (<1%) of the population potentially affected by the proposed project, the proposed project is not expected to significantly impact the populations of Plumas ivesia in the project area. In order to ensure a less than significant impact, it is recommended that: (1) where feasible, align the trail to avoid known populations of Plumas ivesia; and (2) if Plumas ivesia plants are unavoidable and will be impacted, the applicant shall retain a qualified botanist to develop and implement a mitigation plan in coordination with the applicant, property owner, and/or CDFG. Appropriate measures may include soil salvage and placement at a nearby appropriate location.

Special-Status Wildlife

1) The potential for occurrence of Lahontan cutthroat trout within drainages crossing the study corridor is considered low, based on existing records (CNDDB 2009; Coffin and Cowan 1995). However, Martis Creek and associated tributaries may provide suitable habitat for the species and individuals could occupy portions of the system in the future. Well in advance of commencement of proposed construction activities, the USFWS Nevada Field Office should be contacted to initiate informal consultation and determine appropriate measures for avoiding impacts to potential LCT habitat within and downstream of the study corridor and identify any potential permitting responsibilities.

2) Portions of Martis Creek and its tributaries provide potential habitat for Sierra Nevada yellow-legged frog (SNYLF), as well as potential habitat for northern leopard frog (NLF). All disturbance of potential habitat for these species should be avoided to the extent feasible, including all perennial streams and adjacent wetland habitat within the study area. Any work conducted along ephemeral streams of the study corridor should be implemented during the driest part of the season. If it is determined that any disturbance of perennial drainages within the study corridor would be required as part of construction activities, the following measures should be implemented:

- Retain a biological monitor throughout the duration of construction activities in the vicinity of affected aquatic habitat, to ensure that disturbance of SNYLF and its habitat is minimized or avoided. If individuals are detected within a proposed construction area, the CDFG should be contacted immediately to determine appropriate avoidance measures including, but not limited to, moving individuals to appropriate offsite locations.
- Restore all aquatic habitat and wetland areas that experience temporary disturbance as a result of construction activities, to pre-project conditions, where feasible.

3) Portions of the study corridor provide suitable nesting habitat for northern goshawk, as well as for a variety of other raptors which have no formal state or federal listing status. At a minimum, forested habitats within the study corridor have potential to support nesting of the following species known from the region: northern goshawk, Cooper's hawk, and red-tailed hawk. Snags located throughout the study area also provide suitable nesting habitat for American kestrel and a variety of owls. Project implementation could therefore result in disturbance of breeding and nesting of some of the identified species if construction occurs at any time during the typical breeding season (approximately March 1 through August 31). Take of any active raptor nest is prohibited under California Fish and Game Code Section 3503.5. To avoid disturbance of active nests, a pre-construction survey should be conducted by a qualified biologist if construction commences at any time during the typical nesting season. Pre-construction surveys should be conducted no more than 30 days prior to initiation of proposed construction activities. Survey results should then be submitted to the CDFG. If active raptor nests are found on or immediately adjacent to proposed construction areas, consultation should be initiated with the CDFG to determine appropriate avoidance measures. Depending on the species at issue, protective measures would likely include establishing an appropriate buffer zone around each active nest found, and subsequent monitoring of the nest until young have fledged.

4) Potential nesting habitat for willow flycatcher and yellow warbler occurs in scattered locations along various drainages throughout the study area. In addition, nesting activities of willow flycatcher have previously been documented by the CNDDB (2009) in association with riparian scrub of Martis Creek in the southwestern portion of the study area. To avoid impacts to willow flycatcher and potential nesting habitat, all disturbance of riparian scrub vegetation should be avoided, to the extent feasible. In addition, any work conducted in the general vicinity of potential nesting habitat should be conducted following the typical breeding season for both willow flycatcher and yellow warbler (nesting season is spring and early summer; fall is best time for habitat impacts). Any disturbance of breeding or nesting willow flycatcher or its habitat would require a "take" permit under the California Endangered Species Act. If disturbance of potential habitat for willow flycatcher will likely be required as part of the project, CDFG should be contacted well in advance of project implementation to determine if protocol-level surveys are necessary and identify any permitting requirements and mitigation responsibilities.

5) Portions of the study corridor provide potential habitat for Sierra Nevada snowshoe hare (SNSH) and Sierra Nevada mountain beaver (SNMB), although the potential for occurrence of SNSH is considered low due to the species' rarity in the region. Suitable habitat for SNSH occurs in association with willow thickets and adjacent meadows in the vicinities of Martis Creek and its tributary to the east. Potential habitat for SNMB may include areas of dense riparian vegetation containing moist, friable soils associated with Martis Creek and the unnamed tributary to the east. To the extent feasible, avoid any new ground disturbance within and directly adjacent to areas that provide potential habitat for SNMB and SNSH. If areas of potential habitat cannot be avoided, retain a qualified biologist to survey the proposed area of disturbance prior to commencement of construction. If evidence of occurrence of either of these species is found, CDFG should be contacted to determine appropriate avoidance or mitigation measures.

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Appendix A.
Plant Species Observed Within the Martis Valley Regional Trail Study Corridor

Appendix A

Plant Species Observed Within the Martis Valley Trail Study Area

Ferns and Allies

Dennstaedtiaceae

Pteridium aquilinum var. pubescens	Bracken fern

Equisetaceae

Equisetum arvense	Common horsetail

Woodsiaceae

Athyrium filix-femina var. cyclosorum	Western lady fern

Gymnosperms

Cupressaceae

Juniperus occidentalis	Western juniper

Pinaceae

Abies concolor	White fir
Pinus contorta subsp. murrayana	Lodgepole pine
Pinus jeffreyi	Jeffrey pine
Pinus ponderosa	Pacific ponderosa pine

Angiosperms - Dicots

Amaranthaceae

**Chenopodium album*	White pigweed

Apiaceae (Umbelliferae)

Heracleum lanatum	Cow parsnip
Lomatium nevadense var. nevadense	Nevada lomatium
Perideridia parishii subsp. latifolia	Parish's yampah

Apocynaceae

Apocynum androsaemifolium	Bitter dogbane

Asteraceae (Compositae)

Agoseris sp.	Agoseris
Arnica parryi	Parry's arnica
Artemisia arbuscula subsp. arbuscula	Low sagebrush
Artemisia tridentata	Big sagebrush
Balsamorhiza hookeri	Flat-scale balsam-root
Cirsium scariosum var. americanum	Stemless thistle
Ericameria nauseosa	Rubber rabbitbrush
Erigeron bloomeri var. bloomeri	Bloomer's fleabane
Eurybia integrifolia	Thickstem aster
Gnaphalium palustre	Western marsh cudweed
Madia glomerata	Mountain tarweed
Psilocarphus brevissimus var. brevissimus	Dwarf woolly-heads
Senecio integerrimus	Mountain butterweed

* Indicates a non-native species

Symphyotrichum spathulatum var. spathulatum	Western mountain aster
**Taraxacum officinale*	Common dandelion
**Tragopogon dubius*	Yellow salsify
Wyethia mollis	Mountain mule's-ears

Betulaceae

Alnus incana subsp. tenuifolia	Mountain alder

Boraginaceae

Cryptantha affinis	Cryptantha
Phacelia hastata subsp. hastata	Phacelia
Plagiobothrys hispidulus	Popcornflower

Brassicaceae (Cruciferae)

Erysimum capitatum subsp. capitatum	Western wallflower
Rorippa sinuata	Spreading yellow cress

Campanulaceae

Porterella carnulosa	Fleshy porterella

Caryophyllaceae

Eremogone congesta var. congesta	Capitate sandwort
Silene douglasii	Campion
Stellaria longipes var. longipes	Long-stalk starwort

Ericaceae

Arctostaphylos patula	Greenleaf manzanita

Fabaceae (Leguminosae)

Astragalus purshii var. tinctus	Locoweed
Lotus purshianus var. purshianus	Spanish-clover
Lupinus lepidus var. confertus	Dwarf lupine
Trifolium longipes var. elmeri	Long-stalk clover
**Trifolium repens*	White clover

Lamiaceae (Labiatae)

Monardella odoratissima subsp. pallida	Monardella

Linaceae

Linum lewisii var. lewisii	Prairie flax

Loasaceae

Mentzelia dispersa	Blazing star

Onagraceae

Epilobium brachycarpum	Summer cottonweed
Epilobium densiflorum	Dense-flower spike-primrose

Orobanchaceae

Castilleja pilosa	Indian paintbrush
Orobanche fasciculata	Clustered broom-rape
Orthocarpus cuspidatus subsp. cryptanthus	Orthocarpus

Phrymaceae

Mimulus breweri	Monkeyflower
Mimulus guttatus	Common monkeyflower

Plantaginaceae

Collinsia parviflora	Blue-eyed Mary

* Indicates a non-native species

Penstemon rydbergii var. oreocharis	Rydberg's beardtongue
**Veronica anagallis-aquatica*	Water speedwell

Polemoniaceae

Navarretia capillaris	Navarretia
Navarretia intertexta subsp. propinqua	Great Basin navarretia
Navarretia leptalea subsp. bicolor	Navarretia
Polemonium occidentale	Western Jacob's-ladder

Polygonaceae

Eriogonum nudum	Nude buckwheat
Eriogonum umbellatum var. nevadense	Nevada buckwheat
Polygonum douglasii	Douglas' knotweed
Polygonum polygaloides subsp. kelloggii	Polygala knotweed
Rumex salicifolius	Willow dock

Portulacaceae

Claytonia rubra subsp. rubra	Claytonia

Ranunculaceae

Delphinium nuttallianum	Dwarf larkspur
Ranunculus occidentalis	Western buttercup

Rhamnaceae

Ceanothus prostratus	Mahala mat
Ceanothus velutinus var. velutinus	Tobacco brush

Rosaceae

Geum macrophyllum	Bigleaf avens
Ivesia sericoleuca	Plumas ivesia
Potentilla glandulosa	Glandular cinquefoil
Purshia tridentata var. tridentata	Antelope bush
**Rosa sp.*	Wild rose
Sanguisorba occidentalis	Western burnet

Rubiaceae

Kelloggia galioides	Kelloggia

Salicaceae

Populus tremuloides	Quaking aspen
Salix geyeriana	Geyer's willow
Salix lemmonii	Lemmon's willow
Salix sp.	Willow

Scrophulariaceae

**Verbascum thapsus*	Woolly mullein

Violaceae

Viola purpurea subsp. purpurea	Mountain violet

Angiosperms -Monocots

Agavaceae

Camassia quamash subsp. breviflora	Common camassia

Alliaceae

Allium campanulatum	Onion

Cyperaceae

Carex sp.	Sedge

Juncaceae

Juncus balticus	Baltic rush
Juncus bufonius	Toad rush
Juncus sp.	Rush

Poaceae (Gramineae)

**Agropyron cristatum*	Crested wheatgrass
**Bromus tectorum*	Cheat grass
**Dactylis glomerata*	Orchard grass
Danthonia unispicata	One-spike oatgrass
Deschampsia cespitosa subsp. cespitosa	Tufted hairgrass
Deschampsia danthonioides	Annual hairgrass
Elymus elymoides	Squirreltail
Elymus glaucus	Blue wildrye
**Elytrigia repens*	Quackgrass
Hordeum brachyantherum	Meadow barley
Muhlenbergia richardsonis	Mat muhly
Phleum alpinum	Mountain timothy
**Phleum pratense*	Common timothy
**Poa bulbosa subsp. vivipara*	Bulbous bluegrass
**Poa pratensis subsp. pratensis*	Kentucky bluegrass
Poa secunda	Secund bluegrass

Appendix B.
Wildlife Species Observed Within the Martis Valley Regional Trail Study Corridor

Appendix B
Wildlife Species Observed Within the Martis Valley Trail Study Area

Reptiles

Northern sagebrush lizard	*Sceloporus graciosus graciosus*

Birds

Turkey vulture	*Cathartes aura*
Osprey	*Pandion haliaetus*
American kestrel	*Falco sparverius*
Northern flicker	*Colaptes auratus*
Western wood-pewee	*Contopus sordidulus*
Dusky flycatcher	*Empidonax oberholseri*
Steller's jay	*Cyanocitta stelleri*
Common raven	*Corvus corax*
Cliff swallow	*Petrochelidon pyrrhonota*
Mountain chickadee	*Poecile gambeli*
Red-breasted nuthatch	*Sitta canadensis*
Brown creeper	*Certhia americana*
American robin	*Turdus migratorius*
Yellow-rumped warbler	*Dendroica coronata*
Western tanager	*Piranga ludoviciana*
Chipping sparrow	*Spizella passerina*
Brewer's sparrow	*Spizella breweri*
Dark-eyed junco	*Junco hyemalis*

Mammals

Belding's ground squirrel	*Spermophilus beldingi*
Golden-mantled ground squirrel	*Spermophilus lateralis*
Douglas' squirrel	*Tamiasciurus douglasii*
Mountain pocket gopher	*Thomomys monticola*
Coyote	*Canis latrans*
Mule deer	*Odocoileus hemionus*

Appendix C.
Special-Status Plant Species Known to Occur in the Region of the Martis Valley Regional Trail Study Corridor

Appendix C

Special-Status Plant Species Known to Occur in the Region of the Martis Valley Trail Study Area

Family / Taxon / Common Name	Status*	Flowering Period	Habitat	Probability on Project Site
Asteraceae (Compositae)				
Erigeron eatonii nevadincola Nevada daisy	Fed: - State: - CNPS: List 2.3	May-July	Great Basin scrub; lower montane coniferous forest; pinyon and juniper woodland (rocky).	Unlikely. Last seen in project region in 1915 (CNDDB 2009). Suitable habitat occurs onsite; however, it would have been observed during our extensive surveys in the sagebrush scrub during focused surveys for Plumas ivesia.
Erigeron miser Starved daisy	Fed: - State: - CNPS: List 1B.3	June-October	Upper montane coniferous forest (rocky). 1840-2620 m.	None. Micro-habitat (steep, rocky granitic outcrops) not within the study area. Moreover, found at higher elevations than those within the study area.
Brassicaceae (Cruciferae)				
Arabis rigidissima demota Carson Range rock cress	Fed: - State: - CNPS: List 1B.2	August-August	Broad-leaved upland forest; upper montane coniferous forest; [rocky],	None. Occurs above 7,300 feet (too high for study area).
Rorippa subumbellata Tahoe yellow cress	Fed: FC State: CE CNPS: List 1B.1	June-September	Lower montane coniferous forest; meadows; [decomposed granitic beaches].	None. Occurs along Lake Tahoe. No suitable habitat in the study area.
Bruchiaceae				
Bruchia bolanderi Bolander's bruchia	Fed: - State: - CNPS: List 2.2	May-July	Coniferous forest (meadows and seeps, damp soil). 1700-2500 m.	Possible. Suitable habitat onsite. Moss that grows on damp soil. One occurrence in project region.
Cyperaceae				
Carex constanceana Constance's sedge	Fed: - State: - CNPS: List 1B.1	August-August	Subalpine coniferous forest (sandy, mesic).	Possible. Suitable habitat occurs in the stream and wetland habitats onsite.

Appendix C

Special-Status Plant Species Known to Occur in the Region of the Martis Valley Trail Study Area

Family Taxon Common Name	Status*	Flowering Period	Habitat	Probability on Project Site
Carex limosa Mud sedge	Fed: - State: - CNPS: List 2.2	June-August	Bogs and fens [lower montane coniferous forest; upper montane coniferous forest].	Possible. Suitable habitat occurs in the stream and wetland habitats onsite.
Droseraceae				
Drosera anglica Narrow-leaved sundew	Fed: - State: - CNPS: List 2.3	June-August	Bogs and fens; meadows.	Unlikely. Very marginally suitable habitat in the wetland meadow near Martis Creek. No Drosera species observed during surveys. In the project region, Drosera anglica is found in fens, which do not occur onsite.
Lamiaceae (Labiatae)				
Scutellaria galericulata Marsh skullcap	Fed: - State: - CNPS: List 2.2	June-September	Lower montane coniferous forest; meadows (mesic); marshes and swamps.	Unlikely. Only record in the project region is from 1885 (CNDDB 2009). Mostly occurs in marshes and swamps, which are not located in the study area.
Malvaceae				
Sphaeralcea munroana Munroe's desert mallow	Fed: - State: - CNPS: List 2.2	May-June	Great Basin scrub.	Unlikely. Suitable habitat occurs onsite; however, it would have been observed during our extensive surveys in the sagebrush scrub during focused surveys for Plumas ivesia. Only record in the project region is from 1922.
Meesiaceae				
Meesia triquetra Three-ranked hump-moss	Fed: - State: - CNPS: List 4.2	August-September	Bogs and fens; meadows and seeps; upper montane coniferous forest (mesic soil). 1300-2500 m.	Possible. Suitable habitat onsite.
Meesia uliginosa Broad-nerved hump-moss	Fed: - State: - CNPS: List 2.2	August-September	Meadows and seeps; upper montane coniferous forest (damp soil). 1300-2500 m.	Possible. Suitable habitat onsite.

Appendix C

Special-Status Plant Species Known to Occur in the Region of the Martis Valley Trail Study Area

Family Taxon Common Name	Status*	Flowering Period	Habitat	Probability on Project Site
Ophioglossaceae				
Botrychium crenulatum Scalloped moonwort	Fed: - State: - CNPS: List 2.2	June-July	Lower montane coniferous forest; bogs and fens; meadows; marshes and swamps (freshwater).	Possible. Suitable habitat onsite.
Botrychium lunaria Common moonwort	Fed: - State: - CNPS: List 2.3	August-August	Meadows; subalpine coniferous forest; upper montane coniferous forest.	None. Occurs above 9,000 feet (outside of study area elevation).
Botrychium minganense Mingan moonwort	Fed: - State: - CNPS: List 2.2	July-August	Lower montane coniferous forest (mesic).	Possible. Suitable habitat onsite.
Poaceae (Gramineae)				
Glyceria grandis American mannagrass	Fed: - State: - CNPS: List 2.3	June-August	Bogs and fens; meadows; marshes and swamps (streambanks and lake margins).	Possible. Suitable habitat occurs in streams and wetlands.
Polygonaceae				
Eriogonum umbellatum torreyanum Donner Pass buckwheat	Fed: - State: - CNPS: List 1B.2	July-September	Meadows; upper montane coniferous forest; [volcanic, rocky].	Unlikely. Very marginal micro-habitat onsite (steep slopes and ridgetops; in bare or sparsely vegetated areas). Only observed Eriogonum umbellatum var. nevadense.
Portulacaceae				
Claytonia megarhiza Fell-fields claytonia	Fed: - State: - CNPS: List 2.3	July-August	Alpine boulder or rock; subalpine coniferous forest (rocky).	None. Occurs above 8,500 feet (outside of study area elevation).

Appendix C

Special-Status Plant Species Known to Occur in the Region of the Martis Valley Trail Study Area

Family Taxon Common Name	Status*	Flowering Period	Habitat	Probability on Project Site
Lewisia longipetala Long-petaled lewisia	Fed: - State: - CNPS: List 1B.3	July-August	Alpine boulder or rock; subalpine coniferous forest (mesic, rocky/granitic).	None. Occurs above 8,100 feet (outside of study area elevation). Suitable habitat not onsite.
Potamogetonaceae				
Potamogeton filiformis Slender-leaved pondweed	Fed: - State: - CNPS: List 2.2	May-July	Marshes and swamps (assorted shallow freshwater).	Possible. Suitable habitat in onsite perennial creeks.
Rhamnaceae				
Rhamnus alnifolia Alder buckthorn	Fed: - State: - CNPS: List 2.2	May-July	Upper and lower montane coniferous forests; meadows and seeps; riparian scrub. 1370-2130 meters.	Possible. Suitable habitat onsite in riparian scrub.
Rosaceae				
Ivesia sericoleuca Plumas ivesia	Fed: - State: - CNPS: List 1B.2	May-September	Great Basin scrub; lower montane coniferous forest; meadows and seeps; vernal pools; [vernally mesic, usually volcanic].	Occurs. Observed in sagebrush scrub habitat onsite.

***Status**

Federal:
FE - Federal Endangered
FT - Federal Threatened
FPE - Federal Proposed Endangered
FPT - Federal Proposed Threatened
FC - Federal Candidate

State:
CE - California Endangered
CT - California Threatened
CR - California Rare
CSC - California Species of Special Concern

CNPS (California Native Plant Society - List.RED Code):
List 1A - Extinct
List 1B - Plants rare, threatened, or endangered in California and elsewhere
List 2 - Plants rare, threatened, or endangered in California, more common elsewhere
List 3 - Plants about which more information is needed, a review list
List 4 - Plants of limited distribution, a watch list
RED Code
1 - Seriously endangered (>80% of occurrences threatened)
2 - Fairly endangered (20 to 80% of occurrences threatened)
3 - Not very endangered (<20% of occurrences threatened)

Appendix D.
Special-Status Wildlife Species Known to Occur in the Region of the Martis Valley Regional Trail Study Corridor

Appendix D

Special-Status Wildlife Species Known to Occur in the Region of the Martis Valley Trail Study Area

	Status*	Habitat	Probability on Project Site
Fish			
Lahontan cutthroat trout *Oncorhynchus clarki henshawi*	Fed: FT State: - Other: -	Historically found in all cold waters of the Lahontan Basin, including Independence Lake.	Possible. Suitable habitat occurs in association with Martis Creek, and some tributaries. Previously documented occurrences in mainstem of Martis Creek and west Martis Creek.
Amphibians			
Sierra Nevada yellow-legged frog *Rana sierra*	Fed: FC State: CSC Other: *	Associated with streams, lakes, and ponds in montane riparian, lodgepole pine, subalpine conifer and wet meadow habitats. Occurs in the northern and central portions of the Sierra Nevada at elevations above 4,500 feet. Always near water.	Possible. Marginal-quality habitat occurs on site in association with Martis Creek and some tributaries. Several previously documented occurrences in project region, mostly from alpine lakes and streams.
Northern leopard frog *Rana pipiens*	Fed: - State: CSC Other:	Known from a variety of aquatic habitats. Endemic populations potentially occur in Truckee River drainage.	Possible. Potential habitat occurs in association with Martis Creek and tributaries. Closest documented occurrence is from Kings Beach area, north shore Lake Tahoe.
Birds			
Bald eagle *Haliaeetus leucocephalus*	Fed: - State: CE Other: *	Occurs along shorelines, lake margins, and rivers. Nests in large, old-growth or dominant trees with open branches.	Unlikely. Species unlikely to nest on site but may periodically venture through site during foraging activities.
Northern goshawk *Accipiter gentilis*	Fed: - State: CSC Other: *	Dense, mature coniferous forests, most typically dense fir stands in the Sierra Nevada mountains.	Possible. Previously documented nesting activity approximately 1 mile east of the project site near Monte Carlo Meadows. Potential nesting in project area.
Greater sandhill crane *Grus canadensis tabida*	Fed: - State: CT Other: CFP	Nesting habitat in NE California includes wet meadows that are often interspersed with emergent vegetation. Winters in the Central Valley using irrigated pastures as habitat.	Unlikely. No suitable breeding habitat present within or near the project site. No known occurrences recorded in vicinity of project area. May visit site during migration.
Black swift *Cypseloides niger*	Fed: - State: CSC Other: *	Breeds on steep, usually wet cliffs in interior canyons and along the ocean coast.	None. No suitable nesting habitat observed within project area.

Appendix D

Special-Status Wildlife Species Known to Occur in the Region of the Martis Valley Trail Study Area

	Status*	Habitat	Probability on Project Site
Willow flycatcher *Empidonax traillii*	Fed: - State: CE Other: *	Uncommon summer resident in upper elevation montane riparian and wet meadow areas, usually with a thick growth of shrubby willow.	Likely. Previously documented nesting activity along Martis Creek, approximately 0.5 mile upstream of Highway 267. Suitable breeding habitat occurs in scattered areas along Martis Creek and tributaries.
Yellow warbler *Dendroica petechia*	Fed: - State: CSC Other: *	Breeds in riparian vegetation throughout California; populations in Sacramento and San Joaquin valleys are declining. Common in eastern Sierran riparian habitats below 8,000 feet.	Possible. Three previously documented occurrences in project region. Suitable nesting habitat occurs along portions of Martis Creek and tributaries.
Mammals			
Sierra Nevada snowshoe hare *Lepus americanus tahoensis*	Fed: - State: CSC Other: -	Montane riparian habitats with thickets of alders and willows and in stands of young conifers interdispersed with chaparral. Early seral stages of mixed conifer, subalpine conifer, red fir, Jeffrey pine, lodgepole pine, and aspen, usually along edges.	Possible. Potential habitat occurs in scattered locations on site including riparian corridors of Martis Creek and tributaries.
White-tailed jackrabbit *Lepus townsendii*	Fed: - State: CSC Other: -	Sagebrush, subalpine conifer, juniper, alpine dwarf-shrub, and perennial grassland habitats. Also found in low sagebrush, wet meadow, and early successional stages of conifer habitats.	Unlikely. Suitable habitat present on site but very rare in region. Only documented occurrence in region is from 1920 in vicinity of Tahoe City.
Sierra Nevada mountain beaver *Aplodontia rufa californica*	Fed: - State: CSC Other: -	Dense decidious trees and shrubs in riparian habitat with an abundant source of water.	Possible. Several known occurrences in the Truckee region and along tributaries to Truckee River. Suitable habitat may occur in vicinity of portions of Martis Creek.
Sierra Nevada red fox *Vulpes vulpes necator*	Fed: - State: CT Other: *	Occurs in conifer forests and rugged alpine landscape of the Sierra Nevada and Cascade ranges between 4,000 feet and 12,000 feet, most often above 7,000 feet.	Unlikely. Very rare within project region. Known from higher elevations with minimal human presence.
Pacific fisher *Martes pennanti pacifica*	Fed: FC State: CSC Other: *	Occurs in intermediate to large-tree stage coniferous forests and riparian woodlands with a high percent level of canopy closure.	Unlikely. Suitable habitat does not occur within the project site. Prefers dense coniferous forests at higher elevations, with minimal human disturbance. Only one previously documented occurrence in project region.
California wolverine *Gulo gulo luteus*	Fed: - State: CT Other: *	Habitat generally consists of open terrain above the timberline, but has been observed at 1500 feet.	Unlikely. Suitable habitat does not occur within or near the project site and no documented occurrences in vicinity. Known from higher elevations with minimal human presence.

Appendix D

Special-Status Wildlife Species Known to Occur in the Region of the Martis Valley Trail Study Area

	Status*	Habitat	Probability on Project Site
American badger *Taxidea taxus*	Fed: - State: CSC Other: -	Occurs in dry, open soils in herbaceous, shrub, and forest habitats. Needs friable, uncultivated soil. Preys on rodents.	Unlikely. Only documented occurrence in project region is from near Sierraville to north. Some limited potential for species to occur on site.

***Status**

Federal:	State:	Other:
FE - Federal Endangered FT - Federal Threatened FPE - Federal Proposed Endangered FPT - Federal Proposed Threatened FC - Federal Candidate FPD - Federal Proposed for Delisting	CE - California Endangered CT - California Threatened CR - California Rare CC - California Candidate CFP - California Fully Protected CSC - California Species of Special Concern	Some species have protection under the other designations, such as the California Department of Forestry Sensitive Species, Bureau of Land Management Sensitive Species, U.S.D.A. Forest Service Sensitive Species, and the Migratory Bird Treaty Act. Raptors and their nests are protected by provisions of the California Fish and Game Code. Certain areas, such as wintering areas of the monarch butterfly, may be protected by policies of the California Department of Fish and Game.

APPENDIX C2

Biological Resources Assessment Supplement

October 3, 2011

Martis Valley Trail Segment 3F Biological Resources Addendum

This report addresses biological resources for a proposed segment of the Martis Valley Trail within the Northstar Resort property. The study area consists of the corridor identified for the proposed alignment of Segment "3F" of the trail and runs generally south to north from near State Highway 267 at Northstar Drive to near the Village at Northstar and Ski View Road and One Village Place. The length of the trail alignment is approximately 1.4 miles (Figure 1). An aerial photo of the alignment area is provided in Figure 2.

A biological resources assessment report was conducted by North Fork Associates (NFA) for the entire trail system in 2009 and the results presented in a report dated October 15, 2009. This letter report is the result of a one day survey on July 7, 2011 and is an addendum to the 2009 report and only addresses biological issues of the Segment 3F alignment. A wetland delineation of the Segment 3F study area was also conducted in July 2011 and those results are included under separate cover in the wetland delineation report and map for the entire project.

No trail presently exists along the proposed trail alignment. Portions of the alignment cross disturbed areas but the alignment generally is situated in the coniferous forest.

Biological Communities

Alignment 3F traverses through two primary habitat types, coniferous forest and riparian (see Figure 3 – Site Photos). Figure 4 shows the distribution and total area of habitat types observed within the survey area. Coniferous forest is mostly a mature stand of conifer dominated by Jeffery pine and white fir. Western white pine and lodgepole pine are also common throughout the area. The shrub layer is relatively sparse and contains greenleaf manzanita, mahala mat, serviceberry, salmonberry, gooseberry, and antelope brush. The herbaceous cover is also relatively sparse and includes blue wildrye, quackgrass, common cinquefoil, bitter dogbane, and mountain mule's-ears. Much of the forest understory has been thinned, presumably to reduce fire potential.

There are two riparian areas near the southern end and within the Alternative 3F alignment. Represented by Perennial Stream 2, this stream supports a band of riparian shrubs, primarily mountain alder and willow. The channel is relatively confined and the riparian zone does not extend laterally much beyond the bank full line. Water was flowing at approximately 20 cfs during the July site visit. The channel width at the proposed trail crossing site is approximately twelve feet and is rocky and unvegetated.

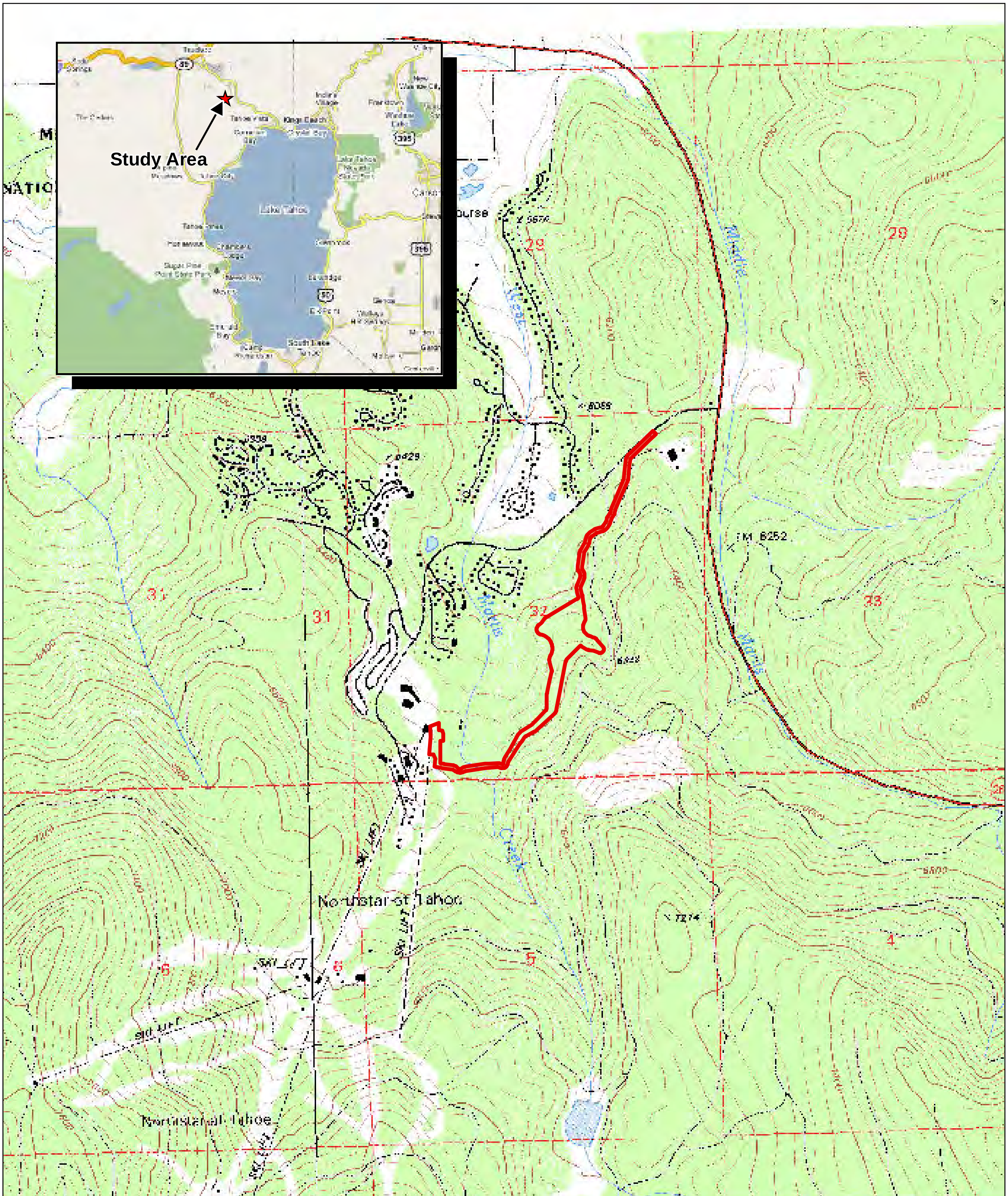
The second riparian area is represented by six small channels that all flow through one area of the proposed trail alignment (Intermittent Streams 6-11). These channels are associated with West Martis Creek. All the channels flow north and occur within the coniferous forest. Intermittent Stream 6 is the largest of these channels and was carrying the most water. Intermittent Streams 7-11 were all similar in size and flow. Riparian vegetation is primarily mountain alder and willow but there are also many aspen and black cottonwood along the corridors. These low volume narrow channels support abundant aquatic vegetation where the dry season water wets the soil. Species include common monkeyflower, arrowleaf groundsel, sedges and rushes, rein orchid, and duckweed (a floating aquatic species).

Wildlife species observed along the alignment included red-breasted nuthatch, northern flicker, mountain chickadee, dark-eyed junco, western tanager, and yellow-rumped warbler. We also observed or observed sign of mule deer, coyote, raccoon, and long-eared chipmunk.

We queried the current CNDDB to determine if any additional data had been added since 2009. Figure 5 shows CNDDB species occurrence records within 5 miles of the study area. One new species has been added to the database for the project region since 2009: woolly-fruited sedge (*Carex lasiocarpa*). This species should be added to those already identified in Table 2, *Special-Status Species That Could Occur Within the Martis Valley Regional Trail Study Corridor*, included in NFA's October 15, 2009 report for the project area. Woolly-fruited sedge is a California Native Plant Society Rank 2 species. Rank 2 species are considered rare, threatened, or endangered in California, but are more common elsewhere. This species typically occurs in montane bogs and fens, marshes, swamps, and other areas with standing water. Potential habitat for this species occurs along low gradient segments of drainages in the project area. Besides this species, we believe there are no other special status species to consider for this alignment. This species was not observed within the study area during field surveys conducted.

Conclusions

We observed habitats and assessed the Alternative 3F alignment for the presence or absence of special status species, or for the potential for occurrence of special status species. We did not observe any special status species within the alignment on July 7, 2011 but this survey was not exhaustive. The alignment is a subset of many of the same habitat types we assessed in 2009. Sensitive habitat includes all the stream zones. We recommend following the conclusions and recommendations within the October 15, 2009 report as they match what we would consider for this alignment. The following pages include figures referenced in this document.



Segment 3F Study Area

Study Area Map Location
USGS Base Map: Martis Peak, CA
7.5 minute topographic quadrangle
Section: 32
Township: 17N
Range: 17E

N

0 500 1,000 2,000

1 inch = 2,000 feet

north fork associates

Figure 1

Site & VIcinity Map
Segment 3F
Martis Valley Regional Trail
Placer County, California

Photo 1. Typical view through coniferous forest in northern portion of Segment 3F corridor.

Photo 2. Typical view through coniferous forest in central portion of Segment 3F corridor.

Photo 3. Riparian area along small channel (Intermittent Stream 8). Shrubs are mostly mountain alder.

north fork associates

Photo Date: July 7, 2011

Figure 3

SITE PHOTOS

Segment 3F

Martis Valley Regional Trail

Placer County, California

N

0 375 750

1 inch = 750 feet

Segment 3F Study Area

Imagery: ESRI 2009

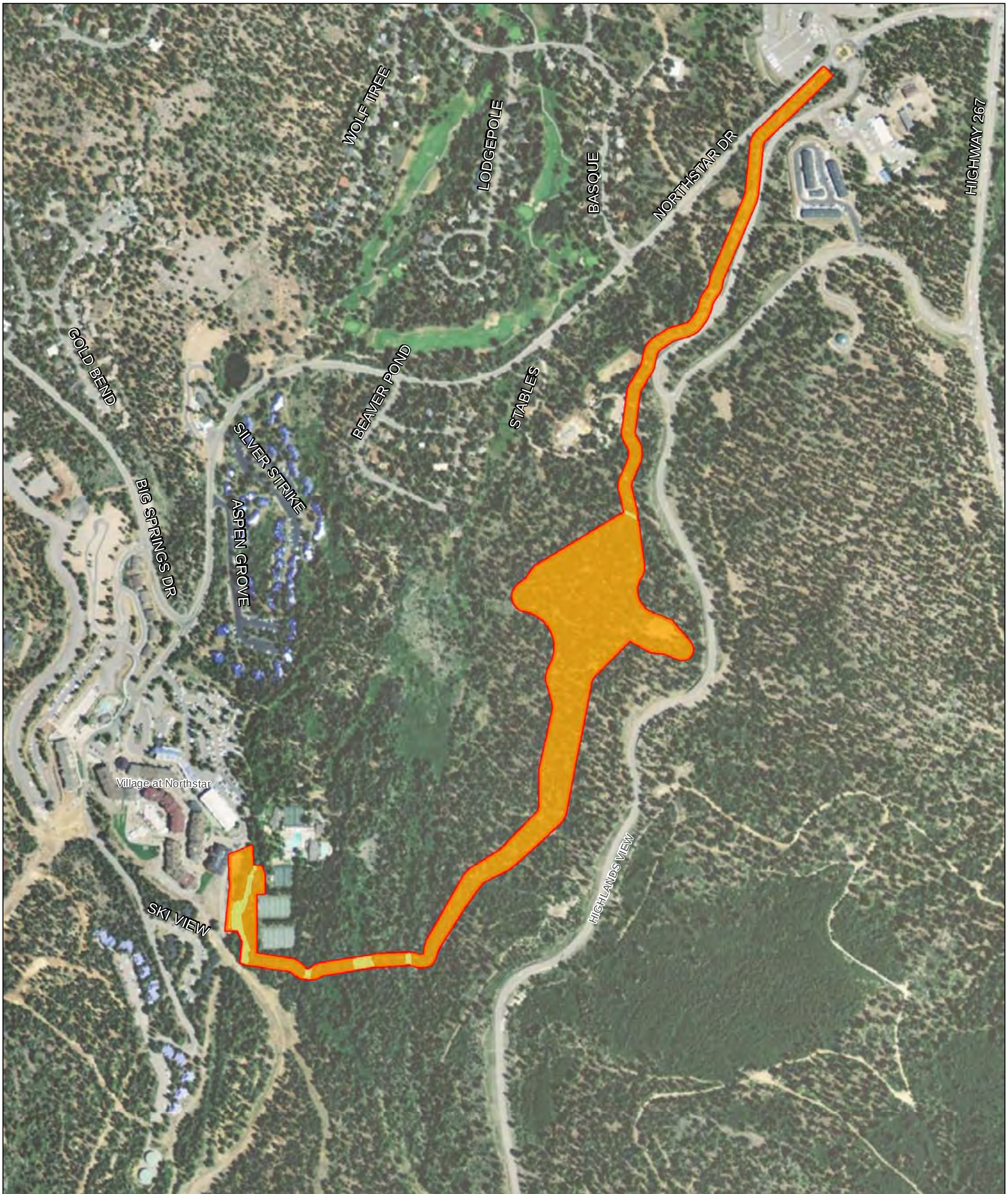
Figure 2

Aerial Photo

Segment 3F

Martis Valley Regional Trail

Placer County, California



Segment 3F Study Corridor (24.5 acres)

Coniferous Forest (23.70 ac.)

Riparian (0.82 ac.)

Imagery: ESRI 2009

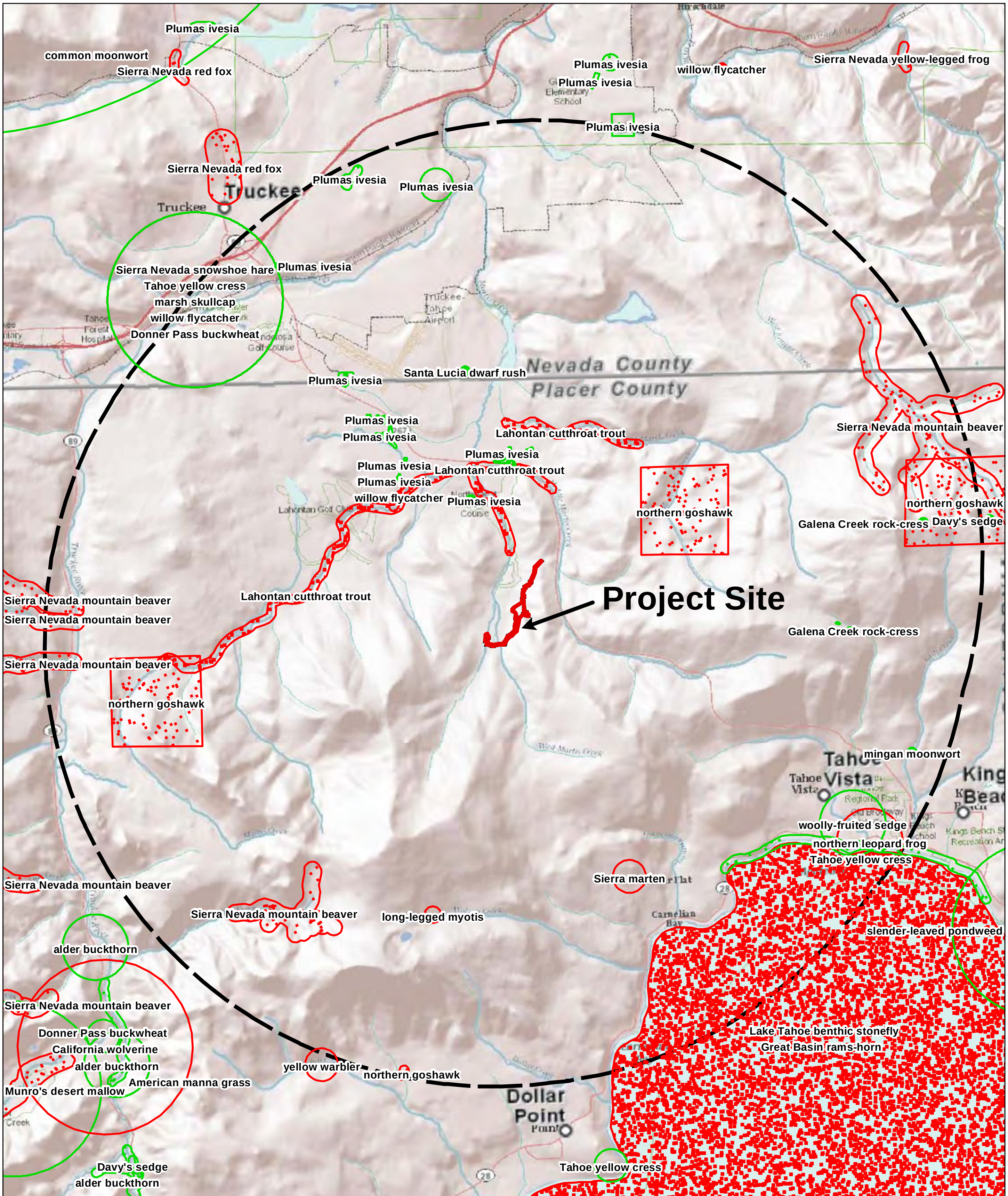
Figure 4

Habitat Map

Segment 3F

Martis Valley Regional Trail

Placer County, California



north fork associates

N

0 4,000 8,000

1 inch = 8,000 feet

Segment 3F Study Area

5-mile Buffer of Study Area

Data: California Natural Diversity Database
California Department of Fish and Game
Map: 2009 ESRI

Figure 5

CNDDB Species Occurrence Data

Segment 3F

Martis Valley Regional Trail

Placer County, California

APPENDIX C3

Wetland Delineation

WETLAND DELINEATION
FOR THE

MARTIS VALLEY REGIONAL TRAIL STUDY CORRIDOR

PLACER COUNTY, CALIFORNIA

Prepared for:
NORTHSTAR COMMUNITY SERVICES DISTRICT
908 Northstar Drive
Northstar, CA 96161
Contact: Mike Staudenmayer

Prepared under contract to:
AUERBACH ENGINEERING CORPORATION
3092 N. Lake Boulevard
Tahoe City, CA 96145
Contact: Wally Auerbach

Prepared by:

north fork associates
110 Maple Street, Auburn, California 95603
(530) 887-8500

OCTOBER 14, 2009

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WETLAND DELINEATION
FOR THE
MARTIS VALLEY REGIONAL
TRAIL STUDY CORRIDOR

INTRODUCTION

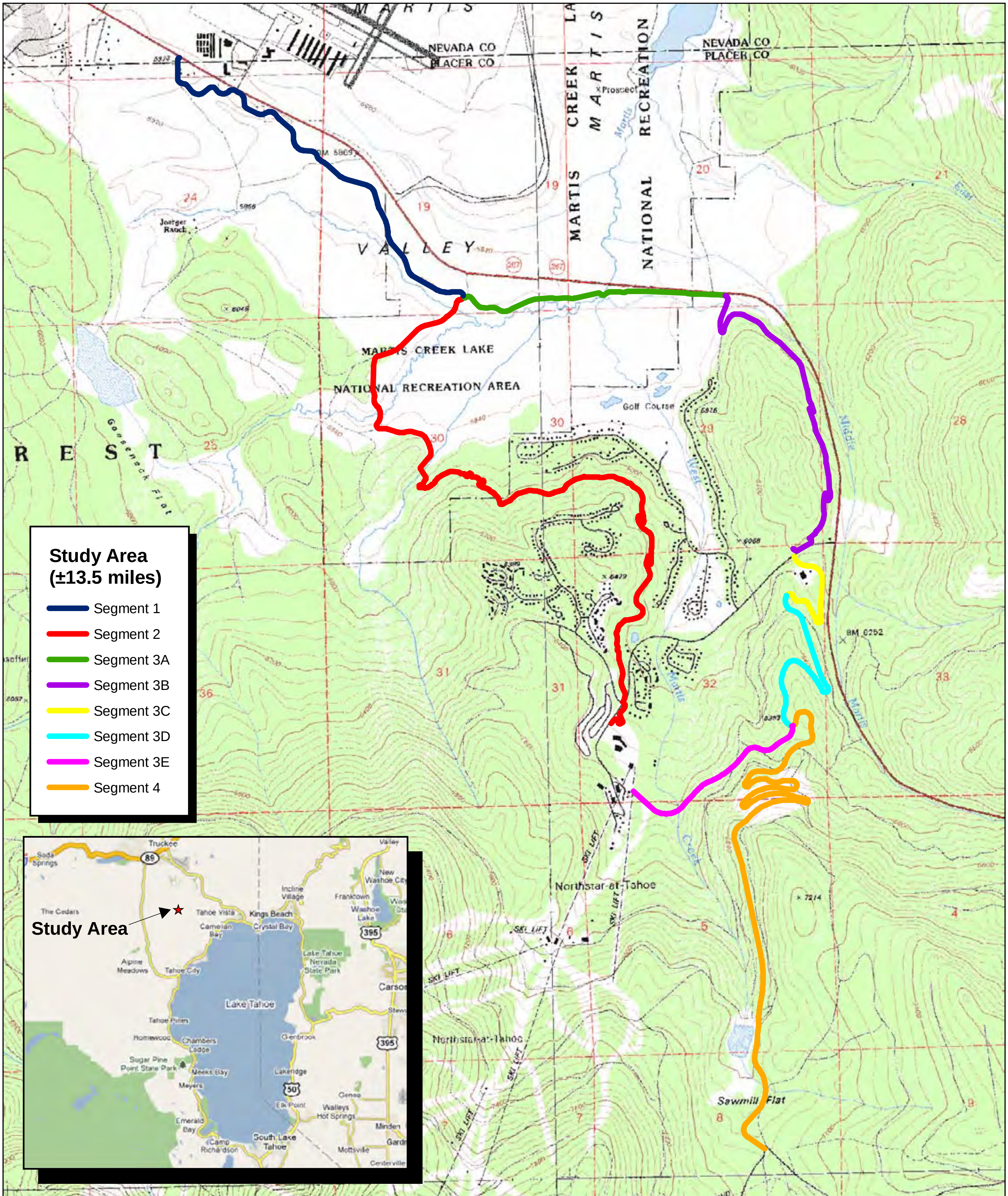
The Martis Valley Regional Trail study corridor runs for several miles between the eastern limits of the Town of Truckee and the Four Corners area near Brockway Summit in Placer County. The trail corridor is located within Townships 16N and 17N and Ranges 16E and 17E of the Truckee and Martis Peak U.S. Geological Survey 7.5 minute quadrangles. The proposed trail alignment crosses through Sections 5, 8, 13, 19, 24, 29, 30, and 32 of these quadrangles (Figure 1).

The study corridor is 50 feet wide and takes in both a proposed trail alignment and an alternative trail alignment. Both alignments generally follow the route of existing trails, although they depart substantially from existing trails in several places. The study corridor was broken into eight segments for planning purposes. The proposed trail alignment includes Segments 1, 2, 3E, and 4. The alternative alignment includes Segments 3A-3D. Implementation of the proposed trail project would occur in two phases. Phase 1 includes constructing the trail from its western terminus to Northstar, including Segments 1 and 2 of the proposed alignment. An alternative for Phase 1 would follow Segment 1 of the proposed alignment and Segments 3A and 3B of the alternative alignment. Construction of Phase 1 is the project currently under consideration. No construction is currently proposed on Segments 3C, 3D, 3E, or 4, which would be part of future phases of the trail project (Figures 1 and 2).

Segment 1 of the proposed trail alignment originates south of Highway 267, north of Schaffer Mill Road, and heads east, keeping just south of Highway 267 through Martis Valley to the wildlife viewing area parking lot south of Highway 267. Segment 2 of the proposed alignment extends from the parking area generally southeast, crossing Martis Valley before ascending the slope into the Northstar Community and ending at Big Springs Drive. Segment 3A of the alternative trail alignment extends from the parking area east to where it joins Segment 3B at the base of Porcupine Hill. Segment 3B continues at an elevated position on the slope along Highway 267 until it ends at a junction with Northstar Drive about 500 feet west of the Highway 267/Northstar Drive intersection. Segments of the proposed trail that would be constructed in future project phases include Segments 3C, 3D, 3E, and 4, which continue southward to connect to the Four Corners area near Brockway Summit; the ridge between Martis Valley and the Lake Tahoe Basin.

The study area is set on the eastern side of the Sierra Nevada Mountains, north of Lake Tahoe and southeast of the Town of Truckee, at elevations between approximately 5,880 feet and 6,200 feet. The topography is gently rolling to generally flat within Martis Valley and steep in the vicinity of Northstar and leading to Brockway Summit. Habitat types found onsite include coniferous forest, sagebrush scrub, wet and dry meadow, and riparian. Adjacent land uses include the Northstar Community (including Northstar at Tahoe golf course), Lahontan Golf Club, Truckee-Tahoe Airport, Martis Creek Lake, and undeveloped areas of Tahoe National Forest (Figure 2).

Directions: From Sacramento, head east on Interstate 80. After Donner Pass, take exit 188B to merge onto State Route 267 toward Lake Tahoe. Pass the intersection with Schaffer Mill Road. After approximately three miles, turn right off of State Route 267 into the Wildlife Viewing Area parking lot and park in the lot at the end of the dirt road. The proposed and alternative trail alignments connect near the Wildlife Viewing Area parking lot.



N

0 750 1,500 3,000

Scale in Feet

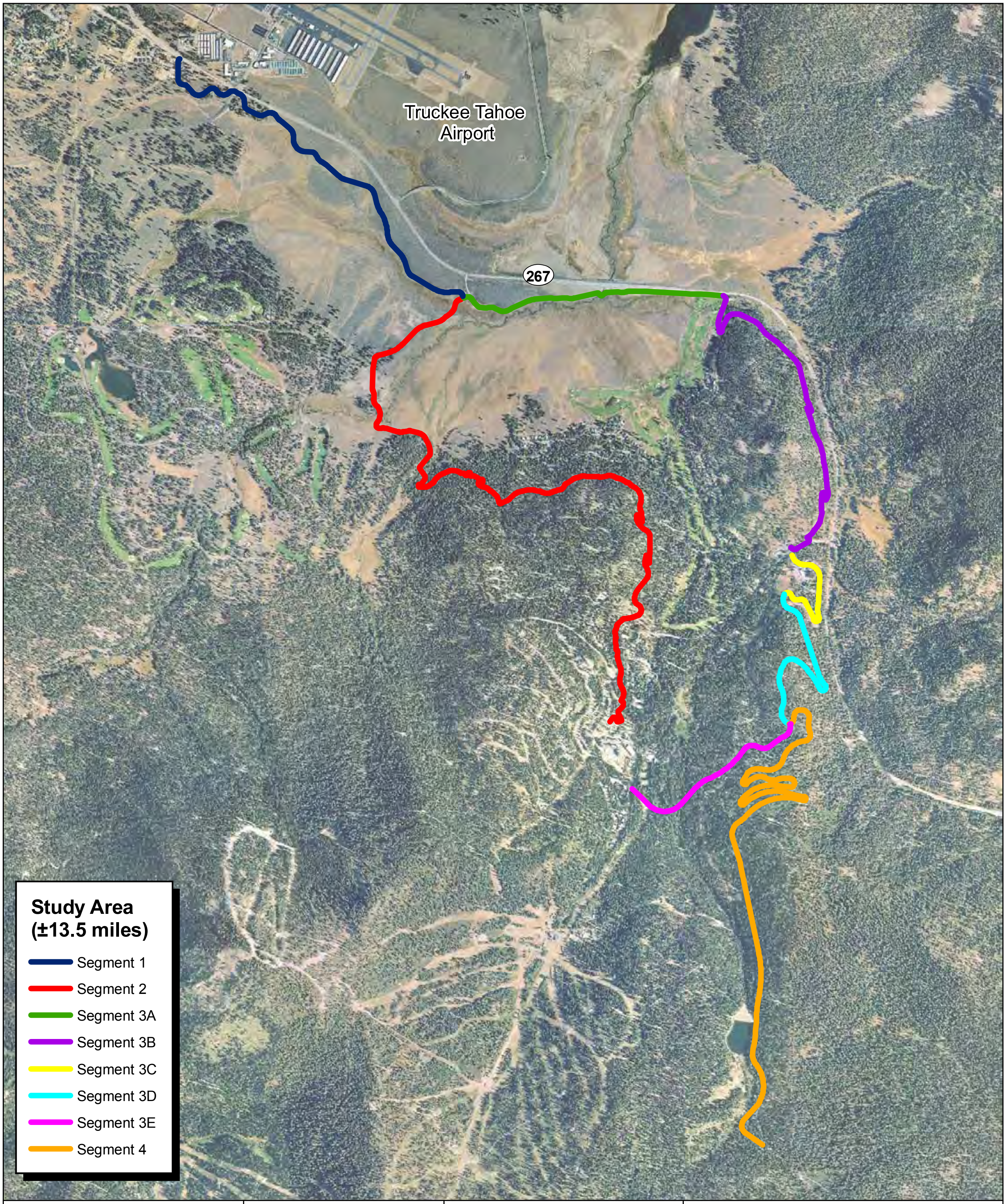
USGS Base Map:
Truckee & Martis Peak, CA
7.5 minute topographic quadrangle
Sections:
5,8,13,19,20,24,28,29,30,32,33
Township: 16N,17N
Range: 16E,17E

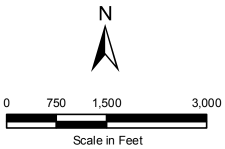
Figure 1

SITE & VICINITY MAP

Martis Valley Regional Trail

Placer County, California





Aerial Photo: 2005 Placer County.

Figure 2

AERIAL PHOTO

Martis Valley Regional Trail

Placer County, California

CONTACT INFORMATION

Applicant:
Northstar Community Services District
908 Northstar Drive
Northstar, CA 96161
Phone: (530) 562-0747
Fax: (530) 562-1505
Contact: Mike Staudenmayer

Delineator:
North Fork Associates
110 Maple Street
Auburn, California 95603
Phone: (530) 887-8500
Fax: (530) 887-1250
Contact: Jeff Glazner

Property Owners:

Placer County

Martis Valley Professional Center

9701, LLC

DMB/Highlands Group, LLC

Truckee Tahoe Airport District

Kielhofer Et Al

The U.S. Army Corps of Engineers

Caltrans

CNL Income Properties, Inc.

METHODS

Waters of the United States were delineated on June 25, July 9, July 23, July 29, August 20, and September 15, 2009 by Jeff Glazner and Erin Gottschalk Fisher. The delineation was conducted according to the 1987 Corps Manual (Environmental Laboratory 1987) as amended by the Western Mountains, Valleys, and Coast Region Regional Supplement (U.S. Army Corps of Engineers 2008).

Within the study corridor, information about vegetation, soils, and hydrology was recorded at fifteen three-parameter data point locations. Data sheets are located in Appendix A. Information on soils was taken from the Placer County soil survey (USDA, NRCS 1980). A Munsell Color (2000) chart was used in the field to determine moist soil colors.

Common plant names are used in this document. Appendix B is a list of plants observed during the delineation, along with the scientific name and wetland status of each species. Scientific names follow *The Jepson Manual* (Hickman 1993), as updated by the Jepson Interchange, an online database maintained by the University of California and Jepson Herbaria. The wetland status for species observed was taken from Reed (1988).

Trimble GeoXH global positioning system (GPS) units were used to obtain location information about data points, wetland areas, and other pertinent features. The GPS data were corrected in the office using the nearest available base station. 2009 aerial photography provided by Auerbach Engineering Corporation and 2005 Placer County aerial photography were combined with GPS data in ArcGIS to create the wetland delineation map. The wetland delineation map is presented as an 11x17 map book attached as Appendix A of this document. Appendix D contains a CD with the electronic files in ArcView shape format.

RESULTS

Climate and Weather

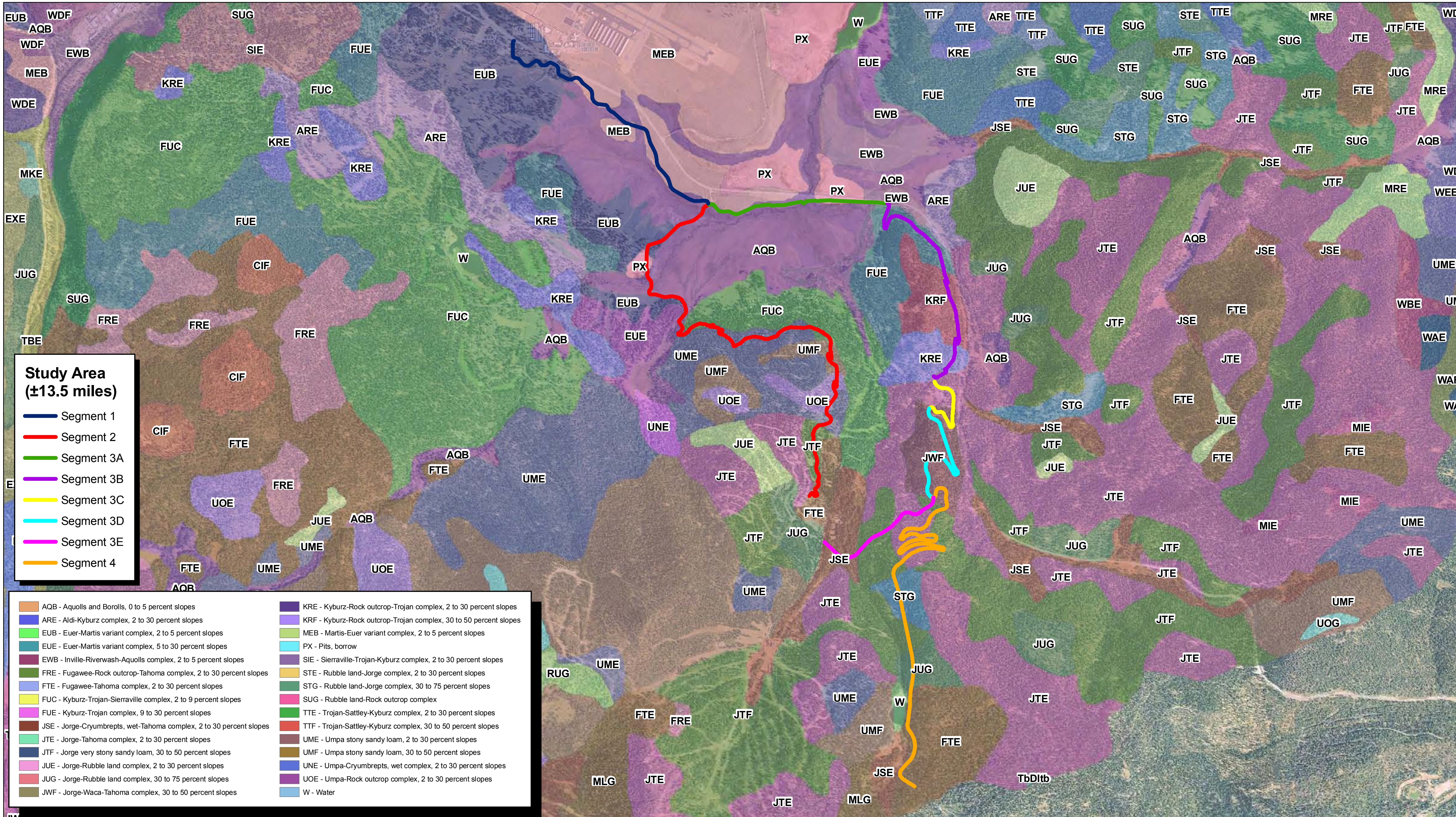
The Martis Valley Regional Trail study corridor has a montane climate with cold, snowy winters and mild, mostly dry summers. The National Weather and Climate Center (WCC) weather station positioned closest to the project site is located in the Town of Truckee (WETS Station: Truckee Ranger Station, CA #049043). Data from this station is presented here as a reasonable approximation of climate conditions at the project site.

The growing season in Truckee is relatively short, from mid-May to late September (about 120 days). Mean annual precipitation is 30.15 inches, with most of that falling as snow. Although warm season thunderstorms are common, summer rainfall does not contribute much to the overall wetland water budget. Weather conditions during all field work associated with this wetland delineation were warm and dry except for some light rain during the July 29th site visit.

Geology and Soils

According to the geologic map, the site is underlain by Alluvium (lake, playa, and terrace deposits), Quaternary volcanic flow rocks, and Tertiary volcanic flow rocks (California Department of Conservation 1987). Fourteen soil units have been mapped on the site (Figure 3) (USDA, NRCS 2007).

- AQB Aquolls and Borolls, 0 to 5 percent slopes
- EUB Euer-Martis variant complex, 2 to 15 percent slopes
- EUE Euer-Martis variant complex, 5 to 30 percent slopes
- FTE Fugawee-Tahoma complex, 2 to 30 percent slopes
- FUC Kyburz-Trojan-Sierraville complex, 2 to 9 percent slopes
- FUE Kyburz-Trojan complex, 9 to 30 percent slopes
- JTF Jorge very stony sandy loam, 30 to 50 percent slopes
- KRE Kyburz-Rock outcrop-Trojan complex, 2 to 30 percent slopes
- KRF Kyburz-Rock outcrop-Trojan complex, 30 to 50 percent slopes
- MEB Martis-Euer variant complex, 2 to 5 percent slopes
- PX Pits, borrow



north fork associates

N
0 750 1,500 3,000
Scale in Feet

Aerial Photo: 2005 Placer County.

Figure 3

SOIL MAP
Martis Valley Regional Trail
Placer County, California

- UME Umpa stony sandy loam, 2 to 30 percent slopes
- UMF Umpa stony sandy loam, 30 to 50 percent slopes
- UOE Umpa-Rock outcrop complex, 2 to 30 percent slopes

Aquolls are Mollisols that are often saturated for much of the year and may develop a histic horizon. These soils generally form in drainageways and on valley floors, and have low chromas and distinct mottles. Permeability is variable. Aquolls are common soils in montane meadows, and are usually hydric.

Borolls are more-or-less freely drained Mollisols that are usually found on the edges of wet meadows. These soils often have a thick surface layer of stratified coarse sand and clay. Permeability is variable and mottles are often found in the lower horizons. In the California mountains Borolls support aspen groves and grassland. Borolls are not necessarily hydric.

Euer soils are Alfisols that are deep, well-drained sandy to gravelly loams derived from glacial outwash and volcanic material. The A horizon is approximately 15 inches deep. A-horizon colors are 10YR to 7.5YR with chromas between 2 and 3. Because of the clay layer in the B horizon, Euer soils have moderately slow permeability.

Martis soils are Alfisols that are sandy to gravelly loams derived from glacial till and outwash from mostly volcanic sources. The A horizon is usually about 17 inches deep and ranges in hue from 10YR to 7.5YR. Chromas are between 1 and 3. Martis soils are well drained with moderately slow permeability.

Fugawee soils are Andic Haploxeralfs and consist of moderately deep, well-drained soils that formed in material weathered from basic volcanic rock. Fugawee soils are on mountains and have slopes 2 to 50 percent. The top two inches are typically covered in pine or fir litter. The A horizon is approximately 19 inches think with colors 10 YR 2/2 to 10 YR 3/3. Fugawee soils have slow to rapid runoff and moderate permeability.

Tahoma soils are Ultic Haploxeralfs that consist of deep and very deep, well-drained soils that formed in material weathered from basic volcanic rock. Tahoma soils are on mountain sides and have slopes ranging from 2 to 50 percent. The A horizon is 22 inches deep with a color ranging between 10 YR, 7.5 YR, or 5 YR with chromas between 2 and 5.

Kyburz soils are Ultic Haploxeralfs that consist of moderately deep, well-drained soils formed in material weathered from basic volcanic rock. These soils occur on uplands and have slopes of 2 to 50 percent. The A horizon is six inches deep with a dark brown color (7.5 YR 3/2). Kyburz soils have slow to rapid runoff and moderate to moderately slow permeability.

Trojan soils are Ultic Argixerolls that consist of deep and very deep, well-drained soils that formed in colluvium and residuum derived from volcanic rocks or from schist and argillite. Trojan soils are on hills and mountains with slopes from 2 to 50 percent. The A horizon is 10 inches deep with a color from 7.5 YR 4/2 to 5 YR 3/2. Trojan soils have medium or high surface runoff and moderately slow permeability.

Sierraville soils are Ultic Haploxeralfs that typically have reddish brown, slightly acid, stony sandy loam. The A horizon is nine inches deep with a color of 5 YR 5/3 to 2.5 YR

4/4. Sierraville soils are well-drained with slow to rapid runoff and moderately slow permeability.

Jorge soils are Andic Haploxeralfs that consist of deep or very deep, well-drained soils that formed from material weathered from basic volcanic rock. The A horizon is 24 inches deep with a color ranging between 10 YR and 5 YR with a value and chroma between 2 and 4. Jorge soils have low to high runoff and moderate permeability.

Umpa soils are Andic Dystroxerepts that consist of moderately deep, well-drained soils that formed in material weathered from andesite. Umpa soils are on uplands and have slopes of 5 to 75 percent. The A horizon varies in hue between 10 YR and 7.5 YR with values and chroma between 2 and 4. Umpa soils have medium to rapid runoff and moderately rapid permeability.

Hydrology

The study area region slopes toward Martis Valley, which is drained by Martis Creek, the main hydrological feature throughout the study area. Martis Creek flows in a northeasterly direction and crosses the study corridor in the northern portion of Segment 2 of the proposed alignment and again in the middle of Segment 3A of the alternative alignment. Four tributaries to Martis Creek (including Middle and West Martis Creek) also cross the study corridor, with two unnamed tributaries crossing Segment 2 of the proposed alignment, Middle Martis Creek crossing the northern portion of Segment 3B of the alternative alignment, and West Martis Creek crossing the western end of Segment 3B of the proposed alignment. Martis Creek and its tributaries are represented as solid blue line features on the USGS map. After crossing the study corridor in Segment 3A of the alternative alignment near Highway 267, Martis Creek crosses under Highway 267 in a large box culvert. On the north side of Highway 267, Martis Creek drains into Martis Creek Lake. Martis Creek continues below the dam, draining into the Truckee River south of Interstate 80. The Truckee River flows into Pyramid Lake in the Great Basin in Nevada.

Other hydrological features within the study corridor include wetland swales, ephemeral and intermittent streams and the very large wetland meadows complex associated with Martis Creek. These features are all part of the local watershed.

Vegetation

Five primary vegetation communities occur in the study area: coniferous forest, sagebrush scrub, riparian, wet meadow, and dry meadow. These vegetation communities are discussed below.

Approximately 10.23 miles of the study corridor is within the **coniferous forest** vegetation community. Coniferous forest occurs at elevations slightly higher than the floor of Martis Valley and is the dominant habitat on the slopes ascending from the valley to Northstar and Brockway Summit. The southeastern portion of the study corridor, including Segments 3B – 3D of the alternative trail alignment and Segments 3E, 4 and the southeastern portion of Segment 2 of the proposed trail alignment, is within coniferous forest habitat. Common forest trees within the study corridor include red fir at the higher elevations and white fir at the lower elevations, lodgepole pine, Jeffrey pine, and western white pine. Lodgepole pine is particularly abundant near the meadows and streams. Understory shrubs include greenleaf manzanita, mahala mat, tobacco brush, big sagebrush, and antelope brush. The herbaceous cover is relatively sparse and includes bitter dogbane, mountain mule's-ears, phacelia, campion, blue wildrye, quackgrass, and orchard grass.

Approximately 3.17 miles of the study corridor passes through the **sagebrush scrub** vegetation community. This vegetation community occurs at a lower elevation generally than the coniferous forest and is the dominant habitat type along Segment 1 of the proposed alignment and Segment 3A of the alternative alignment. Areas of sagebrush scrub habitat also occur along the northern portion of Segment 2 of the proposed alignment and the northernmost portion of Segment 3B of the alternative alignment. This habitat type is dominated by big sagebrush; secondary shrub dominants include antelope brush and rubber rabbitbrush. The sagebrush scrub varies from dense intertwining branches of big sagebrush and antelope brush to more open areas that also support herbaceous vegetation, such as Parish's yampah, thickstem aster, mountain tarweed, cryptantha, locoweed, dwarf lupine, clustered broom-rape, blue-eyed Mary, sulfer flower, navarretia, onion, cheat grass, bulbous bluegrass, and squirreltail. Embedded within the sagebrush scrub are areas dominated by low sagebrush.

The **wet meadow** vegetation community supports wetland vegetation due to hydrological influences from Martis Creek (and tributaries) and/or a seasonally high water table (Figure 4a). The wet meadow vegetation community encroaches in approximately 0.05 mile of the trail corridor, the largest portion occurring just south of the wildlife viewing area parking lot at the north end of Segment 2 of the proposed alignment. The herbaceous wet meadow habitat supports many wetland species, including Ryberg's beardtongue, long-stalk clover, dense-flower spike-primrose, western mountain aster, dwarf woolly-heads, water speedwell, Great Basin navarretia, long-stalk starwort, glandular cinquefoil, western buttercup, meadow barley, and tufted hairgrass. The majority of the biomass in the wet meadow areas is made up of several species of sedges and rushes. The wetter the meadow, the more abundant the sedge cover. Some marginal wetland species, such as Parry's arnica, Kentucky blue grass, and common timothy also occur in the wet meadow.

The dry **meadow** vegetation community is typically found in the transition zone between wet meadow or riparian and upland sage scrub and coniferous forest habitat types. The study corridor runs through meadow habitat for approximately 0.08 mile within Segment 2 of the proposed alignment south of the proposed crossing of Martis Creek, and within Segment 3A of the alternative alignment. This vegetation community supports both wetland and upland species including a sparse cover of sagebrush, cheatgrass, and Douglas' knotweed. The line between wet and dry meadow lacks definition in some areas.

Approximately 0.06 mile of the study corridor passes through the **riparian** vegetation community associated with Martis Creek and its tributaries within Segment 2 of the proposed alignment and within portions of Segments 3A and 3B of the alternative alignment. The riparian habitat is generally a patchy band of willows approximately 10 to 20 feet wide along each bank of the creek. Small lodgepole pine trees also occur throughout the riparian habitat. Other associated plant species are similar to the species found in the wet meadow, along with mountain alder, wild rose, mountain timothy, willow dock, common monkeyflower, and stemless thistle.

Waters of the United States

Five categories of waters of the United States have been mapped within the study corridor: wetland swale, wetland meadow, perennial stream, intermittent stream, and ephemeral stream. Table 1 provides a summary of the acreage of each category of waters of the United States on the site; Figures 4 and 5 are photos of representative examples. Wetlands referred to in the following discussion are identified in a map book included with this document as Appendix A. To provide appropriate detail for this linear study area, the wetland delineation map book included with this document is divided into multiple map sheets (referred to below).

Table 1.
Waters of the United States

Type	Acreage
Wetlands:	
Wetland Swale	0.06
Wetland Meadow	0.09
Other Waters:	
Perennial Stream	0.21
Intermittent Stream	0.07
Ephemeral Stream	0.02
Total Waters of the United States	**0.45**

Wetland Swale

Wetland swales are water conveyance features that do not develop the bed-and-bank morphology typical of streams, although they have wetland soils and are vegetated with wetland species. One wetland swale, WS-1, totaling 0.06 acre, is mapped within the Martis Valley Regional Trail study corridor. The swale is located within Segment 1 of the proposed trail alignment in sagebrush scrub habitat (Appendix A, Sheet C). Wetland swales are similar to wetland meadows in that they support many of the same species and have hydrologic connection to adjacent streams. Wetland swales, however, occur on a slope and convey water rather than hold water. Common plant species in the wetland swales include wire rush, Kentucky bluegrass, Great Basin navarretia, long stalk clover, annual hairgrass, Rydberg's beardtongue, and western mountain aster.

4a. – Sagebrush Scrub / Wetland Meadow interface. Proposed trail is just upslope of meadow in sagebrush.

4b. – Looking downstream along area of proposed crossing of Martis Creek at PS-1.

4c. – Looking upstream along Martis Creek (PS-2) from existing bridge near Highway 267. Willow scrub (Riparian) habitat occurs along narrow perennial stream.

4d. – Perennial Stream (PS-3) in area of proposed crossing of tributary in Segment 2.

north fork associates

Photo Dates: June 25, 2009; July 23, 2009, August 20, 2009; September 15, 2009

Figure 4

SITE PHOTOS

Martis Valley Regional Trail

Placer County, California

5a. – Intermittent Stream (IS-1) and adjacent Wetland Meadow (WM-2). Culvert crosses under existing gravel trail.

5b. – From near existing wildlife viewing area looking southwest along existing trail to area where trail crosses IS-1 and IS-2 and runs through WM-1 and WM-2.

5c. – Looking west over Ephemeral Stream (ES-1) near Northstar at Tahoe Golf Course adjacent to Highway 267.

5d. – Culvert at ES-3 along Segment 4 of the Phase 2 trail alignment.

north fork associates

Photo Dates: June 25, 2009; July 23, 2009; August 20, 2009

Figure 5

SITE PHOTOS

Martis Valley Regional Trail

Placer County, California

Wetland Meadow

The wetland meadow ("wet meadow") habitat is described above in the *Vegetation* section. Wetland meadow occurs in areas adjacent to Martis Creek and its tributaries. The proposed trail alignment crosses or encroaches on two areas of wetland meadow, WM-1 and WM-2, along Segment 2 (Appendix A, Sheet F). A total of 0.09 acre of wetland meadow occurs within these two areas. The wetland meadow supports wetland vegetation and hydric soils due to hydrological influences from Martis Creek (and tributaries) and a high water table (Figure 4a). The wetland meadow is dominated by herbaceous wetland species, primarily sedges and rushes, but also abundant are Ryberg's beardtongue, long-stalk clover, dense-flower spike-primrose, western mountain aster, dwarf woolly-heads, water speedwell, Great Basin navarretia, long-stalk starwort, glandular cinquefoil, western buttercup, meadow barley, and tufted hairgrass. At the drier margins, facultative species such as Parry's arnica, Kentucky blue grass, and common timothy are common.

Perennial Stream

Perennial streams, unlike ephemeral or intermittent streams, flow year-round and exhibit well defined bed-and-bank morphology. The study area crosses perennial streams at three locations (PS-1 through PS-3) totaling 0.21 acre. There are two crossings of Martis Creek and one crossing of an unnamed tributary to Martis Creek (Appendix A, Sheets G, I, K). Segment 2 of the proposed alignment crosses Martis Creek and the unnamed tributary to Martis Creek and Segment 3A of the alternative alignment crosses Martis Creek near Highway 267.

At the proposed trail crossing of Martis Creek at PS-1 in Segment 2 of the proposed alignment (Appendix A, Sheet I), the stream channel is downcut and well defined. High water spills to the north side of the channel. We have mapped the ordinary high water mark at approximately 70 feet wide at this proposed crossing location. Bankside vegetation includes riparian scrub (Figure 4b). The south side of the channel is mapped as dry meadow.

PS-2 is at a crossing of Martis Creek in the alternative trail alignment just south of Highway 267 (Appendix A, Sheet G). At this location, Martis Creek has a gravel and rock bottom. Bankside riparian at PS-2 is patchy (Figure 4c). The ordinary high water mark is approximately 20 feet wide. The existing Tomkins Memorial Trail spans the creek in this location on a wooden bridge. After leaving the study corridor, Martis Creek flows through a large box culvert under Highway 267.

PS-3 is located at a study corridor crossing of a perennial tributary to Martis Creek south of PS-1 in Segment 2 of the proposed trail alignment (Appendix A, Sheet K). There is a braided stream system at this location that during high water, flows through three small channels across the corridor. On September 15, 2009, only the southern channel was flowing (approximately 5 cfs). Within the study corridor, the bankside vegetation is primarily willow but with abundant lodgepole pine. The understory is mostly sedges (Figure 4d).

Intermittent Stream

Intermittent streams begin flowing sometime during the rain/snow melt season and usually continue to the end of the rain/snow melt season. Intermittent streams have a groundwater component that allows them to flow during dry weather. Four intermittent streams occur within the study corridor (Appendix A, Sheets F, H, and T); all three are tributaries to Martis Creek. A total of 0.07 acre of intermittent stream occurs within the study corridor.

IS-1 and IS-2 in the northern portion of Segment 2 of the proposed trail alignment are part of a braided channel system that drains water from northwest to southeast toward Martis Creek (Appendix A, Sheet F). These intermittent streams cross the study corridor in three culverts under an existing dirt/gravel road (Figures 5a and 5b). Two of the culverts support distinct channels and only one of the channels contained flowing water (approximately 1 to 3 cfs) during the July 23rd site visit. The intermittent streams are flanked by wetland meadow and do not support riparian vegetation (Figures 5a and 5b).

IS-3 is Middle Martis Creek and crosses the study corridor at the north end of Segment 3B of the alternative alignment. During field surveys, there was a small amount of water trickling out of the culvert under the road; however, once leaving the metal culvert, the water goes under the rocky channel bed. There was no surface water observed in the creek channel at the time of the site visit. In the study corridor, Middle Martis Creek varies between five and 10 feet wide at its ordinary high water mark. From the culvert, the edges of the creek are lined with riprap. Bankside vegetation includes a dense cover of willows.

The crossing of West Martis Creek, IS-4, occurs in Segment 3E of the proposed future Phase 2 alignment (Appendix A, Sheet T). This stream zone appears to carry occasional and short term high scouring flows but the seasonal duration is relatively low. We estimate that this stream flows for approximately half of the year. It was dry on our August 20th site visit. The ordinary high water mark at the location of the crossing was variable with an average width of 30 feet. The bed of the channel is rocky and vegetation associated both bankside and within the channel includes several willow species (including scoulers willow), mountain alder, aspen, salmonberry, blue wildrye, milfoil, and arrow butterweed.

Ephemeral Stream

Ephemeral streams flow only during periods of rainfall/snow melt or for a short time thereafter. Ephemeral streams do not have a groundwater component. Three ephemeral streams occur within the study corridor, comprising an area of 0.02 acre (Appendix A, Sheets G, K, and X). ES-1 occurs in Segment 3A of the alternative trail alignment and carries runoff from Highway 267 into Middle Martis Creek (Appendix A, Sheet G) (Figure 5c). ES-2 is located in a steep area of coniferous forest within Segment 2 of the proposed trail alignment (Appendix A, Sheet K). ES-3 occurs at the south end of Segment 4 of the proposed future Phase 2 trail alignment (Appendix A, Sheet X) (Figure 5d). Upland vegetation occurs adjacent to each of these ephemeral streams, which were dry during each of our site visits.

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Appendix A.
Preliminary Wetland Delineation Map Book

The map book was updated and is presented in the Draft EIR Appendix C4.

Appendix B.
Wetland Data Sheets

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Martis Valley Trail City/County: Placer County Sampling Date: 7/23/09

Applicant/Owner: Northstar Community Services District State: CA Sampling Point: 1

Investigator(s): Jeff Glazner, Erin Gottschalk Fisher Section, Township, Range: Sections 19,20,24,28,29,30, & 32, T 17 North and R 16 & 17 East

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): concave Slope (%): 3%

Subregion (LRR): MLRA 22A Lat: 2238956.055°north Long: 7092071.396° west Datum: NAD 83

Soil Map Unit Name: Martis-Euer variant complex, 2 to 5 percent slopes NWI classification: P

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? No Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	**Is the Sampled Area within a Wetland?**	**Yes X No ____**
Hydric Soil Present?	Yes X No ____		
Wetland Hydrology Present?	Yes X No ____		

Remarks:

Wetland swale. Located high in the watershed near Hwy 267.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. Juncus sp.	20	Yes	FACW
2. Perideridia kelloggii	20	Yes	---
3. Poa pratensis ssp. pratensis	10	No	FACU
4. Navarretia intertexta ssp. propinqua	10	No	FAC
5. Symphyotrichum spathulatum var. spathulatum	10	No	FAC
6. Deschampsia danthonioides	30	Yes	FACW
7. Penstemon rydbergii var. oreocharis	10	No	FAC
8. Muhlenbergia richardsonis	20	Yes	FAC
Total Cover:	130		
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 75% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

__ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Wetland Non-Vascular Plants[1]

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: Facultative plant community in shallow swale.

SOIL

Sampling Point: 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12	5 YR 2.5/1	90	5 YR 5/8	10	C	M	Sandy, Loamy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
_X_ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: __________

Depth (inches): __________

Hydric Soil Present? Yes _X_ No ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
_X_ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
_X_ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
_X_ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plans (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No _X_ Depth (inches): ______
Water Table Present? Yes ___ No _X_ Depth (inches): ______
Saturation Present? (includes capillary fringe) Yes ___ No _X_ Depth (inches): ______

Wetland Hydrology Present? Yes _X_ No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Evidence of prolonged saturation. Slow moving, near surface water, flows through swale for an extended period.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Martis Valley Trail City/County: Placer County Sampling Date: 7/23/09

Applicant/Owner: Northstar Community Services District State: CA Sampling Point: 2

Investigator(s): Jeff Glazner, Erin Gottschalk Fisher Section, Township, Range: Sections 19,20,24,28,29,30, & 32, T 17 North and R 16 & 17 East

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): convex Slope (%): 5%

Subregion (LRR): MLRA 22A Lat: 2238956.055°north Long: 7092071.396° west Datum: NAD 83

Soil Map Unit Name: Martis-Euer variant complex, 2 to 5 percent slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? No Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____ No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____ No X	
Wetland Hydrology Present?	Yes ____ No X	

Remarks:

Upland comparison data point to sampling point 1. Just upslope from wetland swale.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1. Artemisia arbuscula	50	Yes	---
2.			
3.			
4.			
5.			
Total Cover:	50		
Herb Stratum			
1. Elymus elymoides	20	Yes	---
2. Perideridia kelloggii	10	No	---
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	30		
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum 20 % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species		x 1 =	
FACW species		x 2 =	
FAC species		x 3 =	
FACU species		x 4 =	
UPL species		x 5 =	
Column Totals:	(A)		(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks: Herbaceous upland edge

SOIL

Sampling Point: 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12	5 YR 3/2	100	----				loamy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ________

Depth (inches): ________

Hydric Soil Present? Yes ______ No X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plans (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ______	No X	Depth (inches): ________
Water Table Present?	Yes ______	No X	Depth (inches): ________
Saturation Present? (includes capillary fringe)	Yes ______	No X	Depth (inches): ________

Wetland Hydrology Present? Yes ______ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Lacks evidence of prolonged saturation. Upland edge.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Martis Valley Trail City/County: Placer County Sampling Date: 7/23/09

Applicant/Owner: Northstar Community Services District State: CA Sampling Point: 3

Investigator(s): Jeff Glazner, Erin Gottschalk Fisher Section, Township, Range: Sections 19,20,24,28,29,30, & 32, T 17 North and R 16 & 17 East

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): flat Slope (%): 1%

Subregion (LRR): MLRA 22A Lat: 2238956.055°north Long: 7092071.396° west Datum: NAD 83

Soil Map Unit Name: Aquolls and Borolls, 0 to 5 percent slopes NWI classification: P

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? No Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	**Is the Sampled Area within a Wetland?** **Yes X No ____**
Hydric Soil Present?	Yes X No ____	
Wetland Hydrology Present?	Yes X No ____	

Remarks:

Data point taken in adjacent wetland meadow to seasonal stream (currently flowing).

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. Poa pratensis ssp. pratensis	.30	Yes	FACU
2. Hordeum brachyantherum	30	Yes	FACW
3. Phleum pratense	20	No	FACU
4. Epilobium ciliatum	30	Yes	FACW
5. Carex sp.	20	No	FACW
6.			
7.			
8.			
Total Cover:	130		
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 67% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

__ Prevalence Index is ≤3.0[1]

__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Wetland Non-Vascular Plants[1]

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes X No ____**

Remarks: Meadow species rooted in well aerated soil (more available oxygen).

SOIL

Sampling Point: 3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	5 YR 2.5/1	80	5 YR 5/8	20	C	M	Loamy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

__ Histosol (A1)
__ Histic Epipedon (A2)
__ Black Histic (A3)
__ Hydrogen Sulfide (A4)
__ Depleted Below Dark Surface (A11)
__ Thick Dark Surface (A12)
__ Sandy Mucky Mineral (S1)
__ Sandy Gleyed Matrix (S4)
__ Sandy Redox (S5)
__ Stripped Matrix (S6)
__ Loamy Mucky Mineral (F1) (**except MLRA 1**)
__ Loamy Gleyed Matrix (F2)
__ Depleted Matrix (F3)
X Redox Dark Surface (F6)
__ Depleted Dark Surface (F7)
__ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

__ 2 cm Muck (A10)
__ Red Parent Material (TF2)
__ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ________

Depth (inches): ________

Hydric Soil Present? Yes X No ___

Remarks: Soils in this area are stable but have settled through periodic deposition.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

__ Surface Water (A1)
__ High Water Table (A2)
__ Saturation (A3)
__ Water Marks (B1)
__ Sediment Deposits (B2)
__ Drift Deposits (B3)
X Algal Mat or Crust (B4)
__ Iron Deposits (B5)
X Surface Soil Cracks (B6)
__ Inundation Visible on Aerial Imagery (B7)
__ Sparsely Vegetated Concave Surface (B8)
__ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A and 4B**)
__ Salt Crust (B11)
__ Aquatic Invertebrates (B13)
__ Hydrogen Sulfide Odor (C1)
X Oxidized Rhizospheres along Living Roots (C3)
X Presence of Reduced Iron (C4)
__ Recent Iron Reduction in Tilled Soils (C6)
__ Stunted or Stressed Plans (D1) (**LRR A**)
__ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

__ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
__ Drainage Patterns (B10)
__ Dry-Season Water Table (C2)
__ Saturation Visible on Aerial Imagery (C9)
X Geomorphic Position (D2)
__ Shallow Aquitard (D3)
__ FAC-Neutral Test (D5)
__ Raised Ant Mounds (D6) (**LRR A**)
__ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___
Water Table Present? Yes ___ No X Depth (inches): ___
Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Adjacent to intermittent stream. Receives overflow waters and peripheral wetting.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Martis Valley Trail City/County: Placer County Sampling Date: 7/23/09

Applicant/Owner: Northstar Community Services District State: CA Sampling Point: 4

Investigator(s): Jeff Glazner, Erin Gottschalk Fisher Section, Township, Range: Sections 19,20,24,28,29,30, & 32, T 17 North and R 16 & 17 East

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): flat Slope (%): 3%

Subregion (LRR): MLRA 22A Lat: 2238956.055°north Long: 7092071.396° west Datum: NAD 83

Soil Map Unit Name: Aquolls and Borolls, 0 to 5 percent slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? No Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____ No X	**Is the Sampled Area within a Wetland?**	**Yes ____ No X**
Hydric Soil Present?	Yes ____ No X		
Wetland Hydrology Present?	Yes ____ No X		

Remarks:

Upland comparison data point to sampling point 3. Located near existing gravel road an in upland position just upslope from wetland meadow.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1. Artemisia tridentata	20	Yes	---
2.			
3.			
4.			
5.			
Total Cover:	20		
Herb Stratum			
1. Elytrigia repens	80	Yes	NI
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:	80		
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ____ No X

Remarks: Upland vegetation. Mix of herbs and (woody) sagebrush.

SOIL

Sampling Point: 4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-6	5 YR 3/2	100	----					

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

__ Histosol (A1)
__ Histic Epipedon (A2)
__ Black Histic (A3)
__ Hydrogen Sulfide (A4)
__ Depleted Below Dark Surface (A11)
__ Thick Dark Surface (A12)
__ Sandy Mucky Mineral (S1)
__ Sandy Gleyed Matrix (S4)
__ Sandy Redox (S5)
__ Stripped Matrix (S6)
__ Loamy Mucky Mineral (F1) (**except MLRA 1**)
__ Loamy Gleyed Matrix (F2)
__ Depleted Matrix (F3)
__ Redox Dark Surface (F6)
__ Depleted Dark Surface (F7)
__ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

__ 2 cm Muck (A10)
__ Red Parent Material (TF2)
__ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ________

Depth (inches): ________

Hydric Soil Present? Yes ____ No X

Remarks: Compact/dry soil.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

__ Surface Water (A1)
__ High Water Table (A2)
__ Saturation (A3)
__ Water Marks (B1)
__ Sediment Deposits (B2)
__ Drift Deposits (B3)
__ Algal Mat or Crust (B4)
__ Iron Deposits (B5)
__ Surface Soil Cracks (B6)
__ Inundation Visible on Aerial Imagery (B7)
__ Sparsely Vegetated Concave Surface (B8)
__ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A and 4B**)
__ Salt Crust (B11)
__ Aquatic Invertebrates (B13)
__ Hydrogen Sulfide Odor (C1)
__ Oxidized Rhizospheres along Living Roots (C3)
__ Presence of Reduced Iron (C4)
__ Recent Iron Reduction in Tilled Soils (C6)
__ Stunted or Stressed Plans (D1) (**LRR A**)
__ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

__ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
__ Drainage Patterns (B10)
__ Dry-Season Water Table (C2)
__ Saturation Visible on Aerial Imagery (C9)
__ Geomorphic Position (D2)
__ Shallow Aquitard (D3)
__ FAC-Neutral Test (D5)
__ Raised Ant Mounds (D6) (**LRR A**)
__ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ____	No X	Depth (inches): ____
Water Table Present?	Yes ____	No X	Depth (inches): ____
Saturation Present? (includes capillary fringe)	Yes ____	No X	Depth (inches): ____

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Lacks evidence of wetland hydrology. Upslope from wetland meadow in gravel road influenced area.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Martis Valley Trail City/County: Placer County Sampling Date: 9/15/09

Applicant/Owner: Northstar Community Services District State: CA Sampling Point: 5

Investigator(s): Jeff Glazner Section, Township, Range: Sections 19,20,24,28,29,30, & 32, T 17 North and R 16 & 17 East

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 1%

Subregion (LRR): MLRA 22A Lat: 2238956.055°north Long: 7092071.396° west Datum: NAD 83

Soil Map Unit Name: Aquolls and Borolls, 0 to 5 percent slopes NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? No Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ___	**Is the Sampled Area within a Wetland?** Yes ___ No X
Hydric Soil Present?	Yes ___ No X	___ **Other Waters**
Wetland Hydrology Present?	Yes ___ No X	

Remarks:

Along Martis Creek floodplain – just outside ordinary high water mark in dry meadow edge.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. Carex sp.	.40	Yes	FACW
2. Juncus balticus	40	Yes	OBL
3. Elymus glaucus	10	No	FACU
4. Hordeum brachyantherum	5	No	FACW
5. Artemisia tridentata	5	No	-
6.			
7.			
8.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum ______ % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%
___ Prevalence Index is ≤3.0[1]
___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
___ Wetland Non-Vascular Plants[1]
___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes X No ___

Remarks: Dry meadow edge near northern bank of Martis Creek in dry meadow zone.

SOIL

Sampling Point: 5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	10 YR 4/3	100					loamy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ________

Depth (inches): ________

Hydric Soil Present? Yes ____ No X

Remarks: Lacks hydric soil indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plans (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): ____
Water Table Present? Yes ____ No ____ Depth (inches): ____
Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Lacks evidence of prolonged seasonal saturation.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Martis Valley Trail City/County: Placer County Sampling Date: 9/15/09

Applicant/Owner: Northstar Community Services District State: CA Sampling Point: 6

Investigator(s): Jeff Glazner Section, Township, Range: Sections 19,20,24,28,29,30, & 32, T 17 North and R 16 & 17 East

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 1%

Subregion (LRR): MLRA 22A Lat: 2238956.055°north Long: 7092071.396° west Datum: NAD 83

Soil Map Unit Name: Aquolls and Borolls, 0 to 5 percent slopes NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? No Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	**Is the Sampled Area within a Wetland?** Yes ____ No X
Hydric Soil Present?	Yes ____ No X	____ **Other Waters**
Wetland Hydrology Present?	Yes ____ No X	

Remarks:

Along Martis Creek floodplain – approx 20 feet from active incised Martis Creek channel. Channel appears to be dewatering adjacent meadow areas and this location appears to lack wetland hydrology as a result.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. Carex sp.	.40	Yes	FACW
2. Juncus balticus	40	Yes	OBL
3. Phleum alpinum	5	No	FACW
4. Aster sp.	5	No	FAC
5. Artemisia tridentata	5	No	-
6. Achillea millefolium	5	No	FACU
7.			
8.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum ______ % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Wetland Non-Vascular Plants[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes X No ____

Remarks: Meadow species trending toward upland. Encroachment of sagebrush.

SOIL

Sampling Point: 6

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10 YR 4/3	100					loamy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ________

Depth (inches): ________

Hydric Soil Present? Yes _____ No X

Remarks: Lacks hydric soil indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plans (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes _____ No X Depth (inches): _____
Water Table Present? Yes _____ No _____ Depth (inches): _____
Saturation Present? (includes capillary fringe) Yes _____ No X Depth (inches): _____

Wetland Hydrology Present? Yes _____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Lacks evidence of prolonged seasonal saturation.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Martis Valley Trail City/County: Placer County Sampling Date: 9/15/09

Applicant/Owner: Northstar Community Services District State: CA Sampling Point: 7

Investigator(s): Jeff Glazner Section, Township, Range: Sections 19,20,24,28,29,30, & 32, T 17 North and R 16 & 17 East

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): undulating Slope (%): 1%

Subregion (LRR): MLRA 22A Lat: 2238956.055°north Long: 7092071.396° west Datum: NAD 83

Soil Map Unit Name: Aquolls and Borolls, 0 to 5 percent slopes NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ______ (If no, explain in Remarks.)

Are Vegetation ______, Soil ______, or Hydrology ______ significantly disturbed? No Are "Normal Circumstances" present? Yes X No ______

Are Vegetation ______, Soil ______, or Hydrology ______ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ______	Is the Sampled Area within a Wetland? Yes ______ No X
Hydric Soil Present?	Yes ______ No X	___ Other Waters
Wetland Hydrology Present?	Yes ______ No X	

Remarks:

Very localized depression within dry meadow area. Appears to lack wetland hydrology or it is limited to a very small footprint.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. Carex sp.	.30	Yes	FACW
2. Juncus balticus	50	Yes	OBL
3. Penstemon rydbergii	20	Yes	FAC
4.			
5.			
6.			
7.			
8.			
Total Cover:	100		
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum ______ % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	______	x 1 = ______
FACW species	______	x 2 = ______
FAC species	______	x 3 = ______
FACU species	______	x 4 = ______
UPL species	______	x 5 = ______
Column Totals:	______ (A)	______ (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Wetland Non-Vascular Plants[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes X No ______

Remarks: Meadow species. Localized area lacks encroachment of upland species as found in adjacent meadow areas.

SOIL

Sampling Point: 7

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	7.5 YR 3/3	98	5 YR 4/6	2	C	M	loamy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? Yes ___ No X

Remarks: Lacks hydric soils indicators. Soil lower in organics than areas closer to the creek.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plans (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No ___ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? Yes ___ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Marginal to lacking evidence of prolonged seasonal saturation.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Martis Valley Trail City/County: Placer County Sampling Date: 7/23/09

Applicant/Owner: Northstar Community Services District State: CA Sampling Point: 8

Investigator(s): Jeff Glazner, Erin Gottschalk Fisher Section, Township, Range: Sections 19,20,24,28,29,30, & 32, T 17 North and R 16 & 17 East

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): concave Slope (%): 2%

Subregion (LRR): MLRA 22A Lat: 2238956.055°north Long: 7092071.396° west Datum: NAD 83

Soil Map Unit Name: Euer-Martis variant complex, 2 to 5 percent slopes NWI classification: P

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? No Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** ____
Hydric Soil Present?	Yes ____ No X	
Wetland Hydrology Present?	Yes ____ No X	

Remarks:

Suspect area at edge of meadow. Appears to lack wetland hydrology.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. Juncus balticus	50	Yes	OBL
2. Poa pratensis ssp. pratensis	20	Yes	FACU
3. Phleum pratense	15	No	FACU
4. Navarretia intertexta ssp. propinqua	30	Yes	FAC
5. Trifolium longipes var. elmeri	10	No	FACW
6.			
7.			
8.			
Total Cover:	125		
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%
__ Prevalence Index is ≤3.0[1]
__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
__ Wetland Non-Vascular Plants[1]
__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks: Area dominated by ecologically tolerant meadow species. Juncus is rhizomatous and "traveling" from wetter areas to drier areas.

SOIL

Sampling Point: 8

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12	5 YR 2.5/2	100	5 YR 5/8	2	C	M	Loamy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ________

Depth (inches): ________

Hydric Soil Present? Yes ____ No X

Remarks: Weak redoximorphic features.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plans (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): ____
Water Table Present? Yes ____ No X Depth (inches): ____
Saturation Present? (includes capillary fringe) Yes ____ No X Depth (inches): ____

Wetland Hydrology Present? Yes ____ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Meadow edge adjacent to sagebrush slope. Appears to lack prolonged saturation.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Martis Valley Trail City/County: Placer County Sampling Date: 9/15/09

Applicant/Owner: Northstar Community Services District State: CA Sampling Point: 9

Investigator(s): Jeff Glazner Section, Township, Range: Sections 19,20,24,28,29,30, & 32, T 17 North and R 16 & 17 East

Landform (hillslope, terrace, etc.): floodplain Local relief (concave, convex, none): none Slope (%): 1%

Subregion (LRR): MLRA 22A Lat: 2238956.055°north Long: 7092071.396° west Datum: NAD 83

Soil Map Unit Name: Aquolls and Borolls, 0 to 5 percent slopes NWI classification: R

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? No Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ___
Hydric Soil Present?	Yes X	No ___
Wetland Hydrology Present?	Yes X	No ___

Is the Sampled Area within a Wetland? **Yes X** **No ___**

___ Other Waters

Remarks:

Along Martis Creek tributary – just outside the active channel in adjacent wetland. This wetland is part of a braided perennial stream complex and is lumped with the Perennial Stream as one unit below the OHWM.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1. Salix sp.	10	Yes	OBL
2.			
3.			
4.			
5.			
Total Cover:	10		
Herb Stratum			
1. Carex sp.	60	Yes	FACW
2. Juncus balticus	10	No	OBL
3. Hordeum brachyantherum	20	Yes	FACW
4. Deschampsia cespitosa	5	No	FACW
5.			
6.			
7.			
8.			
Total Cover:	95		
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum ___ % Cover of Biotic Crust ___

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	___	x 1 = ___
FACW species	___	x 2 = ___
FAC species	___	x 3 = ___
FACU species	___	x 4 = ___
UPL species	___	x 5 = ___
Column Totals:	___ (A)	___ (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Wetland Non-Vascular Plants[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes X** **No ___**

Remarks: Robust herbaceous wetland vegetation among braided stream system.

SOIL

Sampling Point: 9

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12	10 YR 4/2	95	5 YR 4/6	5			clayey-loamy	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ________

Depth (inches): ________

Hydric Soil Present? Yes X **No** ____

Remarks: Clayey, organic soil zone in relatively flat drainage bottom.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- X High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plans (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ____ No X Depth (inches): ____

Water Table Present? Yes X No ____ Depth (inches): 20

Saturation Present? (includes capillary fringe) Yes ____ No ____ Depth (inches): ____

Wetland Hydrology Present? Yes X **No** ____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Stream zone, shallow groundwater from perennial flows.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Martis Valley Trail City/County: Placer County Sampling Date: 9/15/09

Applicant/Owner: Northstar Community Services District State: CA Sampling Point: 10

Investigator(s): Jeff Glazner Section, Township, Range: Sections 19,20,24,28,29,30, & 32, T 17 North and R 16 & 17 East

Landform (hillslope, terrace, etc.): terrace Local relief (concave, convex, none): none Slope (%): 2%

Subregion (LRR): MLRA 22A Lat: 2238956.055°north Long: 7092071.396° west Datum: NAD 83

Soil Map Unit Name: Aquolls and Borolls, 0 to 5 percent slopes NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? No Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ____ No ____	Is the Sampled Area within a Wetland? Yes ____ No ____	
Hydric Soil Present? Yes ____ No ____	X Other Waters	
Wetland Hydrology Present? Yes ____ No ____		

Remarks:

Active flowing channel. ±5 cfs. Narrow channel – flows appear consistent over period of time. Drift lines are not seen at this location. Flows regulated above?

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1.	.		
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:			
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum ______ % Cover of Biotic Crust ______

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ______ (A)

Total Number of Dominant Species Across All Strata: ______ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ______ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ______	x 1 = ______
FACW species ______	x 2 = ______
FAC species ______	x 3 = ______
FACU species ______	x 4 = ______
UPL species ______	x 5 = ______
Column Totals: ______ (A)	______ (B)

Prevalence Index = B/A = ______

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ____ No ____

Remarks: Unvegetated channel. Bankside vegetation includes Salix spp.

SOIL

Sampling Point: 10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features				Texture	Remarks
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ______ No ______

Remarks: None taken – scoured channel with flowing water.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plans (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes X No ______ Depth (inches): ______

Water Table Present? Yes ______ No ______ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ______ No ______ Depth (inches): ______

Wetland Hydrology Present? Yes ______ No ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Flowing water; appears perennial.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Martis Valley Trail City/County: Placer County Sampling Date: 9/15/09

Applicant/Owner: Northstar Community Services District State: CA Sampling Point: 11

Investigator(s): Jeff Glazner Section, Township, Range: Sections 19,20,24,28,29,30, & 32, T 17 North and R 16 & 17 East

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): concave Slope (%): 5%

Subregion (LRR): MLRA 22A Lat: 2238956.055°north Long: 7092071.396° west Datum: NAD 83

Soil Map Unit Name: Umpa stony sandy loam, 2 to 30 percent slopes NWI classification: R

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? No Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No ____	Is the Sampled Area within a Wetland? Yes ____ No ____
Hydric Soil Present?	Yes ____	No ____	X Other Waters
Wetland Hydrology Present?	Yes ____	No ____	

Remarks:

Intermittent stream. Well defined channel lacking hydrophytic or riparian vegetation. Dry at time of site visit.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1.	.		
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:			
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ____ No ____

Remarks: Unvegetated channel.

SOIL

Sampling Point: 11

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ______________

Depth (inches): ______________

Hydric Soil Present? Yes ______ No ______

Remarks: None taken – scoured channel with rocky bottom.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plans (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ______ No ______ Depth (inches): ____________

Water Table Present? Yes ______ No ______ Depth (inches): ____________

Saturation Present? (includes capillary fringe) Yes ______ No ______ Depth (inches): ____________

Wetland Hydrology Present? Yes ______ No ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Channel width above culvert is 12 ft and below culvert is 15 ft. Flow appears to have ceased early in the summer as there is little evidence of recent water.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Martis Valley Trail City/County: Placer County Sampling Date: 8/20/09

Applicant/Owner: Northstar Community Services District State: CA Sampling Point: 12

Investigator(s): Jeff Glazner Section, Township, Range: Sections 19,20,24,28,29,30, & 32, T 17 North and R 16 & 17 East

Landform (hillslope, terrace, etc.): channel Local relief (concave, convex, none): concave Slope (%): 6%

Subregion (LRR): MLRA 22A Lat: 2238956.055°north Long: 7092071.396° west Datum: NAD 83

Soil Map Unit Name: Jorge-Cryumbrepts, wet-Tahoma complex, 2 to 30 percent slopes NWI classification: R

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? No Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ____ No ____	**Is the Sampled Area within a Wetland?** **Yes ____ No ____**	
Hydric Soil Present? Yes ____ No ____	**X Other Waters**	
Wetland Hydrology Present? Yes ____ No ____		

Remarks:

In West Martis Creek channel. Rocky streambed with evidence of periodic high flows. Channel dry during field visit.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1. .	.		
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:			
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes ____ No ____**

Remarks: Unvegetated channel. Bankside vegetation includes Salix spp, mountain alder and a few scattered aspens.

SOIL

Sampling Point: 12

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ______________

Depth (inches): ______________

Hydric Soil Present? Yes ______ No ______

Remarks: None taken –scoured channel with rocky bottom.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plans (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes _____ No _____ Depth (inches): __________

Water Table Present? Yes _____ No _____ Depth (inches): __________

Saturation Present? (includes capillary fringe) Yes _____ No _____ Depth (inches): __________

Wetland Hydrology Present? Yes _____ No _____

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Seasonally high flows.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Martis Valley Trail City/County: Placer County Sampling Date: 8/20/09

Applicant/Owner: Northstar Community Services District State: CA Sampling Point: 13

Investigator(s): Jeff Glazner Section, Township, Range: Sections 19,20,24,28,29,30, & 32, T 17 North and R 16 & 17 East

Landform (hillslope, terrace, etc.): channel Local relief (concave, convex, none): concave Slope (%): 5%

Subregion (LRR): MLRA 22A Lat: 2238956.055°north Long: 7092071.396° west Datum: NAD 83

Soil Map Unit Name: Fugawee-Tahoma complex, 2 to 30 percent slopes NWI classification: R

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? No Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No ____	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** ____
Hydric Soil Present?	Yes ____	No ____	X **Other Waters**
Wetland Hydrology Present?	Yes ____	No ____	

Remarks:

Ephemeral stream, tributary to Martis Creek. Rocky streambed with evidence of periodic low flows. Channel passed through culvert under dirt road just below data point location.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1.	.		
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:			
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x 1 = ____
FACW species	____	x 2 = ____
FAC species	____	x 3 = ____
FACU species	____	x 4 = ____
UPL species	____	x 5 = ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

___ Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Wetland Non-Vascular Plants[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ____ **No** ____

Remarks: Unvegetated channel. Bankside vegetation is upland forest (red fir, lodgepole pine).

SOIL

Sampling Point: 13

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? Yes _______ No ______

Remarks: None taken –scoured channel with rocky bottom.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plans (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes _____ No _____ Depth (inches):__________

Water Table Present? Yes _____ No _____ Depth (inches): __________

Saturation Present? (includes capillary fringe) Yes _____ No _____ Depth (inches): __________

Wetland Hydrology Present? Yes _____ No ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Storm and snowmelt related flows.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Martis Valley Trail City/County: Placer County Sampling Date: 7/23/09

Applicant/Owner: Northstar Community Services District State: CA Sampling Point: 14

Investigator(s): Jeff Glazner, Erin Gottschalk Fisher Section, Township, Range: Sections 19,20,24,28,29,30, & 32, T 17 North and R 16 & 17 East

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): flat Slope (%): 4%

Subregion (LRR): MLRA 22A Lat: 2238956.055°north Long: 7092071.396° west Datum: NAD 83

Soil Map Unit Name: Aquolls and Borolls, 0 to 5 percent slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation ___, Soil ___, or Hydrology ___ significantly disturbed? No Are "Normal Circumstances" present? Yes X No ___

Are Vegetation ___, Soil ___, or Hydrology ___ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No X	**Is the Sampled Area within a Wetland?** **Yes** ___ **No** X
Hydric Soil Present?	Yes ___	No X	
Wetland Hydrology Present?	Yes ___	No X	

Remarks:

Area adjacent to existing trail in sagebrush/meadow transitional area. Upper portion of sloped meadow that drains toward tributary Martis Creek.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1. Artemisia arbuscula	50	Yes	---
2.			
3.			
4.			
5.			
Total Cover:	50		
Herb Stratum			
1. Eremogone congesta var. congesta	20	Yes	---
2. Ivesia sericoleuca	20	Yes	---
3. Poa bulbosa ssp. vivipara	20	Yes	---
4. Balsamorhiza hookeri	15	No	---
5. Lupinus lepidus var. confertus	10	No	---
6. Castilleja pilosa	10	No	---
7. Elymus elymoides	15	No	---
8.			
Total Cover:	110		
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum ___ % Cover of Biotic Crust ___

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks: Upland meadow species

SOIL

Sampling Point: 14

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-12	5 YR 3/2	100	----					

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ______ No X

Remarks: Lacks redoximorphic features.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plans (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ______ No X Depth (inches): ______

Water Table Present? Yes ______ No X Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ______ No X Depth (inches): ______

Wetland Hydrology Present? Yes ______ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Lacks evidence of prolonged saturation.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Martis Valley Trail City/County: Placer County Sampling Date: 7/23/09

Applicant/Owner: Northstar Community Services District State: CA Sampling Point: 15

Investigator(s): Jeff Glazner, Erin Gottschalk Fisher Section, Township, Range: Sections 19,20,24,28,29,30, & 32, T 17 North and R 16 & 17 East

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): flat Slope (%): 2%

Subregion (LRR): MLRA 22A Lat: 2238956.055°north Long: 7092071.396° west Datum: NAD 83

Soil Map Unit Name: Aquolls and Borolls, 0 to 5 percent slopes NWI classification: N/A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? No Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X No ____	Is the Sampled Area within a Wetland?	Yes ____ No X
Hydric Soil Present?	Yes ____ No X		
Wetland Hydrology Present?	Yes ____ No X		

Remarks:

Suspect area at toe of slope for Hwy 267. Historically modified and highly disturbed. Supports meadow vegetation but lacks evidence of prolonged saturation (no hydric soil or hydrologic indicators).

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1. Artemisia arbuscula	5	No	---
2. Salix spp.	20	Yes	FACW*
3.			
4.			
5.			
Total Cover:	25		
Herb Stratum			
1. Poa pratensis ssp. pratensis	20	Yes	FACU
2. Potentilla glandulosa	15	No	FAC
3. Juncus bufonius	20	Yes	FACW
4. Trifolium longipes var. elmeri	80	Yes	FACW
5. Poa secunda	5	No	FACU
6. Symphyotrichum spathulatum var. spathulatum	15	No	FAC
7.			
8.			
Total Cover:	155		
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

__ Prevalence Index is ≤ 3.0[1]

__ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

__ Wetland Non-Vascular Plants[1]

__ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks: Numerous meadow species in formerly disturbed area. Adjacent to existing trail.

SOIL

Sampling Point: 15

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	7.5 YR 3/2	100	----					Includes rocks (cast off) from trail.

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ______________

Depth (inches): ______________

Hydric Soil Present? Yes ______ No X

Remarks: Unconsolidated soils at toe of Hwy 267 slope.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plans (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ______	No X	Depth (inches): ______
Water Table Present?	Yes ______	No X	Depth (inches): ______
Saturation Present? (includes capillary fringe)	Yes ______	No X	Depth (inches): ______

Wetland Hydrology Present? Yes ______ No X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: No evidence of hydrology. No hydrologic indicators.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Martis Valley Trail City/County: Placer County Sampling Date: 8/20/09

Applicant/Owner: Northstar Community Services District State: CA Sampling Point: 16

Investigator(s): Jeff Glazner Section, Township, Range: Sections 19,20,24,28,29,30, & 32, T 17 North and R 16 & 17 East

Landform (hillslope, terrace, etc.): channel Local relief (concave, convex, none): concave Slope (%): 3%

Subregion (LRR): MLRA 22A Lat: 2238956.055°north Long: 7092071.396° west Datum: NAD 83

Soil Map Unit Name: Inville-Riverwash-Aquolls complex, 2 to 5 percent slopes NWI classification: ______

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? No Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ____ No ____ Hydric Soil Present? Yes ____ No ____ Wetland Hydrology Present? Yes ____ No ____	**Is the Sampled Area within a Wetland?**	**Yes ____ No ____** **X Other Waters**

Remarks:

Ephemeral stream emerging from culvert carrying roadside drainage from Hwy 267. Very minor channel.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1.			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1.	.		
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:			
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ____ No ____

Remarks: Unvegetated channel in disturbed dry meadow area near Northstar Golf Course.

SOIL

Sampling Point: 16

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features				Texture	Remarks
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]		

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ______ No ______

Remarks: None taken –scoured channel with rocky bottom.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plans (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ______ No ______ Depth (inches): ______

Water Table Present? Yes ______ No ______ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ______ No ______ Depth (inches): ______

Wetland Hydrology Present? Yes ______ No ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Storm and snowmelt related flows.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Martis Valley Trail City/County: Placer County Sampling Date: 7/23/09

Applicant/Owner: Northstar Community Services District State: CA Sampling Point: 17

Investigator(s): Jeff Glazner, Erin Gottschalk Fisher Section, Township, Range: Sections 19,20,24,28,29,30, & 32, T 17 North and R 16 & 17 East

Landform (hillslope, terrace, etc.): channel Local relief (concave, convex, none): concave Slope (%): 3%

Subregion (LRR): MLRA 22A Lat: 2238956.055°north Long: 7092071.396° west Datum: NAD 83

Soil Map Unit Name: Kyburz-Trojan complex, 9 to 30 percent slopes NWI classification: R

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? No Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No ____	**Is the Sampled Area within a Wetland?** **Yes ____ No ____**
Hydric Soil Present?	Yes ____	No ____	**X Other Waters**
Wetland Hydrology Present?	Yes ____	No ____	

Remarks:
Middle Martis Creek - tributary to Martis Creek. Intermittent Stream.

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1. Salix sp			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1.	.		
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:			
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species	____	x 1 = ____
FACW species	____	x 2 = ____
FAC species	____	x 3 = ____
FACU species	____	x 4 = ____
UPL species	____	x 5 = ____
Column Totals:	____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ____ No ____

Remarks: Willow-lined channel. Riprap near culvert outfall.

SOIL

Sampling Point: 17

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ____________

Depth (inches): ____________

Hydric Soil Present? Yes _______ No ______

Remarks: None taken –scoured channel with rocky bottom.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plans (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes X No ____ Depth (inches): <1" (in culvert)
Water Table Present? Yes _____ No _____ Depth (inches): ____________
Saturation Present? (includes capillary fringe) Yes _____ No _____ Depth (inches): ____________

Wetland Hydrology Present? Yes _____ No ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Water trickling out of metal culvert under road. Water goes under rocky channel bottom. No flowing water at data point. In the area surrounding the data point, tributary varies with a 5 to 10 feet wide ordinary high water mark.

Appendix C.
Plant Species Observed in the Martis Valley Regional Trail Study Corridor

Appendix C. Plant Species Observed in the Martis Valley Trail Study Area

Common Name	Taxon	Wetland Status
Agoseris	*Agoseris sp.*	-
Annual hairgrass	*Deschampsia danthonioides*	FACW
Antelope bush	*Purshia tridentata var. tridentata*	-
Baltic rush	*Juncus balticus*	OBL
Big sagebrush	*Artemisia tridentata*	-
Bigleaf avens	*Geum macrophyllum*	FACW
Bitter dogbane	*Apocynum androsaemifolium*	-
Blazing star	*Mentzelia dispersa*	-
Bloomer's fleabane	*Erigeron bloomeri var. bloomeri*	-
Blue wildrye	*Elymus glaucus*	FACU
Blue-eyed Mary	*Collinsia parviflora*	-
Bracken fern	*Pteridium aquilinum var. pubescens*	FACU
Bulbous bluegrass	*Poa bulbosa subsp. vivipara*	-
Campion	*Silene douglasii*	-
Capitate sandwort	*Eremogone congesta var. congesta*	-
Cheat grass	*Bromus tectorum*	-
Claytonia	*Claytonia rubra subsp. rubra*	FAC
Clustered broom-rape	*Orobanche fasciculata*	-
Common camassia	*Camassia quamash subsp. breviflora*	FACW
Common dandelion	*Taraxacum officinale*	FACU
Common horsetail	*Equisetum arvense*	FAC
Common monkeyflower	*Mimulus guttatus*	OBL
Common timothy	*Phleum pratense*	FACU
Cow parsnip	*Heracleum lanatum*	FACU
Crested wheatgrass	*Agropyron cristatum*	-
Cryptantha	*Cryptantha affinis*	-
Dense-flower spike-primrose	*Epilobium densiflorum*	OBL
Douglas' knotweed	*Polygonum douglasii*	FACU
Dwarf larkspur	*Delphinium nuttallianum*	FACW
Dwarf lupine	*Lupinus lepidus var. confertus*	-
Dwarf woolly-heads	*Psilocarphus brevissimus var. brevissimus*	OBL
Flat-scale balsam-root	*Balsamorhiza hookeri*	-
Fleshy porterella	*Porterella carnulosa*	OBL
Geyer's willow	*Salix geyeriana*	OBL
Glandular cinquefoil	*Potentilla glandulosa*	FAC
Great Basin navarretia	*Navarretia intertexta subsp. propinqua*	FAC*
Greenleaf manzanita	*Arctostaphylos patula*	-
Indian paintbrush	*Castilleja pilosa*	-

Common Name	Taxon	Wetland Status
Jeffrey pine	*Pinus jeffreyi*	-
Kelloggia	*Kelloggia galioides*	-
Kentucky bluegrass	*Poa pratensis subsp. pratensis*	FACU
Lemmon's willow	*Salix lemmonii*	OBL
Locoweed	*Astragalus purshii var. tinctus*	-
Lodgepole pine	*Pinus contorta subsp. murrayana*	FAC
Long-stalk clover	*Trifolium longipes var. elmeri*	FACW
Long-stalk starwort	*Stellaria longipes var. longipes*	OBL
Low sagebrush	*Artemisia arbuscula subsp. arbuscula*	-
Mahala mat	*Ceanothus prostratus*	-
Mat muhly	*Muhlenbergia richardsonis*	FAC
Meadow barley	*Hordeum brachyantherum*	FACW
Monardella	*Monardella odoratissima subsp. pallida*	FACU
Monkeyflower	*Mimulus breweri*	-
Mountain alder	*Alnus incana subsp. tenuifolia*	NI
Mountain butterweed	*Senecio integerrimus*	FAC
Mountain mule's-ears	*Wyethia mollis*	-
Mountain tarweed	*Madia glomerata*	FACU-
Mountain timothy	*Phleum alpinum*	FACW
Mountain violet	*Viola purpurea subsp. purpurea*	-
Navarretia	*Navarretia capillaris*	-
Navarretia	*Navarretia leptalea subsp. bicolor*	-
Nevada buckwheat	*Eriogonum umbellatum var. nevadense*	-
Nevada lomatium	*Lomatium nevadense var. nevadense*	-
Nude buckwheat	*Eriogonum nudum*	-
One-spike oatgrass	*Danthonia unispicata*	-
Onion	*Allium campanulatum*	-
Orchard grass	*Dactylis glomerata*	FACU
Orthocarpus	*Orthocarpus cuspidatus subsp. cryptanthus*	-
Pacific ponderosa pine	*Pinus ponderosa*	FACU
Parish's yampah	*Perideridia parishii subsp. latifolia*	FACW
Parry's arnica	*Arnica parryi*	-
Phacelia	*Phacelia hastata subsp. hastata*	-
Plumas ivesia	*Ivesia sericoleuca*	-
Polygala knotweed	*Polygonum polygaloides subsp. kelloggii*	NI
Popcornflower	*Plagiobothrys hispidulus*	FACW
Prairie flax	*Linum lewisii var. lewisii*	-
Quackgrass	*Elytrigia repens*	NI*
Quaking aspen	*Populus tremuloides*	FAC+
Rubber rabbitbrush	*Ericameria nauseosa*	-

Common Name	Taxon	Wetland Status
Rush	*Juncus sp.*	VARIES
Rydberg's beardtongue	*Penstemon rydbergii var. oreocharis*	FAC
Secund bluegrass	*Poa secunda*	FACU
Sedge	*Carex sp.*	VARIES
Spanish-clover	*Lotus purshianus var. purshianus*	-
Spreading yellow cress	*Rorippa sinuata*	FACW
Squirreltail	*Elymus elymoides*	-
Stemless thistle	*Cirsium scariosum var. americanum*	FAC
Summer cottonweed	*Epilobium brachycarpum*	-
Thickstem aster	*Eurybia integrifolia*	-
Toad rush	*Juncus bufonius*	FACW+
Tobacco brush	*Ceanothus velutinus var. velutinus*	-
Tufted hairgrass	*Deschampsia cespitosa subsp. cespitosa*	FACW
Water speedwell	*Veronica anagallis-aquatica*	OBL
Western burnet	*Sanguisorba occidentalis*	-
Western buttercup	*Ranunculus occidentalis*	FACW
Western Jacob's-ladder	*Polemonium occidentale*	OBL
Western juniper	*Juniperus occidentalis*	-
Western lady fern	*Athyrium filix-femina var. cyclosorum*	FAC
Western marsh cudweed	*Gnaphalium palustre*	FACW
Western mountain aster	*Symphyotrichum spathulatum var. spathulatum*	FAC
Western wallflower	*Erysimum capitatum subsp. capitatum*	-
White clover	*Trifolium repens*	FACU+
White fir	*Abies concolor*	-
White pigweed	*Chenopodium album*	FAC
Wild rose	*Rosa sp.*	VARIES
Willow	*Salix sp.*	VARIES
Willow dock	*Rumex salicifolius*	OBL
Woolly mullein	*Verbascum thapsus*	-
Yellow salsify	*Tragopogon dubius*	-

Appendix D.
GIS Files

GIS Files are provided to the Corps and are available upon request.

APPENDIX C4

Wetland Delineation Supplement

September 22, 2011

Mr. William Ness
Senior Project Manager
Regulatory Division
Sacramento District
U.S. Army Corps of Engineers
650 Capitol Mall, Suite 5-200
Sacramento, California 95814-4708

Subject: Revised Preliminary Wetland Delineation Map
Martis Valley Regional Trail Project
Placer County, California

Dear Mr. Ness:

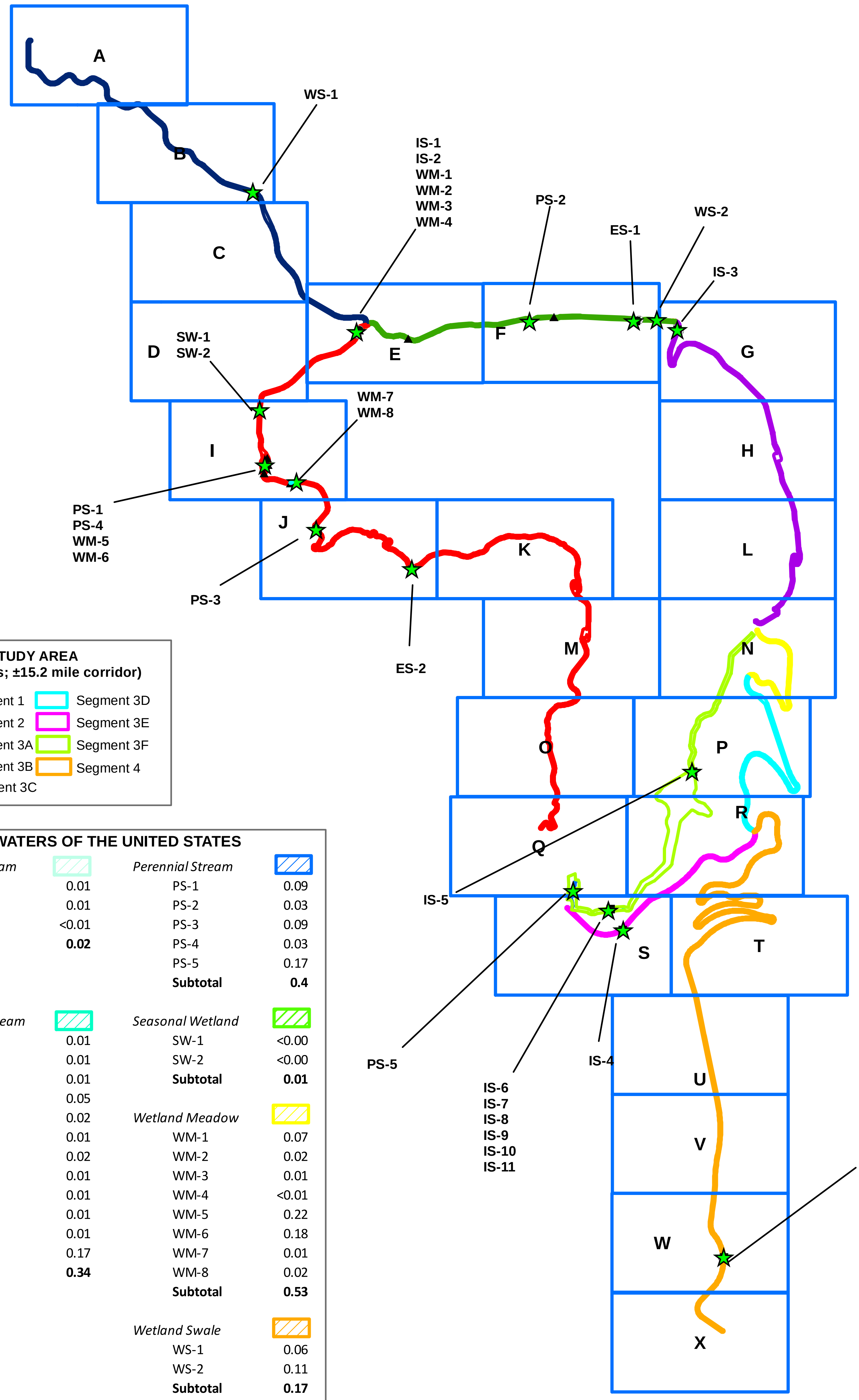
The attached *Preliminary Wetland Delineation Map* for the Martis Valley Regional Trail project study area has been revised based on your field verification visit to the project site with Jeff Glazner. Included with this submittal are data sheets for sampling points 18 and 19 taken along Segment 3F of the proposed trail corridor. These data sheets should be added to the previously-submitted wetland delineation report.

Please contact me or Jeff (530-888-0130) if you have any questions.

Sincerely,

Markus Lang
North Fork Associates

Encl: Preliminary Wetland Delineation Map (25 sheets), Wetland Determination Data Form, Sampling Point 18; Wetland Determination Data Form, Sampling Point 19



STUDY AREA
(±107 acres; ±15.2 mile corridor)

- Segment 1
- Segment 2
- Segment 3A
- Segment 3B
- Segment 3C
- Segment 3D
- Segment 3E
- Segment 3F
- Segment 4

WATERS OF THE UNITED STATES

Ephemeral Stream		*Perennial Stream*	
ES-1	0.01	PS-1	0.09
ES-2	0.01	PS-2	0.03
ES-3	<0.01	PS-3	0.09
Subtotal	**0.02**	PS-4	0.03
		PS-5	0.17
		Subtotal	**0.4**
Intermittent Stream		*Seasonal Wetland*	
IS-1	0.01	SW-1	<0.00
IS-2	0.01	SW-2	<0.00
IS-3	0.01	**Subtotal**	**0.01**
IS-4	0.05		
IS-5	0.02	*Wetland Meadow*	
IS-6	0.01	WM-1	0.07
IS-7	0.02	WM-2	0.02
IS-8	0.01	WM-3	0.01
IS-9	0.01	WM-4	<0.01
IS-10	0.01	WM-5	0.22
IS-11	0.01	WM-6	0.18
IS-12	0.17	WM-7	0.01
Subtotal	**0.34**	WM-8	0.02
		Subtotal	**0.53**
		Wetland Swale	
		WS-1	0.06
		WS-2	0.11
		Subtotal	**0.17**
TOTAL WATERS OF THE U.S. (Acres)			**1.47**

north fork associates

Notes:
1. T 16N,17N; R 16E,17E; S 5,8,13,19,20,24,28,29,30,32,& 33 32 of Truckee & Martis Peak, CA, USGS 7.5 minute topographic quadrangle.
2. Study Area: 107 acres
3. Aerial photographs: Auerbach Engineering Corp, 2009; NAIP, 2009.
4. The boundaries and jurisdictional status of all waters shown on this map are preliminary and subject to verification by the U.S. Army Corps of Engineers.
5. Original map size: 11"x17"
6. Final map issued after verification.

Prepared For:
Northstar Community Services District
908 Northstar Drive, Northstar, CA 96161
Contact: Mike Staudenmayer, (530) 562-0747

Base data provided by Auerbach Engineering Corp.

DELINEATOR: Jeff Glazner, Salix Consulting
DATES OF FIELDWORK: June 25, July 9, July 23, July 29, August 19, and September 15, 2009, July 8, 2011.
DRAWN BY: M. Lang

USACE REGULATORY FILE#: TBD
VERIFIED BY: William Ness, U.S.A.C.E
DATE OF VERIFICATION: August 10, 2011

Preliminary Wetland Delineation Map

Martis Valley Regional Trail

Placer County, California

N

0 1,000 2,000 Feet
1 inch = 2,001 feet

Map Date: September 21, 2011

PREPARED BY:

north fork associates

Aerial photograph and base data provided by: Auerbach Engineering Corp, September 2009.

N

0 50 100 200

1 inch = 200 feet

Study Area (±15.2 miles)

- Segment 1
- Segment 2
- Segment 3A
- Segment 3B
- Segment 3C
- Segment 3D
- Segment 3E
- Segment 3F
- Segment 4

WATERS OF THE UNITED STATES

- Ephemeral Stream
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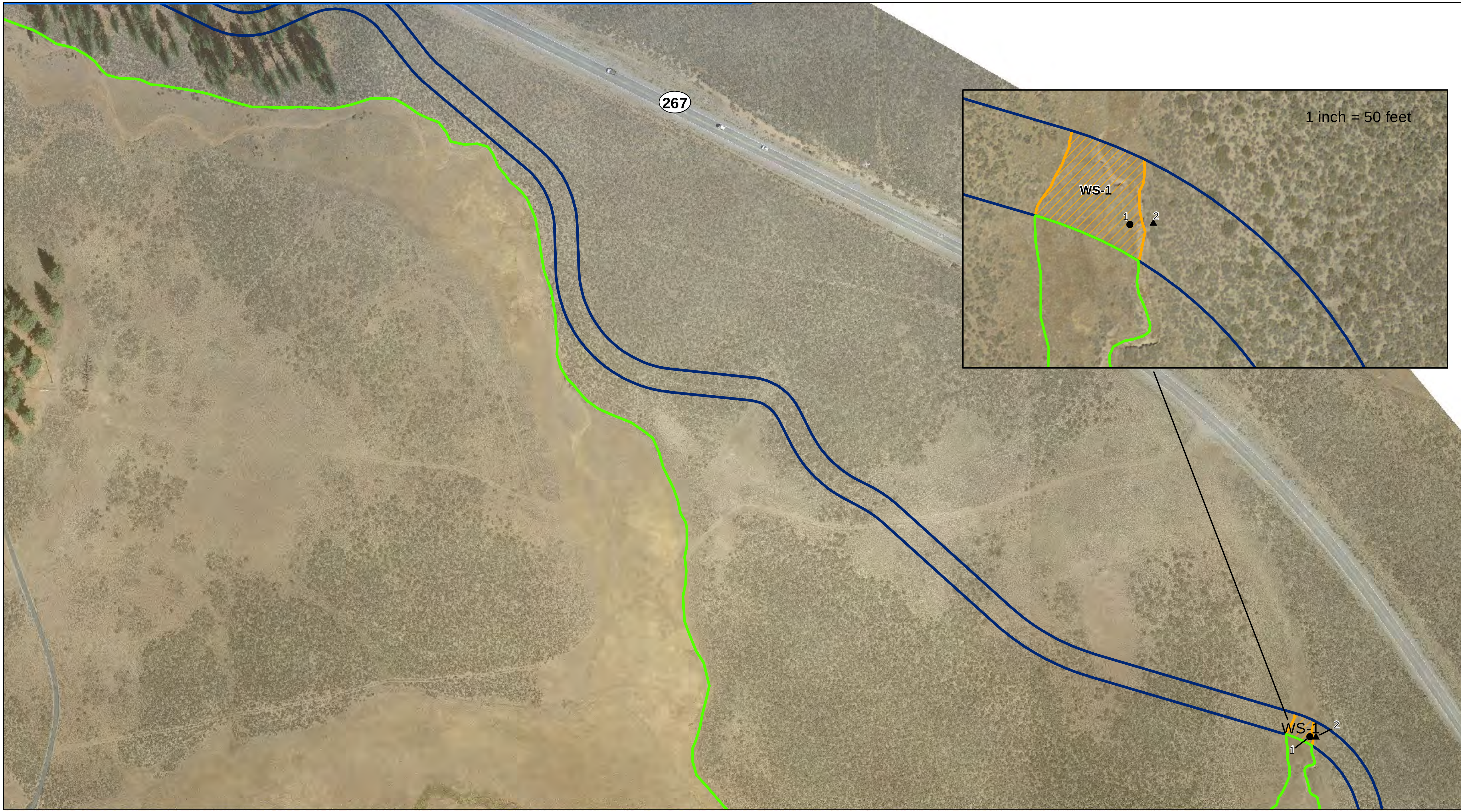
- Wetland Data Point
- Waters Data Point
- Upland Data Point
- Culvert
- Meadow Line

PRELIMINARY WETLAND DELINEATION

Martis Valley Regional Trail

Placer County, CA

Sheet A



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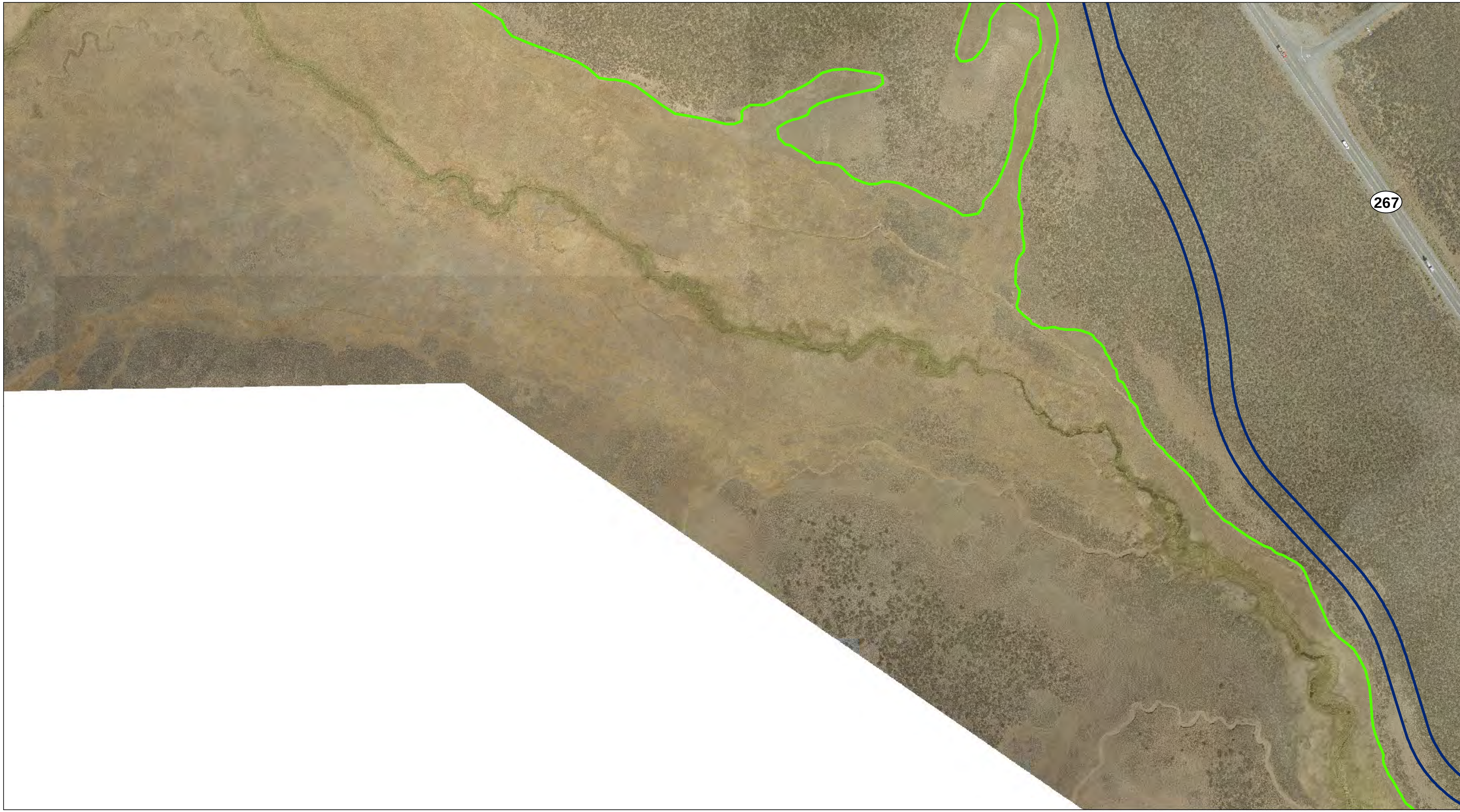
PRELIMINARY WETLAND DELINEATION

Martis Valley Regional Trail

Placer County, CA

Sheet B



PREPARED BY:

north fork associates

Aerial photograph and base data provided by: Auerbach Engineering Corp, September 2009.

N

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PRELIMINARY WETLAND DELINEATION

Martis Valley Regional Trail

Placer County, CA

Sheet C

PREPARED BY:

north fork associates

Aerial photograph and base data provided by: Auerbach Engineering Corp, September 2009; NAIP 2009.

Study Area (±15.2 miles)

Segment 1
Segment 2
Segment 3A
Segment 3B
Segment 3C
Segment 3D
Segment 3E
Segment 3F
Segment 4

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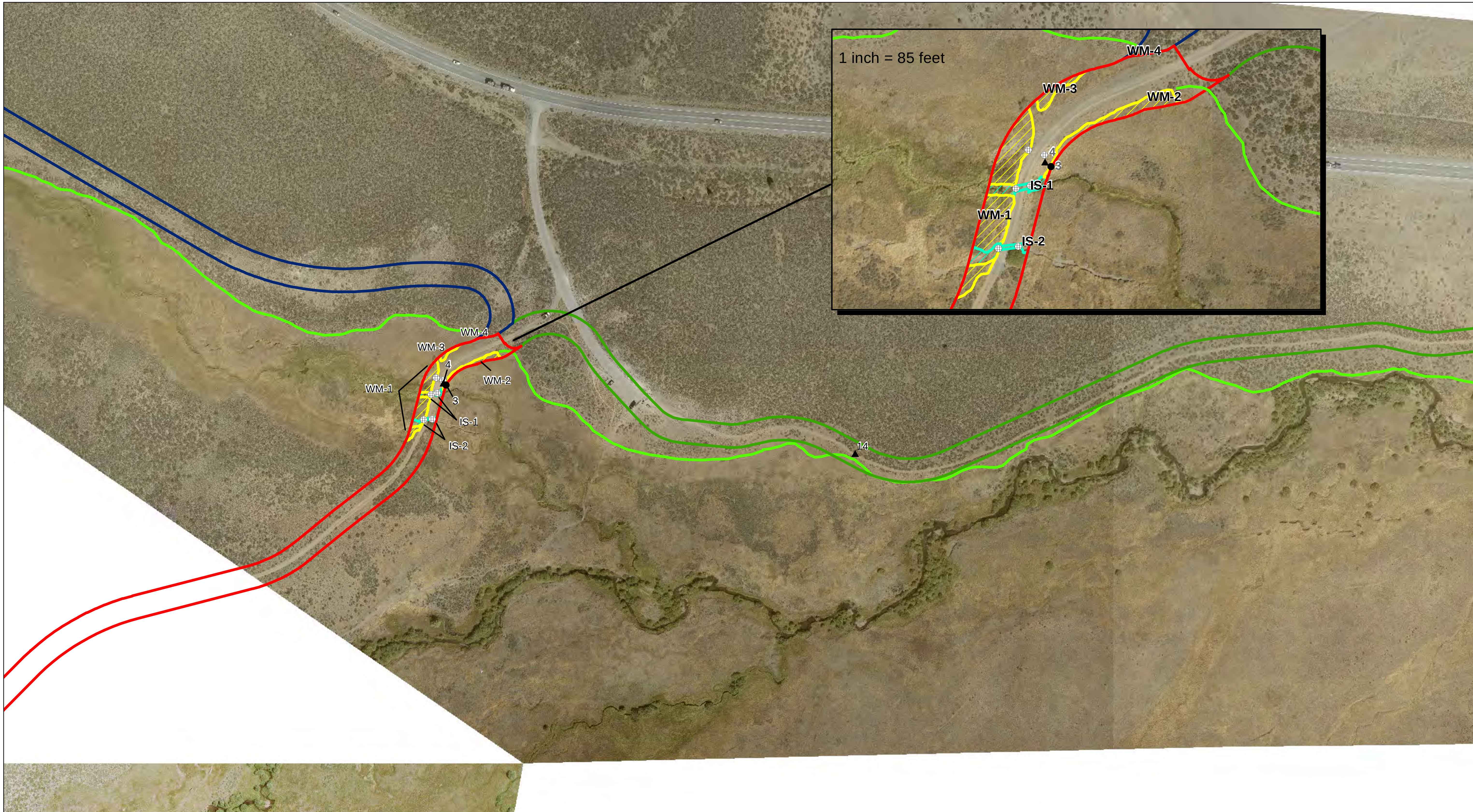
Waters Data Point
Upland Data Point
Culvert
Meadow Line

PRELIMINARY WETLAND DELINEATION

Martis Valley Regional Trail

Placer County, CA

Sheet D



PREPARED BY:

north fork associates

Aerial photograph and base data provided by: Auerbach Engineering Corp, September 2009; NAIP 2009.

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1 inch = 200 feet

Study Area (±15.2 miles)

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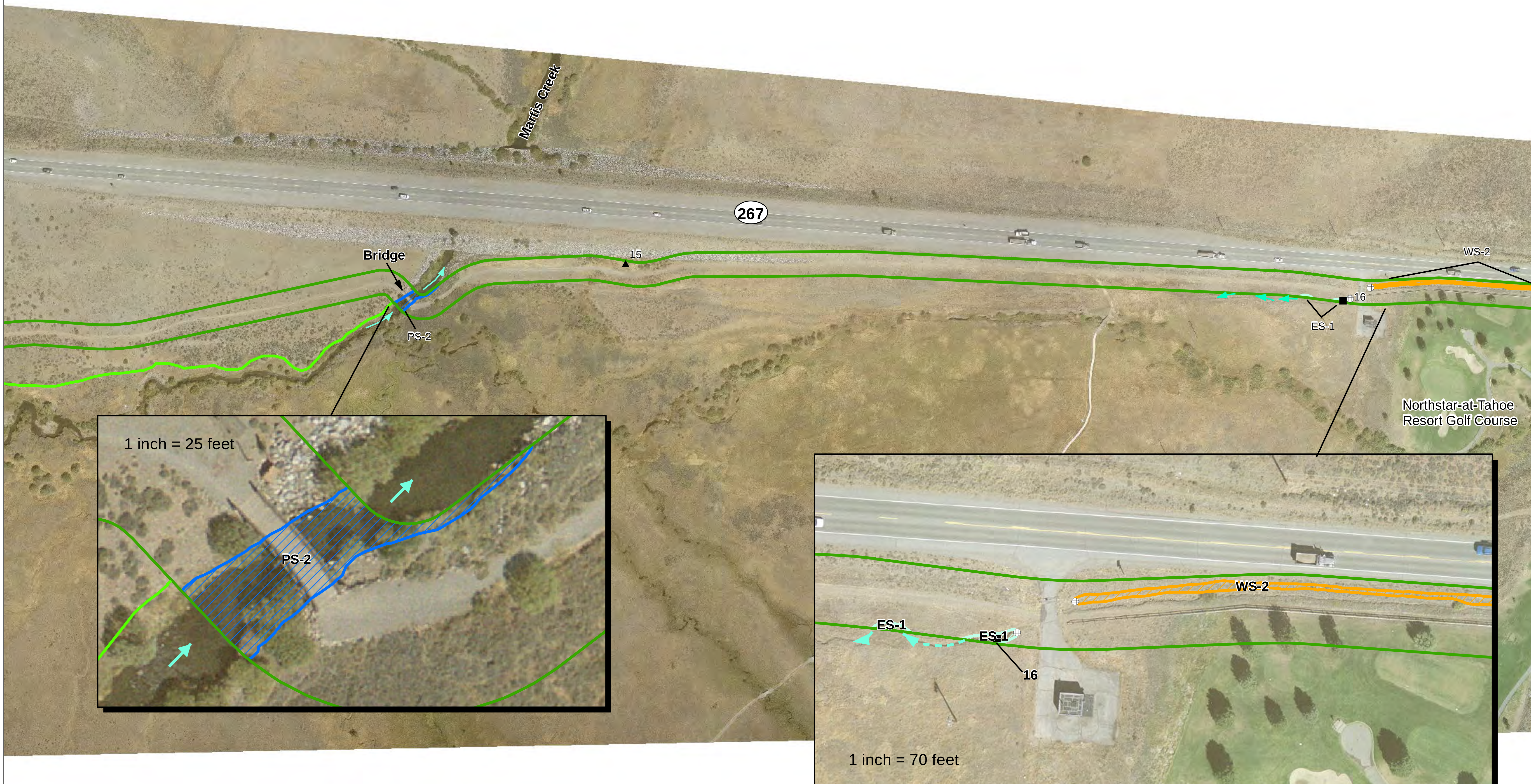
PRELIMINARY WETLAND DELINEATION

Martis Valley Regional Trail

Placer County, CA

Sheet E



PREPARED BY:

north fork associates

Aerial photograph and base data provided by: Auerbach Engineering Corp, September 2009; NAIP 2009.

N

0 50 100 200

1 inch = 200 feet

Study Area (±15.2 miles)

- Segment 1
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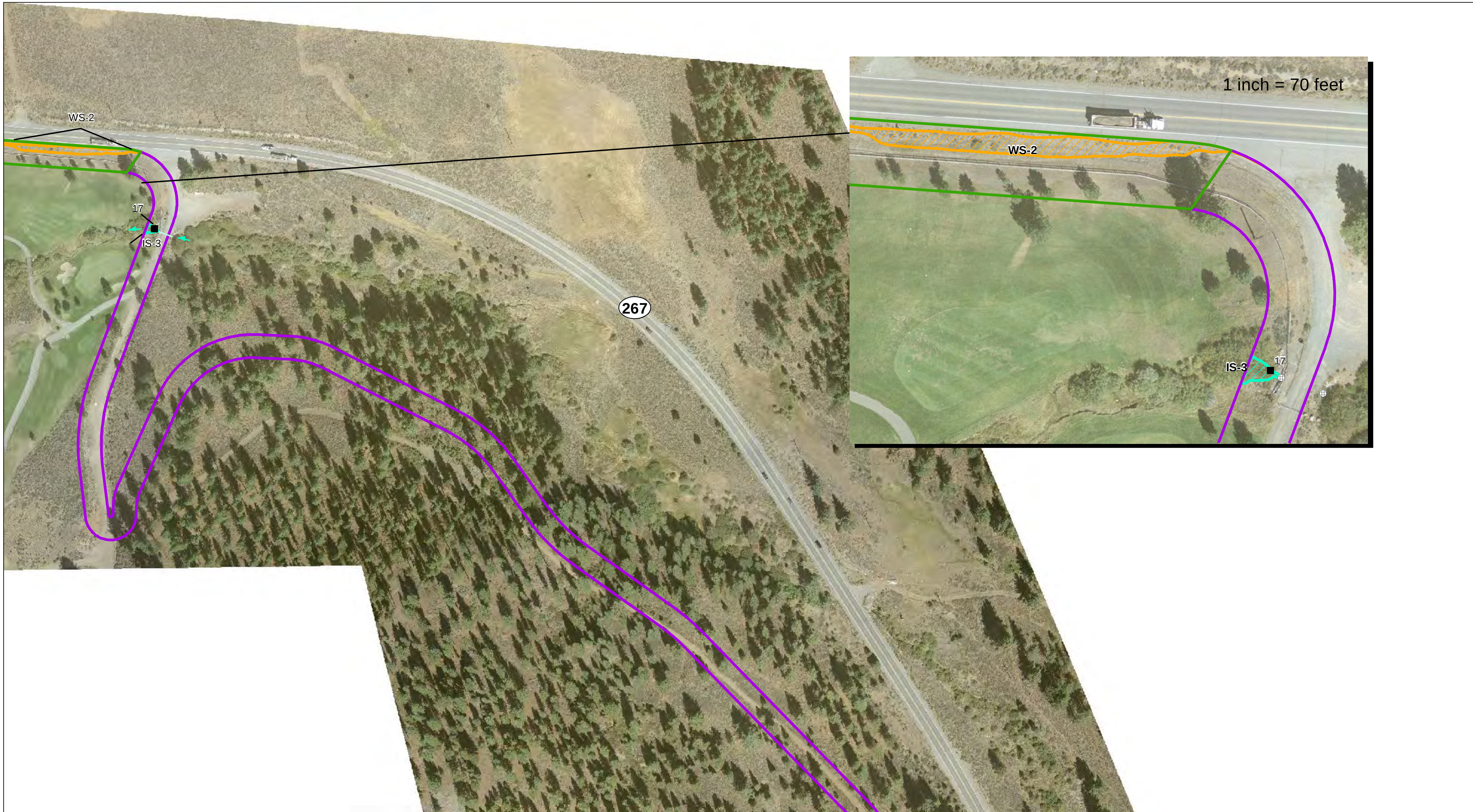
PRELIMINARY WETLAND DELINEATION

Martis Valley Regional Trail

Placer County, CA

Sheet F



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Aerial photograph and
base data provided by:
Auerbach Engineering Corp,
September 2009.

N

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1 inch = 200 feet

Study Area (±15.2 miles)

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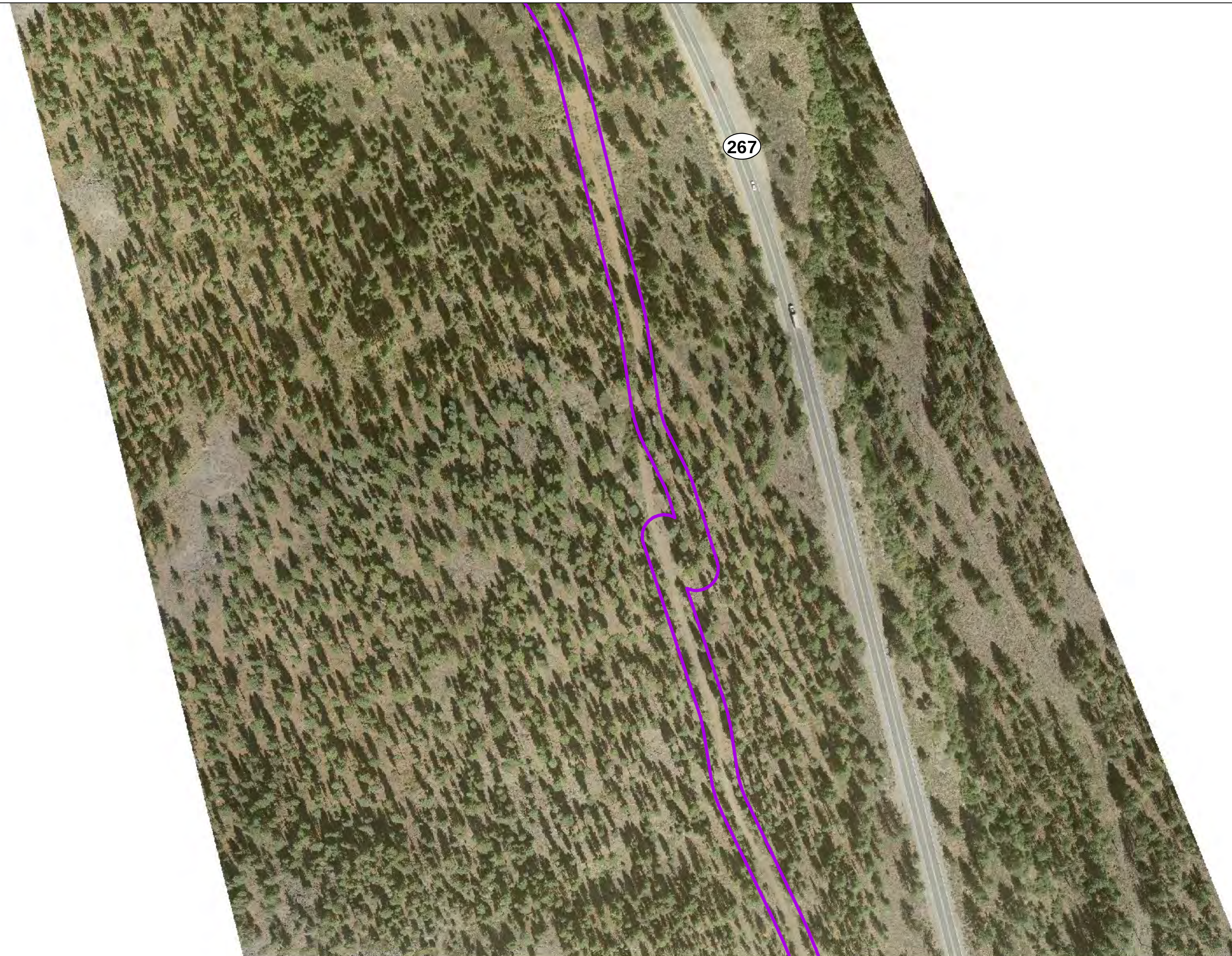
PRELIMINARY
WETLAND DELINEATION

Martis Valley Regional Trail

Placer County, CA

Sheet G



PREPARED BY:

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Aerial photograph and base data provided by: Auerbach Engineering Corp, September 2009.

N

0 50 100 200

1 inch = 200 feet

Study Area (±15.2 miles)

- Segment 1
- Segment 2
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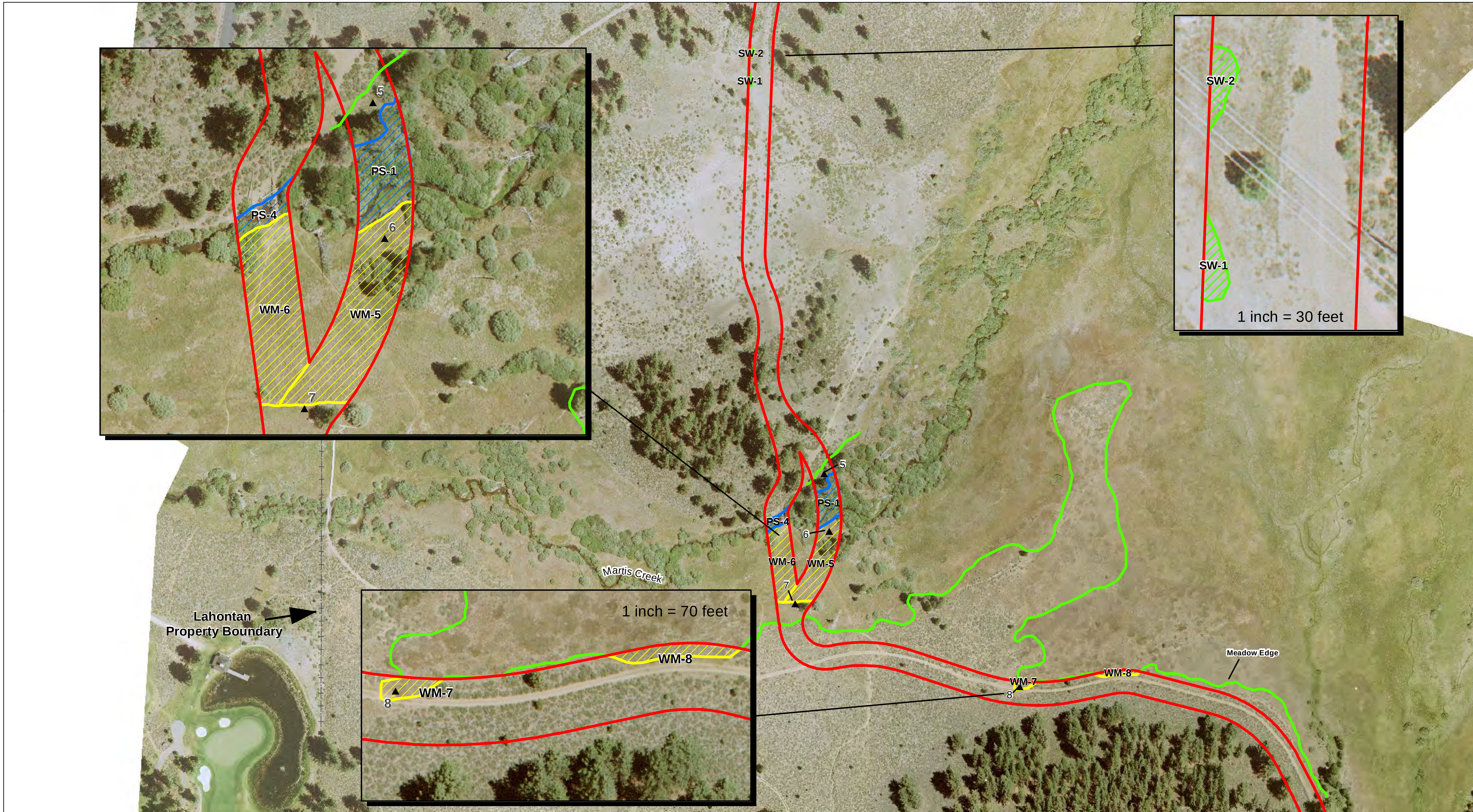
PRELIMINARY WETLAND DELINEATION

Martis Valley Regional Trail

Placer County, CA

Sheet H



PREPARED BY:

Aerial photograph and base data provided by: Auerbach Engineering Corp, September 2009; NAIP 2009.

N

0 50 100 200

1 inch = 200 feet

Study Area (±15.2 miles)

- Segment 1
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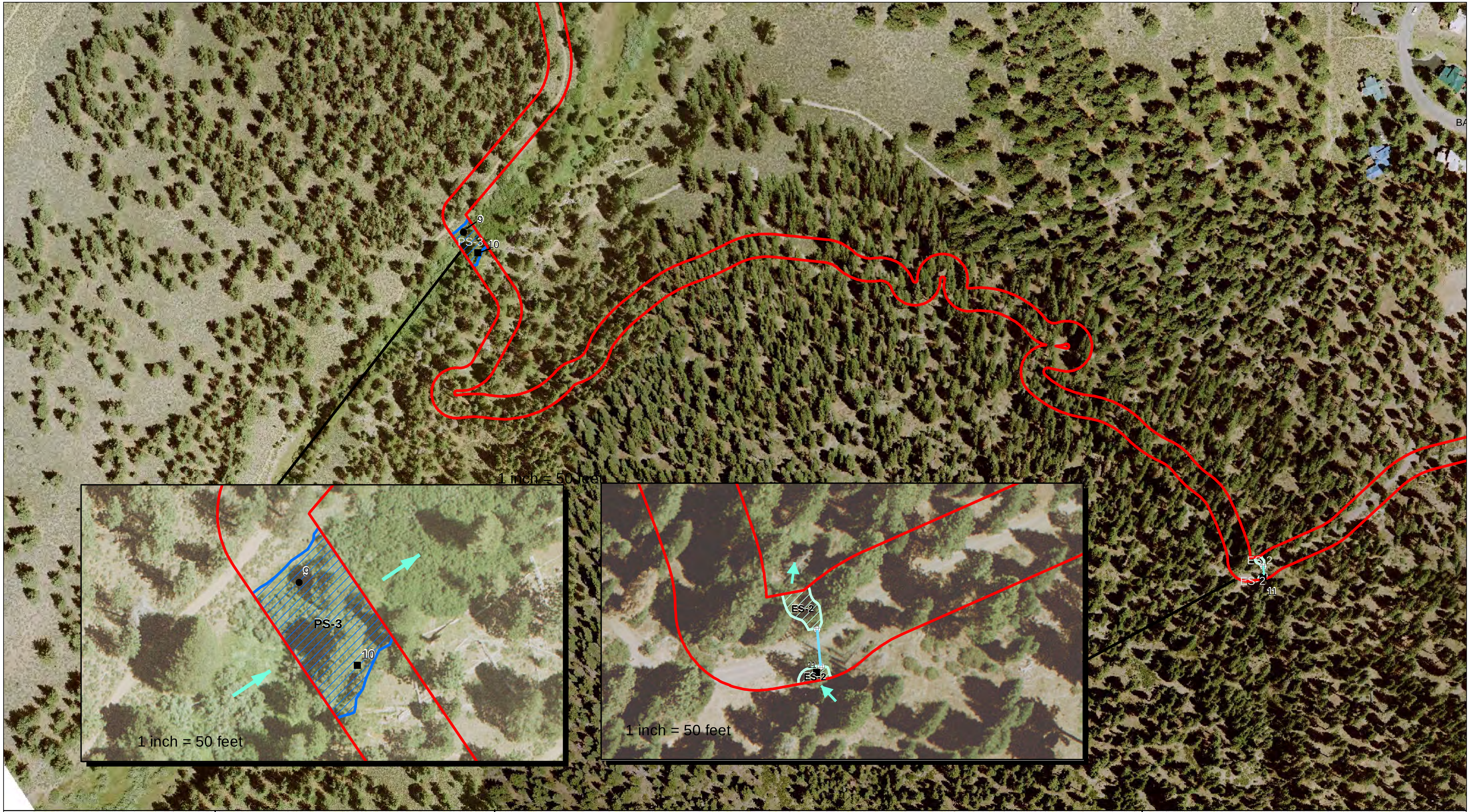
PRELIMINARY WETLAND DELINEATION

Martis Valley Regional Trail

Placer County, CA

Sheet I



PREPARED BY:

north fork associates

Aerial photograph and base data provided by: Auerbach Engineering Corp, September 2009.

N

0 50 100 200

1 inch = 200 feet

Study Area (±15.2 miles)

- Segment 1
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PRELIMINARY WETLAND DELINEATION

Martis Valley Regional Trail

Placer County, CA

Sheet J

PREPARED BY:

north fork associates

Aerial photograph and base data provided by: Auerbach Engineering Corp, September 2009; NAIP 2009.

N

0 50 100 200

1 inch = 200 feet

Study Area (±15.2 miles)

- Segment 1
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PRELIMINARY WETLAND DELINEATION

Martis Valley Regional Trail

Placer County, CA

Sheet K

PREPARED BY:

north fork associates

Aerial photograph and base data provided by: Auerbach Engineering Corp, September 2009 - 2011

N

0 50 100 200

1 inch = 200 feet

Study Area (±15.2 miles)

- Segment 1
- Segment 2
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PRELIMINARY WETLAND DELINEATION

Martis Valley Regional Trail

Placer County, CA

Sheet L

PREPARED BY:

north fork associates

Aerial photograph and
base data provided by:
Auerbach Engineering Corp,
September 2009; NAIP 2009.

N

0 50 100 200

1 inch = 200 feet

Study Area (±15.2 miles)

Segment 1
Segment 2
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Segment 3C
Segment 3D
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WATERS OF THE UNITED STATES

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Waters Data Point
Upland Data Point
Culvert
Meadow Line

PRELIMINARY
WETLAND DELINEATION

Martis Valley Regional Trail

Placer County, CA

Sheet M

PREPARED BY:

north fork associates

Aerial photograph and
base data provided by:
Auerbach Engineering Corp,
September 2009 - 2011; NAIP 2009

N

0 50 100 200

1 inch = 200 feet

Study Area (±15.2 miles)

- Segment 1
- Segment 2
- Segment 3A
- Segment 3B
- Segment 3C
- Segment 3D
- Segment 3E
- Segment 3F
- Segment 4

WATERS OF THE UNITED STATES

- Ephemeral Stream
- Intermittent Stream
- Martis Creek
- Perennial Stream
- Seasonal Wetland
- Wetland Meadow
- Wetland Swale

- Wetland Data Point
- Waters Data Point
- Upland Data Point
- Culvert
- Meadow Line

PRELIMINARY
WETLAND DELINEATION

Martis Valley Regional Trail

Placer County, CA

Sheet N

PREPARED BY:

north fork associates

Aerial photograph and base data provided by: Auerbach Engineering Corp, September 2009; NAIP 2009.

N

0 50 100 200

1 inch = 200 feet

Study Area (±15.2 miles)

- Segment 1
- Segment 2
- Segment 3A
- Segment 3B
- Segment 3C
- Segment 3D
- Segment 3E
- Segment 3F
- Segment 4

WATERS OF THE UNITED STATES

- Ephemeral Stream
- Intermittent Stream
- Martis Creek
- Perennial Stream
- Seasonal Wetland
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- Wetland Data Point
- Waters Data Point
- Upland Data Point
- Culvert
- Meadow Line

PRELIMINARY
WETLAND DELINEATION

Martis Valley Regional Trail

Placer County, CA

Sheet O

PREPARED BY:

north fork associates

Aerial photograph and base data provided by: Auerbach Engineering Corp, September 2009; NAIP 2009.

N

0 50 100 200

1 inch = 200 feet

Study Area (±15.2 miles)

- Segment 1
- Segment 2
- Segment 3A
- Segment 3B
- Segment 3C
- Segment 3D
- Segment 3E
- Segment 3F
- Segment 4

WATERS OF THE UNITED STATES

- Ephemeral Stream
- Intermittent Stream
- Martis Creek
- Perennial Stream
- Seasonal Wetland
- Wetland Meadow
- Wetland Swale

- Wetland Data Point
- Waters Data Point
- Upland Data Point
- Culvert
- Meadow Line

PRELIMINARY WETLAND DELINEATION

Martis Valley Regional Trail

Placer County, CA

Sheet P

PREPARED BY:

Aerial photograph and
base data provided by:
Auerbach Engineering Corp,
September 2009; NAIP 2009.

N

0 50 100 200

1 inch = 200 feet

Study Area (±15.2 miles)

Segment 1
Segment 2
Segment 3A
Segment 3B
Segment 3C
Segment 3D
Segment 3E
Segment 3F
Segment 4

WATERS OF THE UNITED STATES

Ephemeral Stream
Intermittent Stream
Martis Creek
Perennial Stream
Seasonal Wetland
Wetland Meadow
Wetland Swale

Wetland Data Point
Waters Data Point
Upland Data Point
Culvert
Meadow Line

PRELIMINARY
WETLAND DELINEATION

Martis Valley Regional Trail

Placer County, CA

Sheet Q

PREPARED BY:

north fork associates

Aerial photograph and
base data provided by:
Auerbach Engineering Corp,
September 2009; NAIP 2009.

N

0 50 100 200

1 inch = 200 feet

Study Area (±15.2 miles)

- Segment 1
- Segment 2
- Segment 3A
- Segment 3B
- Segment 3C
- Segment 3D
- Segment 3E
- Segment 3F
- Segment 4

WATERS OF THE UNITED STATES

- Ephemeral Stream
- Intermittent Stream
- Martis Creek
- Perennial Stream
- Seasonal Wetland
- Wetland Meadow
- Wetland Swale

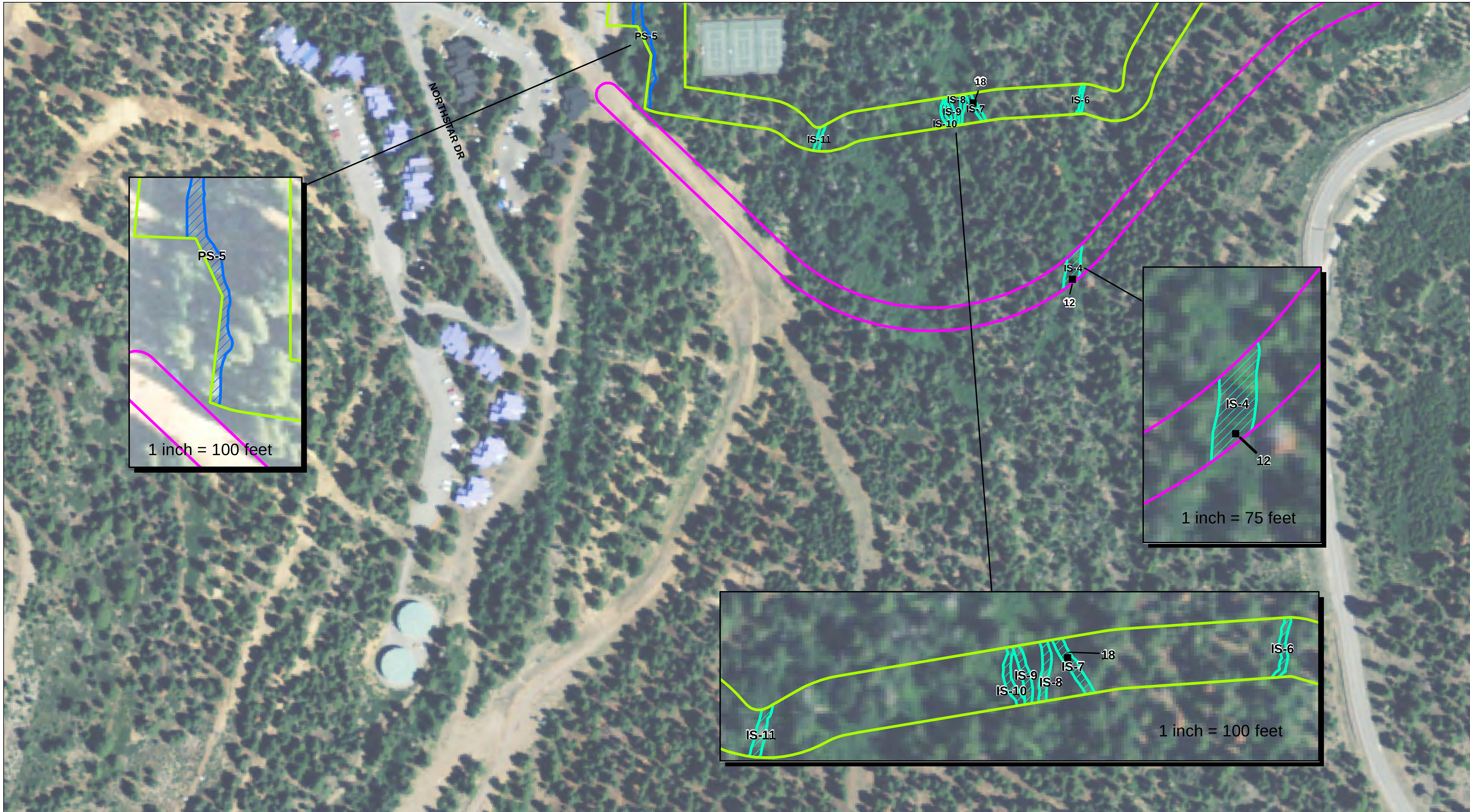
- Wetland Data Point
- Waters Data Point
- Upland Data Point
- Culvert
- Meadow Line

PRELIMINARY
WETLAND DELINEATION

Martis Valley Regional Trail

Placer County, CA

Sheet R



PREPARED BY:

north fork associates

Aerial photograph and base data provided by: Auerbach Engineering Corp, September 2009; NAIP 2009.

N

0 50 100 200

1 inch = 200 feet

Study Area (±15.2 miles)

- Segment 1
- Segment 2
- Segment 3A
- Segment 3B
- Segment 3C
- Segment 3D
- Segment 3E
- Segment 3F
- Segment 4

WATERS OF THE UNITED STATES

- Ephemeral Stream
- Intermittent Stream
- Martis Creek
- Perennial Stream
- Seasonal Wetland
- Wetland Meadow
- Wetland Swale

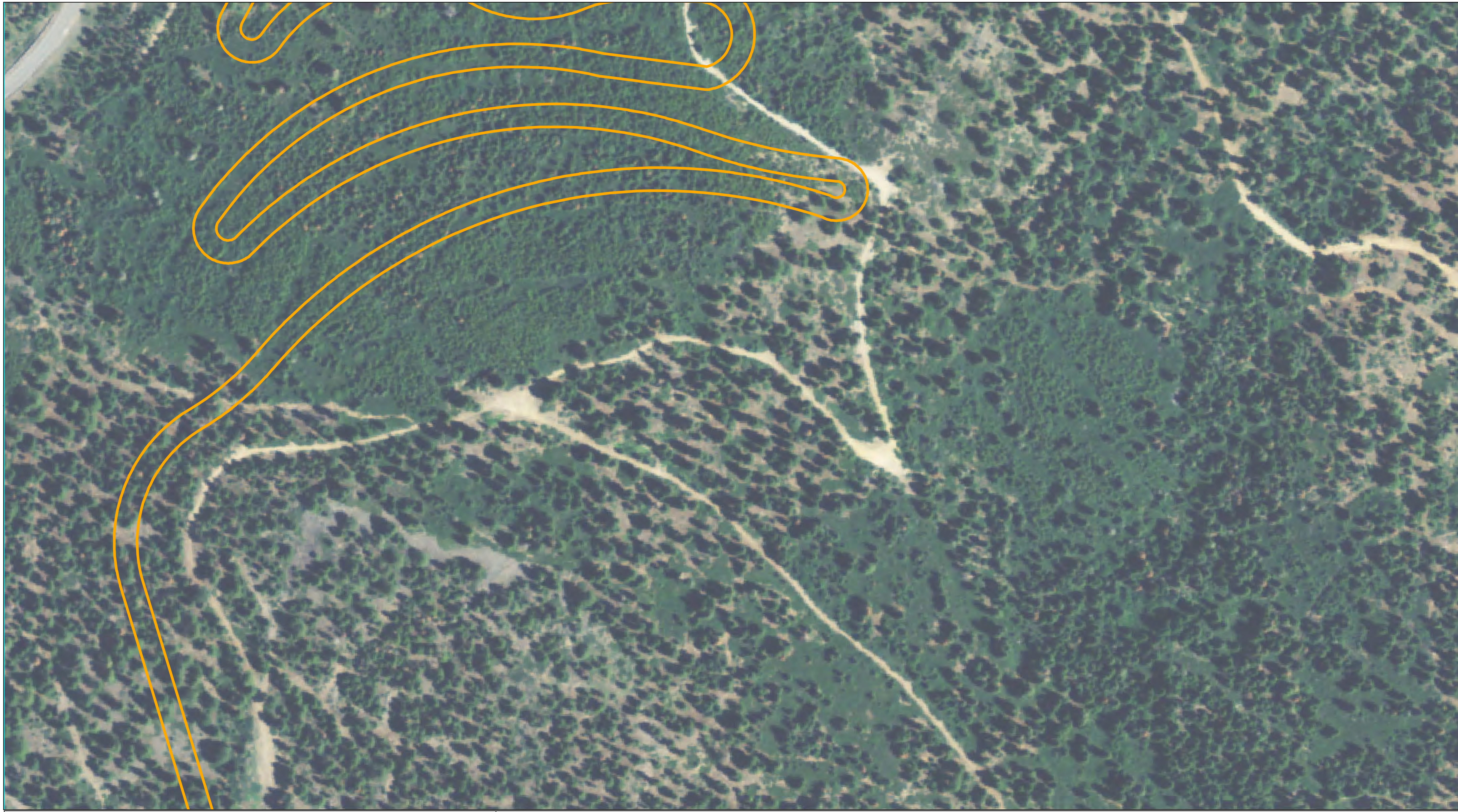
- Wetland Data Point
- Waters Data Point
- Upland Data Point
- Culvert
- Meadow Line

PRELIMINARY WETLAND DELINEATION

Martis Valley Regional Trail

Placer County, CA

Sheet S



PREPARED BY:

north fork associates

Aerial photograph and
base data provided by:
Auerbach Engineering Corp,
September 2009; NAIP 2009.

N

0 50 100 200

1 inch = 200 feet

Study Area (±15.2 miles)

- Segment 1
- Segment 2
- Segment 3A
- Segment 3B
- Segment 3C
- Segment 3D
- Segment 3E
- Segment 3F
- Segment 4

WATERS OF THE UNITED STATES

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- Intermittent Stream
- Martis Creek
- Perennial Stream
- Seasonal Wetland
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- Wetland Swale

- Wetland Data Point
- Waters Data Point
- Upland Data Point
- Culvert
- Meadow Line

PRELIMINARY WETLAND DELINEATION

Martis Valley Regional Trail

Placer County, CA

Sheet T

PREPARED BY:

north fork associates

Aerial photograph and
base data provided by:
Auerbach Engineering Corp,
September 2009; NAIP 2009.

N

0 50 100 200

1 inch = 200 feet

Study Area (±15.2 miles)

Segment 1
Segment 2
Segment 3A
Segment 3B
Segment 3C
Segment 3D
Segment 3E
Segment 3F
Segment 4

WATERS OF THE UNITED STATES

Ephemeral Stream
Intermittent Stream
Martis Creek
Perennial Stream
Seasonal Wetland
Wetland Meadow
Wetland Swale

Wetland Data Point
Waters Data Point
Upland Data Point
Culvert
Meadow Line

PRELIMINARY WETLAND DELINEATION

Martis Valley Regional Trail

Placer County, CA

Sheet U

PREPARED BY:

north fork associates

Aerial photograph and
base data provided by:
Auerbach Engineering Corp,
September 2009; NAIP 2009.

N

0 50 100 200

1 inch = 200 feet

Study Area (±15.2 miles)

- Segment 1
- Segment 2
- Segment 3A
- Segment 3B
- Segment 3C
- Segment 3D
- Segment 3E
- Segment 3F
- Segment 4

WATERS OF THE UNITED STATES

- Ephemeral Stream
- Intermittent Stream
- Martis Creek
- Perennial Stream
- Seasonal Wetland
- Wetland Meadow
- Wetland Swale

- Wetland Data Point
- Waters Data Point
- Upland Data Point
- Culvert
- Meadow Line

PRELIMINARY WETLAND DELINEATION

Martis Valley Regional Trail

Placer County, CA

Sheet V

PREPARED BY:

Aerial photograph and
base data provided by:
Auerbach Engineering Corp,
September 2009; NAIP 2009.

N

0 50 100 200
1 inch = 200 feet

Study Area (±15.2 miles)

- Segment 1
- Segment 2
- Segment 3A
- Segment 3B
- Segment 3C
- Segment 3D
- Segment 3E
- Segment 3F
- Segment 4

WATERS OF THE UNITED STATES

- Ephemeral Stream
- Intermittent Stream
- Martis Creek
- Perennial Stream
- Seasonal Wetland
- Wetland Meadow
- Wetland Swale

- Wetland Data Point
- Waters Data Point
- Upland Data Point
- Culvert
- Meadow Line

PRELIMINARY
WETLAND DELINEATION

Martis Valley Regional Trail

Placer County, CA

Sheet W

PREPARED BY:

north fork associates

Aerial photograph and
base data provided by:
Auerbach Engineering Corp,
September 2009; NAIP 2009.

N

0 50 100 200

1 inch = 200 feet

Study Area (±15.2 miles)

Segment 1
Segment 2
Segment 3A
Segment 3B
Segment 3C
Segment 3D
Segment 3E
Segment 3F
Segment 4

WATERS OF THE UNITED STATES

Ephemeral Stream
Intermittent Stream
Martis Creek
Perennial Stream
Seasonal Wetland
Wetland Meadow
Wetland Swale

Wetland Data Point
Waters Data Point
Upland Data Point
Culvert
Meadow Line

PRELIMINARY
WETLAND DELINEATION

Martis Valley Regional Trail

Placer County, CA

Sheet X

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Martis Valley Trail (Alt 3F) City/County: Placer County Sampling Date: 7/7/11

Applicant/Owner: Northstar Community Services District State: CA Sampling Point: 18

Investigator(s): Jeff Glazner Section, Township, Range: Sections 19,20,24,28,29,30, & 32, T 17 North and R 16 & 17 East

Landform (hillslope, terrace, etc.): channel Local relief (concave, convex, none): concave Slope (%): 3%

Subregion (LRR): MLRA 22A Lat: 2238956.055°north Long: 7092071.396° west Datum: NAD 83

Soil Map Unit Name: Jorge-Cryumbrepts, wet-Tahoma complex, 2 to 30 percent slopes NWI classification: R

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? No Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes ____ No ____ Hydric Soil Present? Yes ____ No ____ Wetland Hydrology Present? Yes ____ No ____	**Is the Sampled Area within a Wetland? Yes ____ No ____** **X Other Waters**

Remarks:

Tributary to West Martis Creek. Intermittent Stream. "Intermittent Stream #7."

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1. Salix sp			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1.	.		
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:			
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:
OBL species		x 1 =
FACW species		x 2 =
FAC species		x 3 =
FACU species		x 4 =
UPL species		x 5 =
Column Totals:	(A)	(B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ____ No ____

Remarks: Mountain alder and aspen is primary woody cover in channel. Herbaceous hydrophytes include cow parsnip, scouring rush, and common monkeyflower.

SOIL

Sampling Point: 18

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

___ Histosol (A1)
___ Histic Epipedon (A2)
___ Black Histic (A3)
___ Hydrogen Sulfide (A4)
___ Depleted Below Dark Surface (A11)
___ Thick Dark Surface (A12)
___ Sandy Mucky Mineral (S1)
___ Sandy Gleyed Matrix (S4)
___ Sandy Redox (S5)
___ Stripped Matrix (S6)
___ Loamy Mucky Mineral (F1) (**except MLRA 1**)
___ Loamy Gleyed Matrix (F2)
___ Depleted Matrix (F3)
___ Redox Dark Surface (F6)
___ Depleted Dark Surface (F7)
___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ______ No ______

Remarks: None taken –channel is low gradient and contains pockets of organic matter.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plans (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): ______

Water Table Present? Yes ___ No ___ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ___ No ___ Depth (inches): ______

Wetland Hydrology Present? Yes ______ No ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Channel flowing at a trickle on 7/7/11. Channel small and shallow. Appears to carry water for much of the summer but likely dries out late in year.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Martis Valley Trail (Alt 3F) City/County: Placer County Sampling Date: 7/7/11

Applicant/Owner: Northstar Community Services District State: CA Sampling Point: 19

Investigator(s): Jeff Glazner Section, Township, Range: Sections 19,20,24,28,29,30, & 32, T 17 North and R 16 & 17 East

Landform (hillslope, terrace, etc.): channel Local relief (concave, convex, none): concave Slope (%): 3%

Subregion (LRR): MLRA 22A Lat: 2238956.055°north Long: 7092071.396° west Datum: NAD 83

Soil Map Unit Name: Jorge-Tahoma complex, 2 to 30 percent slopes NWI classification: R

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? No Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? No (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____ No ____	**Is the Sampled Area within a Wetland?** Yes ____ No ____
Hydric Soil Present?	Yes ____ No ____	X **Other Waters**
Wetland Hydrology Present?	Yes ____ No ____	

Remarks:

Tributary to West Martis Creek. Intermittent Stream. "Intermittent Stream #5."

VEGETATION

Tree Stratum (Use scientific names.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
Total Cover:			
Sapling/Shrub Stratum			
1. Salix sp			
2.			
3.			
4.			
5.			
Total Cover:			
Herb Stratum			
1.	.		
2.			
3.			
4.			
5.			
6.			
7.			
8.			
Total Cover:			
Woody Vine Stratum			
1.			
2.			
Total Cover:			

% Bare Ground in Herb Stratum ____ % Cover of Biotic Crust ____

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ___ Dominance Test is >50%
- ___ Prevalence Index is ≤3.0[1]
- ___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ___ Wetland Non-Vascular Plants[1]
- ___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present.

Hydrophytic Vegetation Present? Yes ____ No ____

Remarks: Sparse willow/mountain alder cover in channel. Salmonberry very prevalent.

SOIL

Sampling Point: 19

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix. [2]Location: PL=Pore Lining, RC=Root Channel, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

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___ Depleted Dark Surface (F7)
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Indicators for Problematic Hydric Soils[3]:

___ 2 cm Muck (A10)
___ Red Parent Material (TF2)
___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present.

Restrictive Layer (if present):

Type: ______

Depth (inches): ______

Hydric Soil Present? Yes ______ No ______

Remarks: None taken –channel with rock and boulders and sparse cover of upland and wetland vegetation.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (any one indicator is sufficient)

___ Surface Water (A1)
___ High Water Table (A2)
___ Saturation (A3)
___ Water Marks (B1)
___ Sediment Deposits (B2)
___ Drift Deposits (B3)
___ Algal Mat or Crust (B4)
___ Iron Deposits (B5)
___ Surface Soil Cracks (B6)
___ Inundation Visible on Aerial Imagery (B7)
___ Sparsely Vegetated Concave Surface (B8)
___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A and 4B**)
___ Salt Crust (B11)
___ Aquatic Invertebrates (B13)
___ Hydrogen Sulfide Odor (C1)
___ Oxidized Rhizospheres along Living Roots (C3)
___ Presence of Reduced Iron (C4)
___ Recent Iron Reduction in Tilled Soils (C6)
___ Stunted or Stressed Plans (D1) (**LRR A**)
___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
___ Drainage Patterns (B10)
___ Dry-Season Water Table (C2)
___ Saturation Visible on Aerial Imagery (C9)
___ Geomorphic Position (D2)
___ Shallow Aquitard (D3)
___ FAC-Neutral Test (D5)
___ Raised Ant Mounds (D6) (**LRR A**)
___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ______ No ______ Depth (inches): ______

Water Table Present? Yes ______ No ______ Depth (inches): ______

Saturation Present? (includes capillary fringe) Yes ______ No ______ Depth (inches): ______

Wetland Hydrology Present? Yes ______ No ______

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks: Channel dry on 7/7/11. Does not appear to carry consistent water beyond springtime.

APPENDIX D

HYDROLOGIC AND SOIL REPORTS

APPENDIX D1

Martis Valley Regional Trail Project
Hydrology Study

MARTIS VALLEY REGIONAL TRAIL

PLACER COUNTY, CA

PROJECT HYDROLOGY STUDY

MARCH 2012

Prepared By:

CIVIL ENGINEERING SOLUTIONS, INC.
590 E Street
Lincoln, CA 95648
(916) 645-5700

JOB # 2011.06

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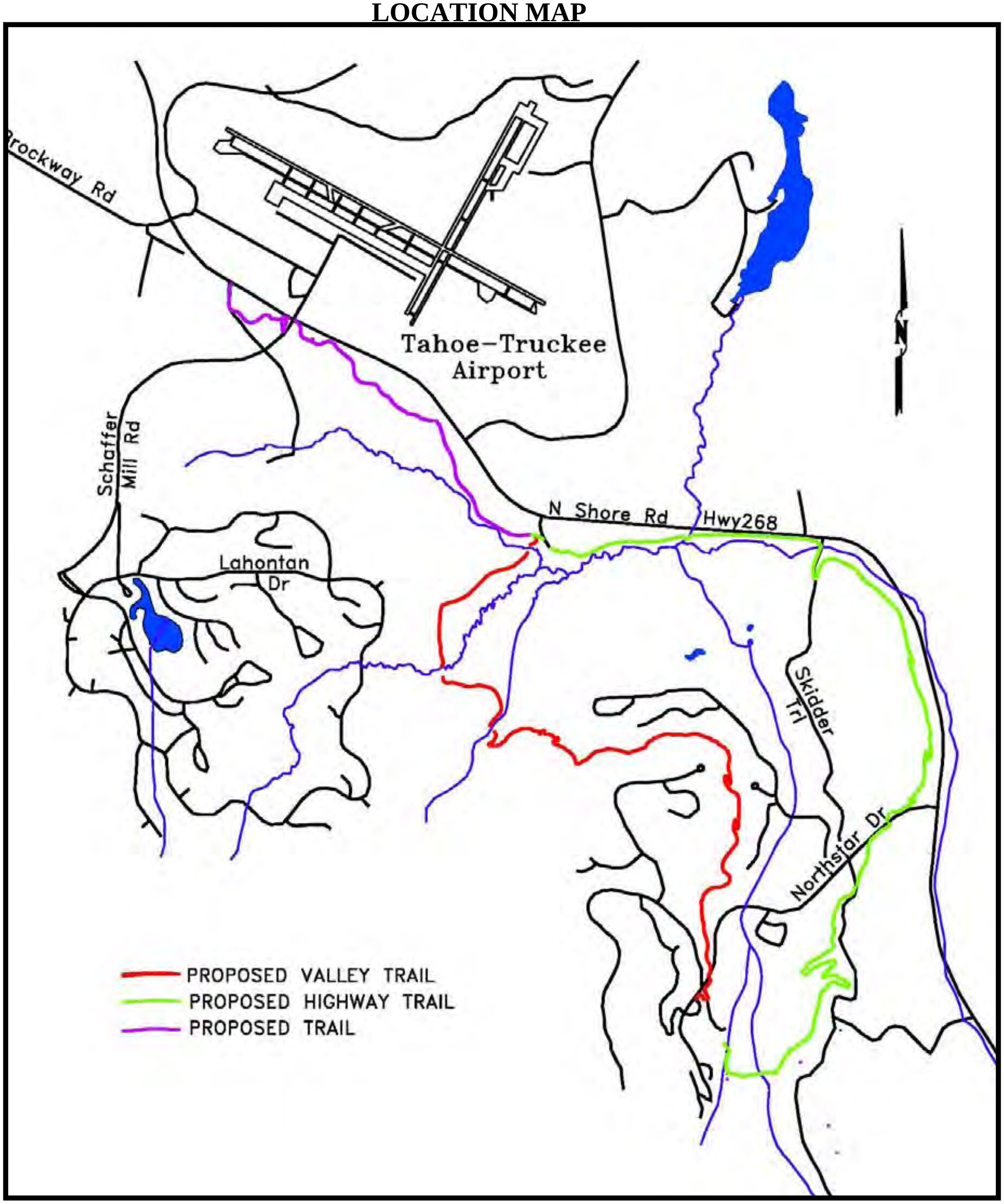
Exhibit FP-W2	-	WARM EVENT POST-PROJECT FLOODPLAIN MAP
Exhibit FP-F1	-	FROZEN EVENT PRE-PROJECT FLOODPLAIN MAP
Exhibit FP-F2	-	FROZEN EVENT POST-PROJECT FLOODPLAIN MAP

1. SECTION 1: WATERSHED HYDROLOGY

LOCATION MAP



1-I. Introduction:

This study expands the watershed analysis for Martis Valley to include all areas of the watershed which would pass across or adjacent to the proposed Martis Valley Trail system. Prior to this study, 14.5 square miles of the watershed had been studied by several projects within the watershed, including: Martis Camp(Siller Ranch), Eaglewood, Lahontan, The Village at Northstar, and Hopkins Ranch. This study expands the analysis to include roughly 25.6 square miles at the Martis Creek crossing of Highway 267, near the Truckee Airport.

The proposed trail system is located near Truckee California, south of Highway 267, and southeast of the Truckee Airport, within Placer County, CA. The proposed trail crosses four (4) different branches of Martis Creek. The proposed trail system includes up to 6.4 miles of regional trail system as well as entry features and informational kiosks.

This study will perform hydrology analysis for the “snowmelt” (rain with snowmelt, “WARM” storm) event and the “snow covered” (rain on ice, “FROZEN” storm) event conditions. The WARM event will be used to determine potential project impacts to peak flow rates. The FROZEN storm event is used for mapping floodplains and evaluating cross culverts and bridges.

Floodplain delineations are included within this study for both the WARM and FROZEN event conditions for the 2-year, 10-year and 100-year flood events.

This study will evaluate the potential peak flow impacts which may result from the project in the WARM storm event, as a result of added impervious surfaces at the proposed trail system. Each trail alternative was evaluated independently for hydrology, and the worst case (higher flow rate) of the two alternatives was used in the hydraulic and floodplain analysis.

This study will also evaluate the potential hydraulic impacts from proposed bridges and culverts.

1-II. Hydrology:

All calculations and analysis included in this study were prepared in accordance with the requirements of the *"Stormwater Management Manual (SWMM)"* dated September 1, 1990 and the SWMM Addendum 1, dated October 1997. HEC-1 files were generated using the Placer County Pre-processor utility and the PDP precipitation generation software.

The Army Corps HEC-1 software was utilized to develop the included hydrologic models. For the main hydrologic analysis of this study, we used the post-project hydrologic factors for upstream offsite areas where the developments are under construction or already constructed. We also included detention and attenuation factors as shown in the post-project conditions of those development analysis.

The hydrology analysis included with this project provides analysis of the 25.6 square miles of tributary area of the Martis Creek watershed. A hydraulic evaluation of the four (4) main creek branches is also provided. Detailed flood mapping of Martis Creek are included.

1.II.A Model Factors:

The proposed project is located east of the Sierra Crest. Elevations within the analyzed watershed area range from 5800 feet at the Martis Creek flats northeast of the project, to elevation 8600 at the Mount Pluto crest (at the Northstar Ski resort).

Placer County requires projects in the "Mountainous areas" to provide two base analyses for the design of storm drainage facilities, the "WARM conditions" model and the "snow-cover conditions" model (sometimes called the "FROZEN conditions" model). The WARM conditions model represents the expected runoff during warm/dry season conditions when snowmelt is also occurring. The FROZEN condition model represents the design event for which the ground is partially frozen by snow cover, and runoff occurs. Additionally, a "snowmelt" rate of flow is added in WARM condition event to simulate the addition of runoff to the event from the melting snow. We assume a snowmelt rate of 0.06 inches per hour for this analysis. This translates to a base flow of approximately 38.7 cfs per square mile. The snowmelt rate is applied to all conditions of the peak flow analysis but is excluded from any volumetric impact analysis because development is not expected to significantly change the snowmelt rates. We included the snowmelt rate in this analysis (even though the total analysis area exceeds 10 square miles) because local project creek crossings of concern did not exceed the 10 square mile requirement in most cases. The result is only a minor conservative assumption of flow rates within the main Martis Creek channel areas.

For the "snow cover" events, a variable amount of imperviousness was applied to the watershed per Table 5-4 of the Placer SWMM.

Standards:

The Placer County PDP software was utilized to determine precipitation rates for the design events 2-year, 10-year, 100-year, 500-year. Elevation data for each watershed centroid was input into the "DAT" file. The ".DAT file was fed into the PDP program to generate the HEC-1 input (.in) file for each event. Storm centering was not utilized in this analysis.

The Placer County Flood Control and Water Conservation District's Stormwater Management Manual specifies several unique model requirement items for "Mountainous Areas" as follows:

> *SWMM Addendum 1 - Part 1: Overland Flow parameters on Natural Land use. "L" - "Typically, about 600 feet, but can vary depending on local topography. In mountainous areas, can be much longer: look for convergence of contours on topographical map."*
>
> *SWMM Section V-C-3b : "Above the cloudburst region (i.e., higher than 4000 feet), a uniform distribution may be assumed over the entire watershed."*
>
> *SWMM Section V-C-4 Snowmelt : "The snowmelt rates shown in Table 5-2 will be used for planning and design involving small watersheds. ... They may also be used as a base flow with HEC-1 for evaluating watersheds less than 10 square miles."*
>
> *SWMM Section V-D-2 Snow Covered Areas : "Snow covered areas are assumed impervious since the ground beneath is likely to be saturated and could also be frozen. The portion of the watershed covered with snow depends on elevation and location relative to the Sierra Nevada Crest as shown in Table 5-4."*

Soils:

The predominant soils of the watershed are Hydrologic Type "B" soils. However, within the watershed all four(4) hydrologic soil types are present. The hydrologic soil type classification helps to provide guidelines for infiltration losses that can be expected at the non-impervious areas of the watershed. Type "A" soils have the highest expected infiltration rates and Type "D" soils have the lowest expected infiltration rates. Standard infiltration rates are reported in Table 5-3 of the SWMM. This infiltration rates used in this analysis are summarized in TABLE I.II.A1 below. The infiltration rates also include adjustments for the absorption and transpiration qualities of the project vicinity. In the upper reaches of the watersheds, the swales are poorly defined, and distinct swales often do not appear for thousands of feet downstream of the ridges. Existing timber is scattered at the lower elevations but increases in density, rapidly, further up the slopes. The upper portions of the ridge lines are at 10% to 30% slopes, while the main creeks flatten out to less than a percent.

TABLE I.II.A1 – Infiltration Factors Applied

Hyd. Soil Group	**A**	**B**	**C**	**D**
Infiltration Rate Applied (in/hr):	.48	.25	.16	.1

Other Factors:

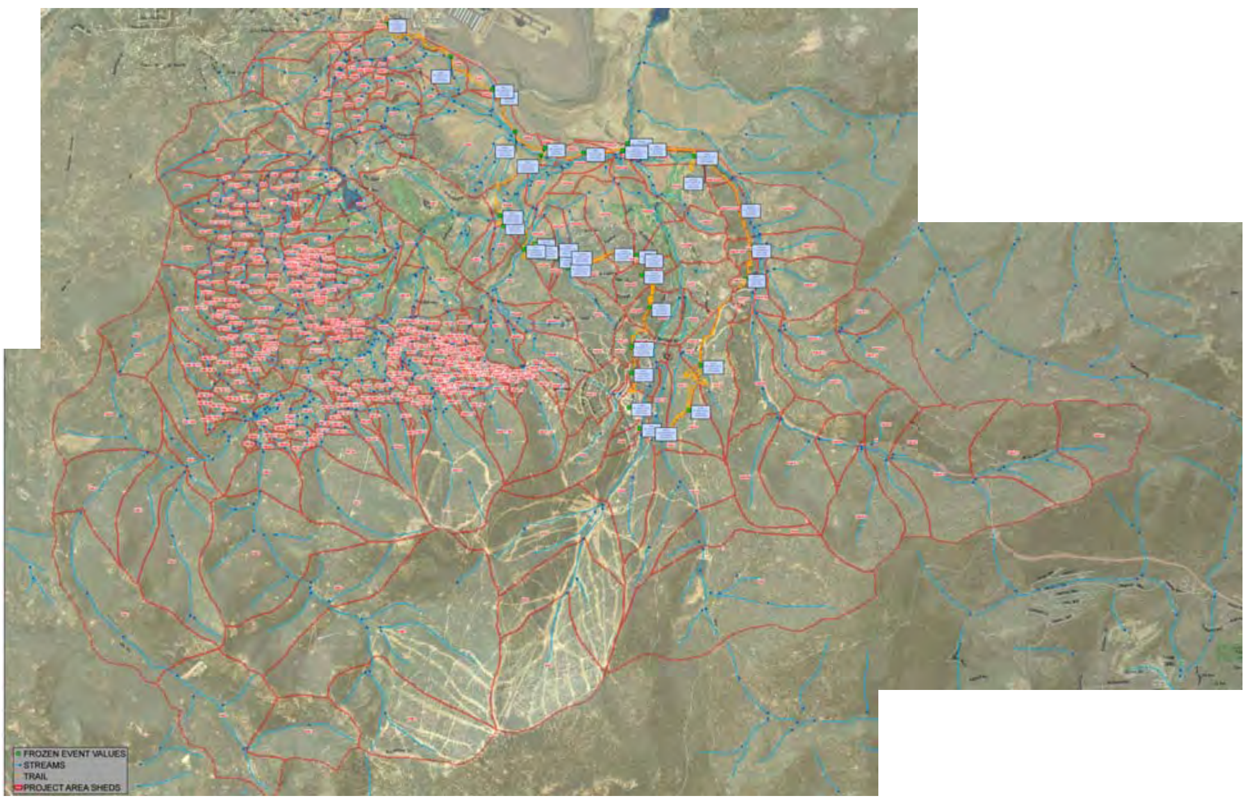
Overland flow Manning's 'n' values were estimated using Table 5-5 of the SWMM and range from 0.11 for roadways and pavement areas to 0.4 thru 0.6 for open space and wooded areas. In general the included models were prepared with a pervious areas shed element and directly connected impervious areas shed element. The hydrologic factors utilized in these models are consistent with those previously utilized with the previously studied development projects.

1.II.B Pre-Project Model:

The project is located within the upper reaches of the Martis Creek watershed and consists of well-drained soils with high infiltration rates typical of the Lake Tahoe region. Four main tributaries of Martis Creek are intersected by the proposed pedestrian trail. The four tributaries join at the south side of Highway 267 and flow through the culvert at the highway as a joined flow. From the Highway, the joined flows pass along the east side of the Truckee Airport before discharging into Martis Lake.

A Pre-project hydrologic analysis was generated to estimate existing peak runoff rates from the project site for the WARM and FROZEN events. Oversized Exhibits SH-1A to SH-1C show the Regional Pre-project Watershed Map for the analysis areas of this study. Impervious values, infiltration rates and overland response factors were estimated for each watershed as shown in TABLE II.I.B.1 to II.I.B.4. Shed names and locations can be correlated with the names shown on Exhibit SH-1A to SH-1C.

FIGURE S-1 : PRE-PROJECT REGIONAL WATERSHEDS



(See Oversized Exhibits SH-1A to SH-1C for detail)

TABLE I.II.B.1 : Pre-Project Hydrologic Factors

					PLANE 1 NON URBAN AND URBAN PLANE PARAMETERS								PLANE 2 URBAN PLANE PARAMETERS							
SHED	DESCRIPTION	Centroid Elevation (ft)	DA AREA (mi^2)	DA AREA (acre)	Initial Abst. (in)	Constant Infiltration (in/hr)	% Imperv. WARM	% Imperv. FROZEN	Overland Length (ft)	Overland Slope	Overland 'n' Value	Plane % of Shed	Initial Abst (in)	Constant Infiltration (in/hr)	% Imperv. WARM	% Imperv. FROZEN	Overland Length (ft)	Overland Slope	Overland 'n' Value	Plane % of Shed
E2	Large Offsite Shed 155.8ac	6231	0.2434	155.70	0.1	0.211	2	92.31	1500	0.083	0.6	100								
E15	Other Large Upstream offsite shed 111.1	6006	0.1736	111.1	0.1	0.147	2	90.06	1000	0.058	0.6	100								
E10	Large Undeveloped upstream watershed (139.2)	6096	0.0311	19.9	0.1	0.179	2	90.96	2500	0.075	0.6	100								
E20A	12.0 AC	5940	0.0106	6.78	0.1	0.243	3	88.2	1200	0.056	0.6	100								
E14A	Small Roadway Shed 4 ac	5989	0.0063	4.03	0.1	0.1	10	89.67	500	0.03	0.6	100								
E18A	Small Hopkins Roadway Drain 3.6ac	5968	0.0057	3.65	0.1	0.207	10	88.74	460	0.03	0.6	100								
E16A	Small Hopkins Roadway Drain 0.4ac	5956	0.0006	0.38	0.1	0.215	90	90	50	0.02	0.6	100								
E20B	10.9 AC	5951	0.0182	11.65	0.1	0.2	5	88.53	800	0.07	0.6	100								
E20C	4.8 AC	5949	0.0076	4.8	0.1	0.25	2	88.47	500	0.05	0.6	90	0.1	0.25	90	90	18	0.02	0.11	10
E20D	10.6 AC	5924	0.0166	10.62	0.1	0.25	15	87.72	500	0.05	0.6	89	0.1	0.25	90	90	18	0.02	0.11	11
E20E	8.4 AC Mostly diverted area added to this shed	5967	0.0132	8.45	0.1	0.25	12	88.56	900	0.02	0.6	90	0.1	0.25	90	90	18	0.02	0.11	10
E30	MAIN SHED ABOVE TWIN CULVERTS IN S. MILL RD. 40.8AC	5901	0.0638	40.83	0.1	0.25	6	87.03	800	0.038	0.6	100								
E19	HILLSIDE ABOVE SM RD. 4.2AC	5951	0.0065	4.16	0.1	0.25	2	88.53	400	0.018	0.6	89	0.1	0.25	90	90	18	0.02	0.11	11
E21	HILLSIDE ABOVE ROAD 5.7AC	5941	0.0084	5.38	0.1	0.25	7	88.23	600	0.017	0.6	74	0.1	0.25	90	90	18	0.03	0.11	26
E22	"HILLSIDE ABOVE 15"" CULVERT	5935	0.0046	2.89	0.1	0.25	7	88.05	350	0.027	0.6	100								
E23	PORTION OF S.MILL RD. 0.5AC	5920	0.0008	0.51	0.1	0.25	90	90	18	0.02	0.11	100								
E40	LARGE SHED DOWNSTREAM OF S. MILL RD. 85.5Ac	5886	0.1147	73.41	0.1	0.18	8.1	86.58	1600	0.034	0.6	100								
E40B	LARGE SHED DOWNSTREAM OF S. MILL RD. 85.5Ac	5884	0.019	12.16	0.1	0.248	8.1	86.52	600	0.01	0.6	100								
E14C	OFF-SITE SHED WEST OF S. MILL RD. 3.6AC	6033	0.0059	3.78	0.1	0.25	2	90.33	600	0.08	0.6	100								
E64A	EAST OF S. MILL RD. 16.1AC	5991	0.0248	15.87	0.1	0.159	14	89.73	1000	0.05	0.6	94	0.1	0.159	90	90	18	0.02	0.11	6
E64B	EAST OF S. MILL RD. 12.1AC	5956	0.019	12.16	0.1	0.175	15	88.68	800	0.07	0.6	97	0.1	0.175	90	90	18	0.02	0.11	3
E70	OFF-SITE LAHONTAN UNITS 7&8 AND LAHONTAN II 78.6AC	5952	0.1256	80.32	0.1	0.171	8	88.56	1200	0.041	0.6	95	0.1	0.171	90	90	18	0.02	0.11	6
E71	OFF-SITE PORTION OF LAHONTAN II 17.8Ac	5968	0.0279	17.86	0.1	0.227	19.1	89.04	1400	0.05	0.6	100								
E72	OFF-SITE PORTION OF LAHONTAN II 12.1Ac	5967	0.0178	11.39	0.1	0.198	9.6	88.71	1700	0.037	0.6	100								
E75	MOSTLY OFF-SITE AND DOWNSTREAM SHED 57.9Ac	5881	0.0905	57.92	0.1	0.191	3.2	86.43	1200	0.058	0.6	100								
E14B	OFF SITE SHED WEST OF S. MILL	6018	0.0397	25.41	0.1	0.192	2	90.18	800	0.08	0.6	100								
E55A	EAST OF S. MILL RD. 16.7AC	5967	0.0261	16.7	0.1	0.136	20	89.01	500	0.04	0.6	100								
E58D	EAST OF S. MILL RD. 23.7AC	5911	0.0229	14.66	0.1	0.25	9.5	87.33	800	0.04	0.6	100								
E55B	EAST OF S. MILL RD. 3.2AC	5951	0.005	3.2	0.1	0.192	40	88.59	200	0.05	0.6	100								
E56C	EAST OF S. MILL RD. 7.7AC	5926	0.012	7.68	0.1	0.247	22	87.78	200	0.05	0.6	100								
E55E	EAST OF S. MILL RD. 3.6AC	5951	0.0056	3.58	0.1	0.25	25	88.53	300	0.02	0.6	100								
E55F	EAST OF S. MILL RD. 1.8AC	5949	0.0028	1.79	0.1	0.25	25	88.47	250	0.03	0.6	100								
E55G	EAST OF S. MILL RD. 1AC	5940	0.0016	0.96	0.1	0.25	11	88.2	150	0.02	0.6	100								
E58C	EAST OF S. MILL RD. 5.6AC	5897	0.0088	5.63	0.1	0.25	36	86.91	250	0.06	0.6	100								
E55H	EAST OF S. MILL RD. 44.1AC	5936	0.0057	3.65	0.1	0.25	2.4	88.08	400	0.02	0.6	100								
E58A	EAST OF S. MILL RD. 6.3AC	5921	0.0083	5.31	0.1	0.25	22	87.63	300	0.04	0.6	100								
E58E	EAST OF S. MILL RD. 3.7AC	5885	0.037	23.68	0.1	0.225	22	86.55	300	0.02	0.6	100								
E80	LAST DOWNSTREAM SHED	5869	0.0452	28.93	0.1	0.131	2	86.07	1300	0.04	0.6	100								
E40C	LARGE SHED DOWNSTREAM OF S. MILL RD. 85.5Ac	5871	0.0344	22.02	0.1	0.166	8.1	86.13	1200	0.01	0.6	100								
E40E	LARGE SHED DOWNSTREAM OF S. MILL RD. 85.5Ac	5874	0.0058	3.71	0.1	0.25	8.1	86.22	600	0.01	0.6	100								
E40D	LARGE SHED DOWNSTREAM OF S. MILL RD. 85.5Ac	5866	0.0074	4.74	0.1	0.194	8.1	85.98	600	0.01	0.6	100								
E85	OFFSITE DOWNSTREAM SHED 313.9	5859	0.4599	294.34	0.1	0.175	2	85.77	2500	0.0625	0.6	100								
E85B	E85B	5870	0.0312	19.97	0.1	0.23	2	86.1	400	0.02	0.6	100								
E85C	E85C	5864	0.0079	5.06	0.1	0.239	2	85.92	400	0.02	0.6	100								
E5A1	E5A1 Drop Inlet	6404	0.073	46.72	0.1	0.204	2	94.04	1350	0.133	0.6	90	0.1	0.204	95	95	200	0.02	0.11	3
E5B	E5B	6348	0.0139	8.9	0.1	0.245	2	93.48	600	0.08	0.6	91	0.1	0.245	95	95	200	0.02	0.11	9
E5C	E5C	6260	0.0051	3.26	0.1	0.25	2	92.6	600	0.07	0.6	92	0.1	0.25	95	95	200	0.02	0.11	8
E5D	E5D	6279	0.085	54.4	0.1	0.25	2	92.79	1500	0.05	0.6	100								
E6A1	E6A1	6119	0.057	36.48	0.1	0.25	2	91.19	1000	0.068	0.6	100								
E6A2	E6A2	6217	0.0149	9.54	0.1	0.25	2	92.17	600	0.068	0.6	100								
E6C	E6C	6042	0.0939	60.1	0.1	0.246	2	90.42	1600	0.09	0.6	100								
GS10D	GS10D	6257	0.0124	7.94	0.1	0.25	2	92.57	900	0.07	0.6	79	0.1	0.25	95	95	100	0.02	0.11	21
GS10C	GS10C	6238	0.0169	10.82	0.1	0.25	2	92.38	900	0.08	0.6	91	0.1	0.25	95	95	100	0.02	0.11	9
GS10B	GS10B	6226	0.0044	2.82	0.1	0.25	2	92.26	600	0.08	0.6	86	0.1	0.25	95	95	100	0.02	0.11	14
GS10A1	GS10A1	6209	0.029	18.56	0.1	0.25	2	92.09	800	0.08	0.6	96	0.1	0.25	95	95	100	0.02	0.11	4
GS10F	GS10F	6163	0.0248	15.87	0.1	0.25	2	91.63	600	0.08	0.6	92	0.1	0.25	95	95	100	0.02	0.11	8
GS10E	GS10E	6152	0.0153	9.79	0.1	0.25	2	91.52	300	0.08	0.6	78	0.1	0.25	95	95	100	0.02	0.11	22
GS10A2	GS10A2	6190	0.0278	17.79	0.1	0.25	2	91.9	1400	0.08	0.6	96	0.1	0.25	95	95	100	0.02	0.11	4
GS10J	GS10J	6144	0.0099	6.34	0.1	0.25	83	91.44	300	0.08	0.6	92	0.1	0.25	95	95	200	0.02	0.11	8
GS10G	GS10G	6108	0.0081	5.18	0.1	0.25	83	91.08	300	0.08	0.6	90	0.1	0.25	95	95	200	0.02	0.11	10
GS10H	GS10H	6104	0.0066	4.22	0.1	0.25	2	91.04	200	0.08	0.6	81	0.1	0.25	95	95	200	0.02	0.11	19
GS10I	GS10I	6076	0.0071	4.54	0.1	0.25	2	90.76	300	0.06	0.6	78	0.1	0.25	95	95	200	0.02	0.11	22
E8A	E8A	6197	0.0049	3.14	0.1	0.25	2	91.97	300	0.12	0.6	73	0.1	0.25	95	95	100	0.02	0.11	27
E8B	E8B	6129	0.0122	7.81	0.1	0.25	2	91.29	400	0.08	0.6	95	0.1	0.25	95	95	100	0.02	0.11	5
E8C	E8C	6063	0.0244	15.62	0.1	0.25	2	90.63	800	0.08	0.6	100								
E9	E9	6004	0.0213	13.63	0.1	0.25	2	90.04	600	0.08	0.6	100								
GS11B	GS11B	6068	0.0031	1.98	0.1	0.25	2	90.68	700	0.1	0.6	100								
GS11A	GS11A	5999	0.0354	22.66	0.1	0.237	2	89.97	700	0.1	0.6	100								
GS13C	GS13C	6083	0.0066	4.22	0.1	0.25	2	90.83	300	0.07	0.6	100								
GS13B	GS13B	6034	0.0168	10.75	0.1	0.25	2	90.34	300	0.07	0.6	100								
GS18A	GS18A	6108	0.002	1.28	0.1	0.25	3	91.08	300	0.094	0.6	100								
GS18	GS18	6041	0.0248	15.87	0.1	0.25	2	90.41	800	0.094	0.6	100								
GS13A	GS13A	5992	0.0196	12.54	0.1	0.181	2	89.76	600	0.067	0.6	100								
GS19	GS19	5993	0.0617	39.49	0.1	0.192	2	89.79	700	0.086	0.6	100								
GS20	GS20	5902	0.0178	11.39	0.1	0.168	2	89.46	600	0.1	0.6	100								
GS21B1	4.2 AC	6166	0.0066	4.16	0.1	0.25	10.06	91.66	300	0.07	0.6	100								
GS21B2	3.2 AC	6133	0.005	3.2	0.1	0.25	15	91.33	300	0.07	0.6	100								
GS21A	GS21A	6003	0.0412	26.37	0.1	0.25	2	90.03	1000	0.07	0.6	80	0.1	0.25	15	90.03	200	0.02	0.24	20
GS22	GS22	6000	0.0741	47.42	0.1	0.249	2	90	700	0.067	0.6	100								
GS23	GS23	5983	0.0596	38.14	0.1	0.25	2	89.49	2000	0.04	0.6	100								
GS24	GS24	6002	0.0352	22.53	0.1	0.25	2	90.02	500	0.1	0.6	100								
GS25B3	1.2 AC	6133	0.0019	1.22	0.1	0.25	15	91.33	300	0.07	0.6	100								
GS25B4	1.8 AC	6125	0.0029	1.86	0.1	0.25	15	91.25	300	0.07	0.6	100								
GS25C4	4.4 AC	6121	0.0069	4.42	0.1	0.25	11.75	91.21	300	0.07	0.6	100								
GS25C5	1.7 AC	6119	0.0026	1.66	0.1	0.25	9.8	91.19	300	0.07	0.6	100								
GS25C6	1.6 AC	6106	0.0023	1.47	0.1	0.25	4.6	91.06	300	0.07	0.6	100								
GS25C9	3.0 AC	6085	0.0047	3.01	0.1	0.25	11.36	90.85	300	0.07	0.6	100								
GS21A2	1.3 AC	6104	0.002	1.28	0.1	0.25	15	91.04	300	0.07	0.6	100								
GS25C1	.4 AC	6087	0.0006	0.38	0.1	0.25	15	90.87	300	0.07	0.6	100								

TABLE I.II.B.2 : Pre-Project Hydrologic Factors (Continued)

					PLANE 1 - NON-URBAN AND URBAN PLANE PARAMETERS								PLANE 2 - URBAN PLANE PARAMETERS							
SHED	DESCRIPTION	Centroid Elevation (ft)	DA AREA (mi^2)	DA AREA (acre)	Initial Abst. (in)	Constant Infiltration (in/hr)	% Imperv. WARM	% Imperv. FROZEN	Overland Length (ft)	Overland Slope	Overland 'n' Value	Plane % of Shed	Initial Abst (in)	Constant Infiltration (in/hr)	% Imperv. WARM	% Imperv. FROZEN	Overland Length (ft)	Overland Slope	Overland 'n' Value	Plane % of Shed
GS25C3	3.9 AC	6099	0.006	3.84	0.1	0.25	11.73	90.99	300	0.07	0.6	100								
GS25C7	3.8 AC	6003	0.006	3.84	0.1	0.25	13.10	90.03	300	0.07	0.6	100								
GS27C	2.8 AC	6061	0.0044	2.82	0.1	0.25	15	90.61	300	0.07	0.6	100								
GS23B	0	6064	0.0061	3.9	0.1	0.25	15	90.64	300	0.07	0.6	100								
GS25E	GS25E	6024	0.034	21.76	0.1	0.25	2	90.24	900	0.1	0.6	100								
GS25A2	1.9 AC	6169	0.0029	1.86	0.1	0.25	8.5	91.69	300	0.07	0.6	100								
GS25A1	.4 AC	6174	0.0007	0.45	0.1	0.25	8.5	91.74	300	0.07	0.6	100								
GS25A3	1.2 AC	6148	0.0018	1.16	0.1	0.25	8.5	91.7	300	0.07	0.6	100								
GS25D3	1.3 AC	6169	0.0022	1.41	0.1	0.25	11.1	91.69	300	0.07	0.6	100								
GS25D2	2.9 AC	6157	0.0045	2.88	0.1	0.25	8.5	91.57	300	0.07	0.6	100								
GS25D1	4.1 AC	6140	0.0062	3.97	0.1	0.25	8.5	91.4	300	0.07	0.6	100								
GS28B2	6.7 AC	6123	0.0105	6.72	0.1	0.25	5.26	91.23	300	0.07	0.6	100								
GS27B1	5.5 AC	6117	0.0087	5.57	0.1	0.25	8.5	91.17	300	0.07	0.6	100								
GS25C2	3.0 AC	6090	0.0047	3.01	0.1	0.25	9.93	90.90	300	0.07	0.6	100								
GS27B3	3.3 AC	6066	0.0052	3.33	0.1	0.25	15	90.66	300	0.07	0.6	100								
GS27B2	0	6062	0.0053	3.39	0.1	0.25	15	90.62	300	0.07	0.6	100								
GS25E1	GS25E	6012	0.0131	8.38	0.1	0.25	2	90.12	900	0.1	0.6	100								
GS30B	1.1 AC	6127	0.0018	1.15	0.1	0.25	15	91.27	300	0.07	0.6	100								
GS28B1	1.6 AC	6117	0.0025	1.6	0.1	0.25	15	91.17	300	0.07	0.6	100								
GS28B3	0.9 AC	6099	0.0015	0.96	0.1	0.25	15	90.99	300	0.07	0.6	100								
GS28A1	7.6 AC	6079	0.012	7.68	0.1	0.25	15	90.79	300	0.07	0.6	100								
GS26A2	GS25A	6054	0.0154	9.86	0.1	0.25	2	90.54	500	0.071	0.6	50								
GS30A	GS30	6104	0.0427	27.33	0.1	0.25	2	91.04	900	0.056	0.6	89								
GS31A	GS31A	5980	0.0843	53.95	0.1	0.25	2	89.7	1000	0.05	0.6	90								
GS32	GS32	5924	0.032	20.48	0.1	0.25	2	87.72	500	0.1	0.6	100								
MD1H3	MD1H3	6510	0.004	2.56	0.1	0.25	2	95.1	300	0.12	0.6	75								
MD1H2	MD1H2	6464	0.0027	1.73	0.1	0.25	2	94.64	300	0.12	0.6	75								
MD1E4	MD1E4	6442	0.0132	8.45	0.1	0.25	2	94.42	300	0.1	0.6	87								
MD1E3	MD1E3	6379	0.0039	2.5	0.1	0.25	2	93.79	300	0.1	0.6	70								
MD1E2	MD1E2	6316	0.0031	1.98	0.1	0.25	2	93.16	300	0.1	0.6	84								
MD1E1E	MD1E1-2	6357	0.0042	2.69	0.1	0.25	2	93.57	1200	0.107	0.6	100								
MD1E1C	MD1E1-3	6238	0.0686	43.9	0.1	0.25	2	92.38	1000	0.08	0.6	100								
MD1E1B	MD1E1-2	6262	0.0141	9.02	0.1	0.25	2	92.62	1200	0.107	0.6	100								
MD1H1	MD1H1-1	6416	0.0073	4.67	0.1	0.25	2	94.15	400	0.06	0.6	100								
MD1H4	MD1H1-2	6403	0.0049	3.14	0.1	0.25	2	94.03	650	0.06	0.6	100								
MD1J_1	MD1J-1	6469	0.0242	15.49	0.1	0.25	2	94.69	1000	0.1	0.6	100								
MD1G3	MD1G3	6371	0.0096	6.14	0.1	0.25	2	93.71	300	0.08	0.6	90								
MD1G2	MD1G2	6357	0.0033	2.11	0.1	0.25	2	93.57	200	0.08	0.6	72								
MD1G2B	MD1G2B	6340	0.0055	3.52	0.1	0.25	2	93.4	200	0.085	0.6	100								
MD1G1B	MD1G1-2	6230	0.0195	12.48	0.1	0.25	2	92.3	1300	0.06	0.6	100								
GS26A	GS26A	6535	0.0074	4.74	0.1	0.25	2	95.35	600	0.1	0.6	85								
GS26B	GS26B	6422	0.0139	8.9	0.1	0.25	2	94.22	600	0.2	0.6	89								
GS26C	GS26C	6311	0.0126	8.06	0.1	0.25	2	93.11	600	0.2	0.6	90								
GS26D	GS26D	6343	0.0144	9.22	0.1	0.25	2	93.43	600	0.1	0.6	89								
GS26E	GS26E	6256	0.0028	1.79	0.1	0.25	2	92.56	300	0.08	0.6	76								
GS26F	GS26F	6256	0.0074	4.74	0.1	0.25	2	92.56	400	0.1	0.6	87								
GS26N1	GS26N-1	6226	0.0046	2.94	0.1	0.25	2	92.26	335	0.02	0.11	100								
GS26G	GS26G	6262	0.0231	14.78	0.1	0.25	2	92.52	600	0.1	0.6	91								
GS26H	GS26H	6214	0.0026	1.66	0.1	0.25	2	92.14	100	0.08	0.6	76								
GS15C	GS15C	6522	0.0106	6.78	0.1	0.25	2	95.22	600	0.15	0.6	91								
GS15D	GS15D	6362	0.0133	8.51	0.1	0.25	2	93.62	300	0.135	0.6	91								
GS15A	GS15A	6582	0.0913	58.43	0.1	0.237	2	95.82	1800	0.12	0.6	97								
GS15B	GS15B	6351	0.0151	9.66	0.1	0.25	2	93.51	400	0.1	0.6	94								
GS16A1	GS16A1	6207	0.019	12.16	0.1	0.25	2	92.07	400	0.1	0.6	96								
GS16A2	GS16A2	6243	0.0137	8.77	0.1	0.25	2	92.43	400	0.1	0.6	91								
GS16B	GS16B	6571	0.026	16.64	0.1	0.233	2	95.71	1800	0.16	0.6	93								
GS16C	GS16C	6374	0.0141	9.02	0.1	0.25	2	93.74	400	0.16	0.6	89								
GS17C	GS17C	6277	0.0147	9.41	0.1	0.25	2	92.77	600	0.12	0.6	91								
E6A3	E6A3	6519	0.0421	26.94	0.1	0.18	2	95.19	1800	0.2	0.6	94								
GS12B	GS12B	6327	0.0089	5.7	0.1	0.25	2	93.27	600	0.12	0.6	89								
GS12C	GS12C	6382	0.0068	4.35	0.1	0.25	2	93.82	500	0.12	0.6	70								
GS12F	GS12F	6291	0.0082	5.25	0.1	0.25	2	92.91	400	0.1	0.6	94								
GS12H	GS12H	6301	0.0082	5.25	0.1	0.25	2	93.01	800	0.1	0.6	94								
GS12D	GS12D	6445	0.0044	2.82	0.1	0.25	2	94.45	400	0.15	0.6	84								
GS12E	GS12E	6365	0.0044	2.82	0.1	0.25	2	93.65	400	0.15	0.6	90								
GS12I	GS12I	6263	0.0177	11.33	0.1	0.25	2	92.63	800	0.1	0.6	95								
GS17A	GS17A	6206	0.0226	14.46	0.1	0.25	2	92.06	800	0.1	0.6	90								
GS26N	GS26N-2	6196	0.0299	19.14	0.1	0.25	2	91.96	1419	0.066	0.6	100								
GS260A	AREA=20.2 AC	6156	0.0321	20.54	0.1	0.25	6	91.56	800	0.05	0.6	96								
GS260B	AREA=3.3 AC UNIT 4A	6166	0.0047	3.01	0.1	0.25	2	91.66	600	0.05	0.6	95								
MD1C2	MD1C2	6130	0.0063	4.03	0.1	0.25	2	91.3	250	0.05	0.6	90								
GS26L3	AREA=0.7 AC UNIT 4A	6132	0.0012	0.77	0.1	0.25	2	91.32	500	0.058	0.6	90								
MD1F-1	MD1F-1	6368	0.0069	4.42	0.1	0.25	2	93.68	600	0.08	0.6	90								
MD1F	MD1F-2	6353	0.0035	2.24	0.1	0.25	2	93.53	500	0.08	0.6	90								
MD1D1D	MD1D1D	6275	0.0124	7.94	0.1	0.25	2	92.75	800	0.05	0.6	100								
MD1D1C	MD1D1C	6254	0.0074	4.74	0.1	0.25	2	92.54	500	0.05	0.6	100								
MD1E	MD1E	6305	0.016	10.24	0.1	0.25	2	93.05	600	0.08	0.6	95								
MD1D1A	MD1D1A	6225	0.0059	3.78	0.1	0.25	2	92.25	400	0.12	0.6	100								
MD1D1B	MD1D1B	6232	0.0028	1.79	0.1	0.25	2	92.32	400	0.12	0.6	100								
MD1D2	MD1D2	6197	0.0077	4.93	0.1	0.25	2	91.97	600	0.2	0.6	100								
GS26J	GS26J	6164	0.0023	1.47	0.1	0.25	2	91.64	230	0.078	0.6	100								
GS26K	GS26K	6166	0.0032	2.05	0.1	0.25	2	91.66	194	0.092	0.6	100								
GS26L	GS26L REVISED AREA=5.8 AC UNIT	6149	0.0091	5.82	0.1	0.25	2	91.49	500	0.058	0.6	90								
GS26L2	GS26L2	6110	0.0029	1.86	0.1	0.25	2	91.1	250	0.047	0.6	90								
MD1C1	MD1C1	6100	0.0155	9.92	0.1	0.25	2	91	400	0.05	0.6	86								
MD1C4	MD1C4	6067	0.0169	10.82	0.1	0.224	2	90.67	400	0.05	0.6	95								
MA1	MA1	7303	0.2995	191.68	0.1	0.191	2	100	1600	0.234	0.6	100								
MA2	MA2	7054	0.5483	350.91	0.1	0.2	2	100	2200	0.284	0.6	100								
MA3	MA3	7366	0.6259	400.58	0.1	0.229	2	100	2300	0.272	0.6	100								
MA4	MA4	6453	0.287	183.68	0.1	0.227	2	94.53	2000	0.3	0.6	100								
MA5	MA5	6409	0.2025	129.6	0.1	0.214	2	94.09	1500	0.183	0.6	100								
MA6	MA6	6783	0.4152	265.73	0.1	0.228	2	97.83	1800	0.097	0.6	100								
MA7	MA7	6346	0.2326	148.86	0.1	0.233	2	93.46	3000	0.227	0.6	100								
MA8	MA8	6860	0.4308	275.71	0.1	0.165	2	90.6	1250	0.32	0.6	100								
MA9	MA9	6181	0.0913	58.43	0.1	0.237	2	91.81	600	0.208	0.6	100								
MA10A	MA10A	6287	0.2885	184.64	0.1	0.241	2	92.87	1600	0.038	0.6	85								
MA10B	MA10B	6270	0.01	6.4	0.1	0.25	2	92.7	900	0.09	0.6	90								
MB7B3A	MB7B3A	6302	0.0051	3.26	0.1	0.25	2	93.02	500	0.08	0.6	95								
MB7B4A	MB7B4A	6252	0.0156	9.98	0.1	0.25	2	92.52	500	0.09	0.6	95								
MB7B3B	MB7B3B	6302	0.0064	4.1	0.1	0.25	2	93.02	600	0.08	0.6	95								
MB7B4D	MB7B4D	6257	0.0044	2.82	0.1	0.25	2	92.57	400	0.07	0.6	95								
MB7B4C	MB7B4C	6216	0.0023	1.47	0.1	0.25	2	92.16	170	0.053	0.6	95								

TABLE I.II.B.3 : Pre-Project Hydrologic Factors (Continued)

					PLANE 1 - NON-URBAN AND URBAN PLANE PARAMETERS								PLANE 2 - URBAN PLANE PARAMETERS							
SHED	DESCRIPTION	Centroid Elevation (ft)	BA AREA (mi^2)	BA AREA (acre)	Initial Abst. (in)	Constant Infiltration (in/hr)	% Imperv. WARM	% Imperv. FROZEN	Overland Length (ft)	Overland Slope	Overland 'n' Value	Plane % of Shed	Initial Abst (in)	Constant Infiltration (in/hr)	% Imperv. WARM	% Imperv. FROZEN	Overland Length (ft)	Overland Slope	Overland 'n' Value	Plane % of Shed
MB7B1A	MB7B1A	6400	0.0709	45.38	0.1	0.25	2	94	1300	0.192	0.6	100								
MB7B1C	MB7B1C	6369	0.0041	2.62	0.1	0.25	2	93.69	400	0.08	0.6	95								
MB7B1B	MB7B1B	6341	0.0107	6.85	0.1	0.25	2	93.41	500	0.08	0.6	95								
MB7B1D	MB7B1D	6250	0.0146	9.34	0.1	0.25	2	92.5	500	0.07	0.6	95								
MB7B1E	MB7B1E	6217	0.0054	3.46	0.1	0.25	2	92.17	500	0.05	0.6	95								
MB7B2	MB7B2	6188	0.0216	13.82	0.1	0.25	2	91.88	1300	0.192	0.6	95								
MB1	MB1	7456	0.5333	341.31	0.1	0.188	2	100	4000	0.275	0.6	100								
MB2	MB2	6762	1.2667	810.69	0.1	0.192	2	97.62	2800	0.339	0.6	100								
MB3	MB3	6632	0.5006	320.38	0.1	0.218	2	96.32	1800	0.278	0.6	100								
MB4	MB4	6485	0.6535	418.24	0.1	0.245	2	94.85	1900	0.184	0.6	100								
MB5	MB5	6222	0.1602	102.53	0.1	0.25	2	92.22	1800	0.278	0.6	100								
MB6A	AREA = 7.0 AC	6199	0.0073	4.67	0.1	0.25	6.6	91.99	1335	0.1543	0.6	100								
MB6B	AREA = 3.9 AC	6190	0.0061	3.9	0.1	0.25	11.8	91.9	240	0.0708	0.6	100								
MB6C	AREA = 3.2 AC	6160	0.0039	2.5	0.1	0.25	7.6	91.6	370	0.1081	0.6	100								
MB6D	MB6D	6151	0.0223	14.27	0.1	0.246	2	91.51	200	0.125	0.6	65								
MB6G	MB6G	6244	0.0109	6.98	0.1	0.25	2	92.44	500	0.125	0.6	30								
MB6F	MB6F	6226	0.0062	3.97	0.1	0.25	2	92.26	500	0.125	0.6	30								
MB6D1	MB6D1	6200	0.0036	2.3	0.1	0.25	2	92	500	0.125	0.6	30								
MB6E	MB6E	6227	0.005	3.2	0.1	0.25	2	92.27	500	0.125	0.6	30								
MB7A1	MB7A1	6457	0.1465	93.76	0.1	0.208	2	94.57	1300	0.192	0.6	97								
MB7A2A	MB7A2A	6297	0.0247	15.81	0.1	0.25	2	92.97	550	0.192	0.6	92								
MB7A2B	MB7A2B	6273	0.0059	3.78	0.1	0.25	2	92.73	300	0.192	0.6	100								
MB7C	MB7C	6245	0.0236	15.1	0.1	0.25	2	92.45	200	0.1	0.6	92								
MB7D1A	MB7D1A	6321	0.0044	2.82	0.1	0.25	2	93.21	500	0.1	0.6	79								
MB7D1B	MB7D1B	6331	0.0025	1.6	0.1	0.25	2	93.31	300	0.1	0.6	79								
MB7D1	MB7D1	6281	0.0011	0.7	0.1	0.25	2	92.81	100	0.1	0.6	100								
MB7D2	MB7D2	6262	0.0215	13.76	0.1	0.25	2	92.62	200	0.1	0.6	95								
MB7E	MB7E	6130	0.0585	37.44	0.1	0.247	2	91.3	200	0.1	0.6	96								
MB8	MB8	6093	0.0545	34.88	0.1	0.214	2	90.93	1000	0.1	0.6	85								
MC1	AREA = 258.6 AC	6908	0.4041	258.62	0.1	0.239	2	99.08	1530	0.4281	0.6	100								
MC2A	AREA = 59.1 AC	6585	0.0923	59.07	0.1	0.25	2.2	95.85	1035	0.401	0.6	100								
MC2B	AREA = 0.9 AC	6188	0.0014	0.9	0.1	0.25	10.3	91.88	550	0.0764	0.6	100								
MC2K	MC2K	6170	0.0001	0.06	0.1	0.25	4.7	91.7	1225	0.1551	0.6	100								
MD1D	MD1d AREA = 5.9 AC	6358	0.0092	5.89	0.1	0.25	3.4	93.58	800	0.2375	0.6	100								
MD1B	MD1b AREA = 5.9 AC	6304	0.0092	5.89	0.1	0.25	3.6	93.04	800	0.2375	0.6	100								
MC2A2	MC2A2	6157	0.0061	3.9	0.1	0.25	4.7	91.57	1225	0.1551	0.6	100								
MD1C	MD1c AREA = 2.9 AC	6274	0.0045	2.88	0.1	0.25	7.9	92.74	500	0.2178	0.6	100								
MC2A3	MC2A3	6174	0.0044	2.82	0.1	0.25	4.7	91.74	1225	0.1551	0.6	100								
MC2D	AREA = 7.8 AC	6293	0.0122	7.81	0.1	0.25	4.7	92.93	1225	0.1551	0.6	100								
MC2E	AREA = 3.9 AC	6236	0.006	3.84	0.1	0.25	8.5	92.36	895	0.1777	0.6	100								
MC2G	AREA = 9.7 AC	6189	0.0151	9.66	0.1	0.25	90	91.89	395	0.2051	0.6	100								
MC2H	AREA = 2.4 AC	6220	0.0038	2.43	0.1	0.25	9.5	92.2	365	0.1096	0.6	100								
MC2L	MC2L	6085	0.0519	33.22	0.1	0.25	10.3	90.85	550	0.0764	0.6	100								
MC2I	AREA = 0.7 AC	6195	0.0011	0.7	0.1	0.25	24.3	91.95	225	0.1289	0.6	100								
MC2J	AREA = 0.6 AC	6163	0.0011	0.7	0.1	0.25	19.2	91.63	225	0.16	0.6	100								
MD4A	MD4A	6944	0.1163	74.43	0.1	0.25	2.5	99.44	500	0.414	0.6	100								
MD3C	MD3c AREA = 6.9 AC = 0.01078 SQ MI % IMPERV = 4.6	6436	0.0108	6.91	0.1	0.25	4.4	94.36	500	0.3184	0.6	100								
MD3B	MD3b AREA = 8.5 AC = 0.01328 SQ MI % IMPERV = 3.8	6521	0.0133	8.51	0.1	0.25	3.6	95.21	500	0.3073	0.6	100								
MD3A1	MD3a AREA = 25.4 AC = 0.03969 SQ MI % IMPERV = 2.6	6712	0.0397	25.41	0.1	0.25	2.5	97.12	500	0.3458	0.6	100								
MD1A1	MD1a AREA = 3.0 AC = 0.00469 SQ MI % IMPERV = 7.1	6294	0.0047	3.01	0.1	0.25	6.4	92.94	500	0.242	0.6	100								
MC2A4	AREA = 59.1 AC	6166	0.0022	1.41	0.1	0.25	2.2	91.66	1035	0.401	0.6	100								
MD1B1	MD1B1	6284	0.0157	10.05	0.1	0.25	2	92.84	800	0.05	0.6	51								
MD1B2	MD1B2	6137	0.0392	25.09	0.1	0.25	2	91.37	800	0.08	0.6	94								
MD1A	MD1a AREA = 3.0 AC = 0.00469 SQ MI % IMPERV = 7.1	6054	0.0581	37.18	0.1	0.194	6.4	90.54	500	0.242	0.6	100								
MD2D	MD2D	6074	0.004	2.56	0.1	0.25	2	90.74	550	0.035	0.6	90								
MD3D	MD3d	6237	0.0094	6.02	0.1	0.25	8	92.37	682	0.161	0.6	100								
MD1E1A	MD1E1A	6218	0.0018	1.15	0.1	0.25	2	92.18	600	0.08	0.6	95								
MD6	MD6	6145	0.0072	4.61	0.1	0.25	7.5	91.45	635	0.156	0.6	100								
MD1	MD1 AREA = 5.7 AC = 0.00891 SQ MI % IMPERV = 14.0	6218	0.0088	5.63	0.1	0.25	13	92.18	483	0.1451	0.6	100								
MD2A	MD2A	6146	0.0026	1.66	0.1	0.25	2	91.46	250	0.035	0.6	90								
MD27	MD27	6109	0.0048	3.07	0.1	0.25	11	91.09	559	0.05	0.6	100								
MD28A	MD28A	6099	0.0043	2.75	0.1	0.25	15.2	90.99	559	0.05	0.6	100								
MD28B	MD28B	6087	0.0092	5.89	0.1	0.25	4.8	90.87	559	0.05	0.6	100								
MD3A	MD3a AREA = 25.4 AC = 0.03969 SQ MI % IMPERV = 2.6	6059	0.0076	4.86	0.1	0.25	2.5	90.59	500	0.3458	0.6	100								
MD7B	MD7B	6251	0.0042	2.69	0.1	0.25	9	92.51	760	0.05	0.6	100								
MD4C	MD4c	6240	0.0056	3.58	0.1	0.25	8.8	92.4	626	0.05	0.6	100								
MD4E	MD4E	6253	0.0016	1.02	0.1	0.25	2	92.53	1500	0.283	0.6	100								
MD4D	MD4d	6246	0.0062	3.97	0.1	0.25	7.5	92.46	895	0.101	0.6	100								
MD9	MD9	6160	0.0106	6.78	0.1	0.25	7.9	91.6	824	0.253	0.6	100								
MD8	MD8	6139	0.0047	3.01	0.1	0.25	4.8	91.39	519	0.126	0.6	100								
MD6A	MD6A	6018	0.1279	81.86	0.1	0.219	7.5	90.18	635	0.156	0.6	100								
MD7D	MD7d	6652	0.0051	3.26	0.1	0.25	2	96.52	500	0.106	0.6	100								
MD7C	MD7c	6450	0.0061	3.9	0.1	0.25	3.2	94.5	500	0.106	0.6	100								
MD7E	MD7E	6273	0.0094	6.02	0.1	0.25	2	92.73	1200	0.313	0.6	90								
MD7F	MD7F	6194	0.0067	4.29	0.1	0.25	2	91.94	1200	0.313	0.6	90								
MD11	MD11	6164	0.0056	3.58	0.1	0.25	4.8	91.64	595	0.05	0.6	100								
MD2B	MD2B	6071	0.0056	3.58	0.1	0.25	2	90.71	690	0.046	0.6	90								
ME3A	ME3A	6051	0.004	2.56	0.1	0.25	2	90.51	420	0.038	0.6	90								
MD17	MD17	6174	0.0075	4.8	0.1	0.25	5.7	91.74	830	0.126	0.6	100								
MD18	MD18	6137	0.0051	3.26	0.1	0.25	6	91.37	930	0.148	0.6	100								
MD19	MD19	6118	0.0056	3.58	0.1	0.25	6.1	91.18	1055	0.21	0.6	100								
MD2A1	MD2A	6089	0.0019	1.22	0.1	0.25	2	90.89	250	0.035	0.6	90								
MD2	MD2	6074	0.0059	3.78	0.1	0.25	16.8	90.74	295	0.125	0.6	100								
ME3A2	ME3A2	6049	0.0062	3.97	0.1	0.25	2	90.49	500	0.044	0.6	90								
MD13	MD13	6987	0.4368	279.55	0.1	0.25	2	99.87	500	0.477	0.6	100								
ME6_19	ME6_19	6649	0.0236	15.1	0.1	0.25	15	96.49	330	0.053	0.6	100								
ME6_14	ME6_14	6522	0.0063	4.03	0.1	0.25	15	95.22	330	0.053	0.6	100								
MD12	MD12	6813	0.0428	27.39	0.1	0.25	2.5	98.13	500	0.106	0.6	100								
MD12B	MD12b	6336	0.0024	1.54	0.1	0.25	24.7	93.36	352	0.256	0.6	100								
MD12C	MD12c	6408	0.0084	5.38	0.1	0.25	6.5	94.08	500	0.205	0.6	100								
MD14B	MD14b	6354	0.0016	1.02	0.1	0.25	12.6	93.54	500	0.106	0.6	100								
MD14C	MD14c	6384	0.006	3.84	0.1	0.25	4.3	93.84	500	0.106	0.6	100								
ME6_13	1.17 AC	6393	0.0022	1.41	0.1	0.25	2.9	93.93	525	0.175	0.6	100								
ME8_3	3.07 AC	6355	0.0048	3.07	0.1	0.25	7.4	93.55	675	0.164	0.6	100								
MD13B	MD13B	6240	0.0392	25.09	0.1	0.25	2	92.4	500	0.477	0.6	100								

TABLE I.II.B.4 : Pre-Project Hydrologic Factors (Continued)

					PLANE 1 - NON-URBAN AND URBAN PLANE PARAMETERS								PLANE 2 - URBAN PLANE PARAMETERS							
SHED	DESCRIPTION	Centroid Elevation (ft)	BA AREA (mi^2)	BA AREA (acre)	Initial Abst. (in)	Constant Infiltration (in/hr)	% Imperv. WARM	% Imperv. FROZEN	Overland Length (ft)	Overland Slope	Overland 'n' Value	Plane % of Shed	Initial Abst (in)	Constant Infiltration (in/hr)	% Imperv. WARM	% Imperv. FROZEN	Overland Length (ft)	Overland Slope	Overland 'n' Value	Plane % of Shed
MD14	MD14	6336	0.006	3.84	0.1	0.25	9.3	93.36	663	0.165	0.6	100								
MD14A	MD14A	6330	0.0009	0.58	0.1	0.25	9.3	93.3	663	0.165	0.6	100								
ME3_5	ME3_5	6224	0.0007	0.45	0.1	0.25	2	92.24	300	0.1	0.6	65								
MD15	MD15	6266	0.0073	4.67	0.1	0.25	9.2	92.66	870	0.159	0.6	100								
MD15A	MD15A	6229	0.0002	0.13	0.1	0.25	9.2	92.29	870	0.159	0.6	100								
MD16A	MD16A	6219	0.0036	2.3	0.1	0.25	10	92.19	772	0.125	0.6	100								
MD16	MD16	6245	0.0063	4.03	0.1	0.25	10	92.45	772	0.125	0.6	100								
MD13C	MD13C	6095	0.0068	4.35	0.1	0.25	2	90.95	500	0.477	0.6	100								
MD20	MD20	6107	0.002	1.28	0.1	0.25	9	91.07	740	0.05	0.6	100								
ME3B	ME3B	5997	0.0182	11.65	0.1	0.25	2	89.91	300	0.1	0.6	65								
GS31B1	GS31B1	6087	0.0029	1.86	0.1	0.25	2	90.87	580	0.038	0.6	90								
GS31B2	GS31B2	6079	0.0047	3.01	0.1	0.25	2	90.79	690	0.057	0.6	90								
GS31B3	GS31B3	6068	0.0056	3.58	0.1	0.25	2	90.68	530	0.06	0.6	90								
GS31B4	GS31B4	6054	0.0012	0.77	0.1	0.25	2	90.54	250	0.048	0.6	90								
GS31B5	GS31B5	6052	0.0056	3.58	0.1	0.25	2	90.52	500	0.05	0.6	90								
ME8_1	0.48 AC	6339	0.0007	0.45	0.1	0.25	26	93.39	180	0.066	0.6	100								
ME3_1	ME3_1	6336	0.0009	0.58	0.1	0.25	2	93.36	300	0.1	0.6	65								
ME3_2	ME3_2	6335	0.0024	1.54	0.1	0.25	2	93.35	300	0.1	0.6	65								
ME3_3	ME3_3	6301	0.0031	1.98	0.1	0.25	2	93.01	300	0.1	0.6	65								
ME3_4	ME3_4	6267	0.0024	1.54	0.1	0.25	2	92.67	300	0.1	0.6	65								
MD21	MD21	6186	0.0033	2.11	0.1	0.25	7.2	91.86	640	0.05	0.6	100								
ME3C3	ME3C3	6096	0.0066	4.22	0.1	0.25	2	90.96	300	0.1	0.6	65								
ME3C1	ME3C1	6102	0.0016	1.02	0.1	0.25	2	91.02	300	0.1	0.6	65								
ME4A	ME4A	5971	0.0939	60.1	0.1	0.232	2	89.13	500	0.12	0.6	90								
ME6_11	0.13 AC	6328	0.0002	0.13	0.1	0.25	49.1	93.28	30	0.02	0.11	100								
ME6_10	0.21 AC	6326	0.0003	0.19	0.1	0.25	67.3	93.26	30	0.02	0.11	100								
ME6_25	7.81 AC	6275	0.0094	6.02	0.1	0.25	7.1	92.75	125	0.16	0.6	100								
ME6_33	ME6_33	6258	0.0026	1.66	0.1	0.25	15	92.58	330	0.053	0.6	100								
ME6_26	0.43 AC	6214	0.0008	0.51	0.1	0.25	3	92.14	200	0.13	0.6	100								
ME7_1	8.34 AC	6223	0.0127	8.13	0.1	0.25	4.6	92.23	470	0.2468	0.6	100								
ME7_2	0.25 AC	6168	0.0004	0.26	0.1	0.25	83.6	91.68	30	0.02	0.11	100								
ME7D6	ME7D6	6213	0.006	3.84	0.1	0.25	2	92.13	500	0.18	0.6	75								
ME7D14	ME7D14	6138	0.0037	2.37	0.1	0.25	15	91.38	150	0.13	0.6	100								
ME7D16	ME7D16	6148	0.0018	1.15	0.1	0.25	15	91.48	177	0.045	0.6	100								
ME7D15	ME7D15	6145	0.0031	1.98	0.1	0.25	15	91.45	175	0.057	0.6	100								
ME7D24	ME7D24	6115	0.0022	1.41	0.1	0.25	15	91.15	144	0.09	0.6	100								
ME4B13	ME4B13	6103	0.0056	3.58	0.1	0.25	15	91.03	270	0.02	0.6	100								
ME7C4	ME7C4	6182	0.0054	3.46	0.1	0.25	2	91.82	500	0.15	0.6	5								
ME7C5	ME7C5	6202	0.0061	3.9	0.1	0.25	2	92.02	500	0.15	0.6	5								
ME4B3	ME4B3	6134	0.0029	1.86	0.1	0.25	2	91.34	300	0.05	0.6	15								
ME4B12	ME4B12	6096	0.0065	4.16	0.1	0.25	15	90.96	430	0.018	0.6	100								
ME4B23	ME4B23	6061	0.0088	5.63	0.1	0.25	15	90.61	210	0.07	0.6	100								
ME4B22	ME4B22	6053	0.0074	4.74	0.1	0.25	15	90.53	220	0.1	0.6	100								
ME3C2	ME3C2	6113	0.0032	2.05	0.1	0.25	2	91.13	300	0.16	0.6	60								
ME4B11	ME4B11	6066	0.0049	3.14	0.1	0.25	15	90.66	340	0.053	0.6	100								
ME4B21	ME4B21	6044	0.0024	1.54	0.1	0.25	15	90.44	220	0.1	0.6	100								
ME4B10	ME4B-10	6068	0.0027	1.73	0.1	0.25	15	90.68	150	0.08	0.6	100								
ME4B	ME4B	6037	0.0055	3.52	0.1	0.25	2	90.37	300	0.05	0.6	15								
MG3_3B	MG3_3B	6928	0.146	93.44	0.1	0.25	2.9	99.28	575	0.225	0.6	100								
MG3_3C	MG3_3C	6589	0.0127	8.13	0.1	0.25	2.9	95.89	575	0.225	0.6	100								
ME6_12	14.48 AC	6583	0.0096	6.14	0.1	0.25	3.4	95.83	600	0.295	0.6	100								
ME6_16	10.41 AC	6370	0.0002	0.13	0.1	0.25	4.4	93.7	600	0.295	0.6	100								
ME6_18	2.92 AC	6343	0.0046	2.94	0.1	0.25	10.2	93.43	150	0.2133	0.6	100								
ME6_20	3.75 AC	6339	0.006	3.84	0.1	0.25	6.3	93.39	200	0.21	0.6	100								
ME6_24	0.70 AC	6287	0.0026	1.66	0.1	0.25	18.6	92.87	305	0.091	0.6	100								
ME6_23	4.19 AC	6222	0.0065	4.16	0.1	0.25	8.2	92.22	200	0.17	0.6	100								
ME6_32	0.39 AC	6194	0.0006	0.38	0.1	0.25	33.9	91.94	24	0.02	0.11	100								
ME6_28	4.93 AC	6163	0.0077	4.93	0.1	0.25	2	91.63	355	0.113	0.6	100								
ME627	1.77 AC	6157	0.0027	1.73	0.1	0.25	2	91.57	120	0.107	0.6	100								
ME6_29	1.37 AC	6127	0.0021	1.34	0.1	0.25	2	91.27	370	0.114	0.6	100								
ME6_30	1.27 AC	6098	0.002	1.28	0.1	0.25	2	90.98	295	0.088	0.6	100								
ME6A25	ME6A25	6096	0.0029	1.86	0.1	0.25	15	90.96	330	0.053	0.6	100								
ME7B	ME7B	6069	0.027	17.28	0.1	0.25	2	90.69	400	0.05	0.6	75								
ME7A	ME7A	5927	0.1404	89.86	0.1	0.227	2	87.81	1300	0.192	0.6	10								
MF1	MF1	5957	0.378	241.92	0.1	0.205	2	88.71	1500	0.087	0.6	100								
MF2	MF2	5903	0.0582	37.25	0.1	0.247	2	87.09	1000	0.07	0.6	100								
MD4_1A	MD4	6876	0.1899	121.54	0.1	0.25	2	98.76	1500	0.283	0.6	100								
MG4_1B	6.35 AC	6466	0.01	6.4	0.1	0.25	2.1	94.66	500	0.35	0.6	100								
MG5_2A	8.61 AC	6536	0.0134	8.58	0.1	0.25	3.2	95.36	600	0.2033	0.6	100								
MG3_1	1.78 AC	6486	0.0028	1.79	0.1	0.25	5.4	94.86	500	0.28	0.6	100								
MG3_1A	1.00 AC	6345	0.0016	1.02	0.1	0.25	5.4	93.45	498	0.28	0.6	100								
MG3_1C	1.47 AC	6530	0.0023	1.47	0.1	0.25	5.4	95.3	498	0.2811	0.6	100								
MG3_6	0.09 AC	6301	0.0002	0.13	0.1	0.25	90	93.01	30	0.02	0.11	100								
MG4_2	4.61 AC	6451	0.0072	4.61	0.1	0.25	3.1	94.51	500	0.284	0.6	100								
MG4_3B	MG4_3B	6300	0.0002	0.13	0.1	0.25	2	93	2300	0.326	0.6	95								
MG4_3A	0.07 AC	6303	0.0001	0.06	0.1	0.25	90	93.03	30	0.02	0.11	100								
MG5_2B	0.06 AC	6330	0.0001	0.06	0.1	0.25	90	93.3	12	0.01	0.6	100								
MG4_4	0.10 AC	6322	0.0002	0.13	0.1	0.25	90	93.22	30	0.02	0.11	100								
MG4_5C	MG4_5C	6258	0.0078	4.99	0.1	0.25	2	92.58	2300	0.326	0.6	95								
MG5_1A	18.98 AC	6608	0.0296	18.94	0.1	0.25	2.8	96.08	600	0.155	0.6	100								
MG5_1B	MG5_1B	6455	0.009	5.76	0.1	0.25	2	94.55	200	0.1	0.6	5								
MG5_3	0.04 AC	6301	0.0001	0.06	0.1	0.25	90	93.01	30	0.02	0.11	100								
MG5_4	0.15 AC	6281	0.0003	0.19	0.1	0.25	90	92.81	30	0.02	0.11	100								
MG5_5	MG5_5	6284	0.0024	1.54	0.1	0.25	2	92.84	200	0.1	0.6	5								
MG3_3A	8.25 AC	6533	0.0129	8.26	0.1	0.25	2.9	95.33	575	0.225	0.6	100								
MG3_2	2.58 AC	6398	0.004	2.56	0.1	0.25	6.1	93.98	390	0.2051	0.6	100								
MG3_4	014 AC	6297	0.0002	0.13	0.1	0.25	88.8	92.97	30	0.02	0.11	100								
MG3_1B	0.87 AC	6425	0.0014	0.9	0.1	0.25	5.4	94.25	500	0.28	0.6	100								
MG3_1D	0.57 AC	6370	0.0009	0.58	0.1	0.25	5.4	93.7	504	0.2778	0.6	100								
MG3_5	0.07 AC	6291	0.0001	0.06	0.1	0.25	90	92.91	30	0.02	0.11	100								
MG3_5A	MG3_5A	6261	0.0073	4.67	0.1	0.25	2.9	92.61	575	0.225	0.6	100								
ME6_1	10.24 AC	6361	0.0082	5.25	0.1	0.25	3.9	93.61	310	0.174	0.6	100								
ME6_2	1.28 AC	6365	0.0099	6.34	0.1	0.25	6.9	93.65	505	0.194	0.6	100								
ME6_3	0.02 AC	6286	0.0003	0.19	0.1	0.25	86.5	92.86	15	0.02	0.6	100								
ME6_5	1.40 AC	6276	0.0022	1.41	0.1	0.25	16.5	92.76	160	0.15	0.6	100								
ME6_7	0.81 AC	6264	0.0013	0.83	0.1	0.25	16.2	92.64	190	0.168	0.6	100								
ME6_8	.44 AC	6231	0.0007	0.45	0.1	0.25	87.8	92.31	20	0.02	0.6	100								
MG1_2	0.67 AC	6285	0.001	0.64	0.1	0.25	11.1	92.85	100	0.14	0.6	100								
MG1_3	1.89 AC	6315	0.0025	1.6	0.1	0.25	9.5	93.15	300	0.07	0.6	100								
MG1_1	1.38 AC	6336	0.0026	1.66	0.1	0.25	2	93.36	185	0.1946	0.6	100								
MG1_4	0.18 AC	6272	0.0003	0.19	0.1	0.25	46.9	92.72	30	0.02	0.11	100								
MG3_33	MG3_33	6210	0.0087	5.57	0.1	0.25	2.9	92.1	575	0.225	0.6	100								

TABLE I.II.B.5 : Pre-Project Hydrologic Factors (Continued)

					PLANE 1 - NON-URBAN AND URBAN PLANE PARAMETERS								PLANE 2 - URBAN PLANE PARAMETERS							
SHED	DESCRIPTION	Centroid Elevation (ft)	BA AREA (mi^2)	BA AREA (acre)	Initial Abst. (in)	Constant Infiltration (in/hr)	% Imperv. WARM	% Imperv. FROZEN	Overland Length (ft)	Overland Slope	Overland 'n' Value	Plane % of Shed	Initial Abst (in)	Constant Infiltration (in/hr)	% Imperv. WARM	% Imperv. FROZEN	Overland Length (ft)	Overland Slope	Overland 'n' Value	Plane % of Shed
ME6_8A	ME6_8A	6168	0.0006	0.38	0.1	0.25	15	91.68	330	0.053	0.6	100								
MG2	MG2	5975	0.1195	76.48	0.1	0.245	2	89.25	700	0.143	0.6	90								
ME6_6	0.16 AC	6263	0.0003	0.19	0.1	0.25	73	92.63	30	0.02	0.11	100								
ME6_21	2.50 AC	6249	0.0039	2.5	0.1	0.25	12	92.49	200	0.125	0.6	100								
ME6_31	0.44 AC	6219	0.0007	0.45	0.1	0.25	42.9	92.19	24	0.02	0.11	100								
MG1B19	MG1B19	6177	0.0072	4.61	0.1	0.25	15	91.77	150	0.04	0.6	100								
MG1B20	MG1B20	6164	0.0039	2.5	0.1	0.25	15	91.64	240	0.08	0.6	100								
ME6A	ME6A	6164	0.003	1.92	0.1	0.25	2	91.64	300	0.12	0.6	50								
MG1B26	MG1B26	6099	0.0038	2.43	0.1	0.25	15	90.99	250	0.096	0.6	100								
MG1B	MG1B	6094	0.0119	7.62	0.1	0.25	2	90.94	300	0.1	0.6	50								
ME6A27	ME6A27	6055	0.0094	6.02	0.1	0.25	15	90.55	230	0.095	0.6	100								
MG1A	MG1A	6022	0.0185	11.84	0.1	0.25	2	90.22	200	0.1	0.6	50								
MG5B1	MG5B1	6456	0.1242	79.49	0.1	0.25	2	94.56	200	0.1	0.6	5								
MG5A2	MG5A2	6240	0.0613	39.23	0.1	0.25	2	92.4	200	0.1	0.6	5								
MG6B	MG6B	6056	0.0479	30.66	0.1	0.201	2	90.56	1000	0.25	0.6	85								
MG5A1	MG5A1	6069	0.0134	8.58	0.1	0.25	2	90.69	200	0.1	0.6	5								
MG7	MG7	5894	0.1439	92.1	0.1	0.207	2	86.82	600	0.25	0.6	100								
NS24A	NS24A	6045	0.0297	19.01	0.1	0.25	2	90.45	900	0.1	0.6	100								
NS24B	NS24B	5932	0.012	7.68	0.1	0.25	2	87.96	300	0.1	0.6	100								
NS24C	NS24C	5862	0.04	25.6	0.1	0.182	2	85.86	800	0.1	0.6	100								
NS25	NS25	5904	0.037	23.68	0.1	0.249	2	87.12	800	0.05	0.6	100								
NS26	NS26	5842	0.1102	70.53	0.1	0.122	2	85.26	1000	0.05	0.6	100								
NS22A	NS22A	6078	0.0103	6.59	0.1	0.25	2	90.78	750	0.1	0.6	100								
NS22C	NS22C	5966	0.0063	4.03	0.1	0.25	2	88.98	300	0.1	0.6	100								
NS23A	NS23A	5878	0.0374	23.94	0.1	0.19	2	86.34	950	0.07	0.6	100								
NS27	NS27	5834	0.0574	36.74	0.1	0.1	2	85.02	830	0.03	0.6	100								
NS28B	NS28B	5818	0.0417	26.69	0.1	0.1	2	84.54	500	0.01	0.6	100								
E85Z	E85Z	5864	0.0291	18.62	0.1	0.25	2	87	400	0.02	0.6	100								
NS28A	NS28A	5841	0.0415	26.56	0.1	0.1	2	85.23	500	0.01	0.6	100								
NS22	NS22	6304	0.2037	130.37	0.1	0.25	2	93.04	2100	0.08	0.6	100								
NS31	NS31	6214	0.0592	37.89	0.1	0.25	2	92.14	1250	0.1	0.6	100								
NS22B	NS22B	6014	0.0098	6.27	0.1	0.25	2	90.14	500	0.1	0.6	100								
NS23B	NS23B	5866	0.1061	67.9	0.1	0.191	2	85.98	1350	0.05	0.6	100								
NS32A	NS32A	6168	0.0191	12.22	0.1	0.25	2	91.68	500	0.1	0.6	100								
NS32B	NS32B	5855	0.1481	94.78	0.1	0.165	2	85.65	1500	0.08	0.6	100								
NS1	BASIN 1 - 330 Ac	7825	0.5174	331.14	0.1	0.178	2	100	3300	0.24	0.8	57								
NS2	BASIN 2 - 267 Ac	7697	0.4184	267.78	0.1	0.25	2	100	2800	0.25	0.8	54								
NS3	BASIN 3 - 331 Ac	7343	0.5218	333.95	0.1	0.25	65	100	2950	0.18	0.24	3								
NS4	BASIN 4 - 166 Ac	6727	0.2602	166.53	0.1	0.25	65	97.27	2110	0.22	0.24	29								
NS5	BASIN 5 - 21 Ac	6520	0.0319	20.42	0.1	0.25	65	95.2	1400	0.25	0.24	36								
NS6	BASIN 6 - 178 Ac	6685	0.2162	138.37	0.1	0.25	65	96.85	3100	0.27	0.24	71								
NS7	BASIN 7 - 38 Ac	6362	0.0602	38.53	0.1	0.25	65	93.62	1570	0.19	0.24	69								
NS8	BASIN 8 - 673 Ac	7113	1.1304	723.46	0.1	0.239	2	100	4200	0.21	0.8	92								
NS9	BASIN 9 - 144 Ac	6837	0.1855	118.72	0.1	0.249	2	98.37	4400	0.2	0.6	100								
NS10	BASIN 10 - 214 Ac	6657	0.3581	229.18	0.1	0.223	2	96.57	3905	0.2	0.6	100								
NS11	BASIN 11 - 60 Ac	6559	0.0389	24.9	0.1	0.249	65	95.59	1600	0.34	0.24	6								
NS11B	BASIN 11 - 60 Ac	6270	0.0546	34.94	0.1	0.25	65	92.7	1600	0.34	0.24	6								
NS12	BASIN 12 - 40 Ac	6210	0.0619	39.62	0.1	0.25	65	92.1	400	0.1	0.24	71								
NS13	BASIN 13 - 15 Ac	6452	0.1459	93.38	0.1	0.25	65	94.52	500	0.16	0.24	86								
NS14	BASIN 14 - 47 Ac	6261	0.0434	27.78	0.1	0.25	65	92.61	775	0.35	0.24	90								
NS14B	NS14B	6176	0.0204	13.06	0.1	0.25	2	91.76	500	0.1	0.6	100								
NS20B	NS20B	6358	0.0322	20.61	0.1	0.25	2	93.58	640	0.1	0.6	100								
NS15	NS15	6103	0.086	55.04	0.1	0.25	2	91.03	1000	0.08	0.6	100								
NS16	NS16	6564	0.1019	65.22	0.1	0.246	2	95.64	1600	0.1	0.6	100								
NS17	NS17	6282	0.0811	51.9	0.1	0.25	2	92.82	1500	0.08	0.6	100								
NS18	NS18	6405	0.1877	120.13	0.1	0.25	2	94.05	3200	0.1	0.6	100								
NS19	NS19	6169	0.0434	27.78	0.1	0.25	2	91.69	1600	0.05	0.6	100								
NS20	NS20	6070	0.0548	35.07	0.1	0.25	2	90.7	600	0.08	0.6	100								
NS21	NS21	6056	0.139	88.96	0.1	0.248	2	90.56	1450	0.05	0.6	100								
NS30D	NS30D	6286	0.0577	36.93	0.1	0.25	2	92.86	900	0.08	0.6	100								
NS30A	NS30A	6014	0.0266	17.02	0.1	0.244	2	90.14	800	0.08	0.6	100								
NS30B	NS30B	5979	0.14	89.6	0.1	0.236	2	89.37	1600	0.1	0.6	100								
NS30E	NS30E	6133	0.0022	1.41	0.1	0.25	2	91.33	200	0.1	0.6	100								
NS30F	NS30F	6158	0.0023	1.47	0.1	0.25	2	91.58	200	0.1	0.6	100								
NS30C	NS30C	5872	0.1237	79.17	0.1	0.151	2	86.16	1600	0.08	0.6	100								
NS33B	NS33B	5818	0.0301	19.26	0.1	0.1	2	84.54	1000	0.05	0.6	100								
NS34	NS34	6122	0.0437	27.97	0.1	0.25	2	91.22	900	0.08	0.6	100								
NS35	NS35	5869	0.1517	97.09	0.1	0.185	2	86.07	1900	0.05	0.6	100								
XMAR1	XMAR1	6837	0.2922	187.01	0.1	0.244	2	90	1900	0.1	0.6	100								
XMAR2	XMAR2	6837	0.4066	260.22	0.1	0.241	2	90	2200	0.1	0.6	100								
XMAR3	XMAR3	6837	0.6221	398.14	0.1	0.248	2	90	3500	0.1	0.6	100								
XMAR4	XMAR4	6837	0.2489	159.3	0.1	0.25	2	90	2300	0.1	0.6	100								
XMAR5	XMAR5	6837	0.3335	213.44	0.1	0.25	2	90	1700	0.1	0.6	100								
XMAR6	XMAR6	6837	0.1147	73.41	0.1	0.25	2	90	1500	0.1	0.6	100								
XMAR7	XMAR7	6837	0.3439	220.1	0.1	0.25	2	90	2800	0.1	0.6	100								
XMAR8	XMAR8	6837	0.2218	141.95	0.1	0.25	2	90	2200	0.1	0.6	100								
XMAR9	XMAR9	6837	0.25	160	0.1	0.25	2	90	2100	0.1	0.6	100								
XMAR10	XMAR10	6837	0.2272	145.41	0.1	0.25	2	90	2300	0.1	0.6	100								
XMAR11	XMAR11	6837	0.1037	66.37	0.1	0.185	2	90	1100	0.1	0.6	100								
XMAR12	XMAR12	6837	0.1361	87.1	0.1	0.206	2	90	1250	0.1	0.6	100								
XMAR13	XMAR13	6837	0.2679	171.46	0.1	0.249	2	90	1800	0.1	0.6	100								
XMAR14	XMAR14	6837	0.0483	30.91	0.1	0.25	2	90	500	0.1	0.6	100								
XMAR15	XMAR15	6837	0.014	8.96	0.1	0.25	2	90	500	0.1	0.6	100								
XMAR17	XMAR17	6837	0.2288	146.43	0.1	0.22	2	90	1300	0.1	0.6	100								
MAR19A	MAR19A	6244	0.0295	18.88	0.1	0.25	2	92.44	1000	0.1	0.6	100								
MAR19B	MAR19B	6120	0.0074	4.74	0.1	0.25	2	91.2	500	0.1	0.6	100								
XMAR18	XMAR18	6837	0.1517	97.09	0.1	0.248	2	90	1600	0.1	0.6	100								
XMAR20	XMAR20	6837	0.2009	128.58	0.1	0.244	2	91	1700	0.1	0.6	100								
MAR21A	MAR21A	6190	0.0602	38.53	0.1	0.25	2	91.9	500	0.1	0.6	100								
MAR21B	MAR21B	6055	0.0241	15.42	0.1	0.245	2	90.55	500	0.1	0.6	100								
MAR22B	MAR22B	5942	0.0266	17.02	0.1	0.23	2	88.26	500	0.1	0.6	100								
MAR22A	MAR22A	6025	0.0165	10.56	0.1	0.25	2	90.25	500	0.1	0.6	100								
XMAR23	XMAR23	6837	0.0439	28.1	0.1	0.138	2	87	500	0.05	0.6	100								
XMAR24	XMAR24	6837	0.0055	3.52	0.1	0.1	2	87	200	0.02	0.6	100								
XMAR25	XMAR25	6837	0.0147	9.41	0.1	0.126	2	87	1000	0.02	0.6	100								
NS33A	NS33A	5840	0.0118	7.55	0.1	0.197	2	85.2	1000	0.02	0.6	100								

Tables I.II.B.5A and I.II.B.5B list the computed Pre-project peak flow rates at key project locations for the various storm events evaluated in this analysis. TABLE I.II.B.5A shows the Warm Storm Event estimated Peak Flows. Table I.II.B.5B shows the Frozen Condition Event estimated Peak Flow Rates. The base HEC-1 file for PDP input for the pre-project conditions is shown in Appendices A-1 and A-2 for the Warm and Frozen events respectively.

TABLE I.II.B.5A: PRE-PROJECT PEAK FLOW RATES WARM EVENT

HEC-1 Watershed Node	Watershed Area (mi^2)	HEC-RAS River/Stream	HEC-RAS Cross Section	500-YEAR FLOW (cfs)	100-YEAR FLOW (cfs)	10-YEAR FLOW (cfs)	2-YEAR FLOW (cfs)
YE20D	0.53	Martis Creek / NW	100	477	345.5	179.4	62.6
UE30CR	0.61	Martis Creek / NW	96	548.6	399.1	208	72.9
YE40BC	0.74	Martis Creek / NW	91	632.1	463.4	243.5	85.4
YE80C	1.28	Martis Creek / NW	89	1096.7	805.5	428.3	156
E40C	0.03	Martis Creek / NW2	110	26.2	19.1	10	3.2
YE40D	0.05	Martis Creek / NW2	108	37.9	27.5	14.3	4.6
YE40DC	1.32	Martis Creek / NW3	79.5	1134.5	833	442.5	160.5
YE85	1.78	Martis Creek / NW3	78	1468.4	1075.3	565.5	191.8
YE85B	1.82	Martis Creek / NW3	77	1490.3	1090.9	573.7	195
YE85CC	1.82	Martis Creek / NW3	73	604.5	557	499.7	195.8
VMF1CR	12.07	Martis Creek / NW4	69.5	8564.1	6190.3	3077.9	1100.3
VMF2CR	12.13	Martis Creek / NW4	68.5	8610.7	6225.2	3097.8	1106
YNS26	13.27	Martis Creek / NW4	65.5	9600.3	6951	3461.1	1265
YNS27	15.21	Martis Creek / NW5	59.5	7744.2	6205.9	3837.1	1450.7
YNS28B	15.28	Martis Creek / NW5	57.5	7786.4	6240.7	3862.3	1462.9
YNS28A	15.32	Martis Creek / NW5	56.5	7814.3	6264.2	3879.3	1471.6
YNSALL	21.04	Martis Creek / NW5	56	10636	8334.8	4940.8	1980.3
YR21B	4.33	Martis Creek / W1	49.5	1639.6	1064.7	483.1	240.7
MAR22B	4.36	Martis Creek / W1	47	230.7	221.2	208.9	199.9
YR22A	4.38	Martis Creek / W1	44	251.5	236.3	216.9	202.5
XMAR23	4.42	Martis Creek / W1	41	296.3	267	230.9	208.2
YMAR23	4.62	Martis Creek / W1	40	459.2	383.8	289.6	224.8
XMAR24	4.62	Martis Creek / W1	39.5	246.7	244.3	239.7	212.3
UHWY	25.69	Martis Creek / MAIN	39.5	8462.6	7076.3	4440.6	2140.7
NS22	0.2	Martis Creek / SP2	189.5	142.7	100	42.5	12.8
YNS31	0.26	Martis Creek / SP2	188.5	194.6	135.7	59.2	17.6
YNS22B	0.27	Martis Creek / SP2	185.5	203.3	141.8	61.7	19
MG7	0.92	Martis Creek / SP1	199	1171.5	862	461.6	180.1
YNS24C	1	Martis Creek / SP1	195.5	1267.4	930.6	498.2	192.5
NS18	0.19	Martis Creek / SP1	20	112.6	78.5	30.3	10.4
E30A		Offsite		6.6	4.7	2.3	0.6

TABLE I.II.B.5B : PRE-PROJECT PEAK FLOW RATES FROZEN EVENT

HEC-1 Watershed Node	Watershed Area (mi^2)	HEC-RAS River/Stream	HEC-RAS Cross Section	500-YEAR FLOW (cfs)	100-YEAR FLOW (cfs)	10-YEAR FLOW (cfs)	2-YEAR FLOW (cfs)
YE20D	0.53	Martis Creek / NW	100	527.6	398.2	235.6	120.5
UE30CR	0.61	Martis Creek / NW	96	607.3	460	273.7	140.3
YE40BC	0.74	Martis Creek / NW	91	699.3	532.9	318.1	163.1
YE80C	1.28	Martis Creek / NW	89	1206.5	918.3	546	279.8
E40C	0.03	Martis Creek / NW2	110	28.5	21.5	12.4	6.1
YE40D	0.05	Martis Creek / NW2	108	41.5	31.1	18.1	8.9
YE40DC	1.32	Martis Creek / NW3	79.5	1247.9	949.4	564	288.7
YE85	1.78	Martis Creek / NW3	78	1620.2	1227.1	727.3	368.9
YE85B	1.82	Martis Creek / NW3	77	1644.1	1246.8	738.7	374.9
YE85CC	1.82	Martis Creek / NW3	73	638.1	580.1	521.7	340.6
VMF1CR	12.07	Martis Creek / NW4	69.5	10035	7695.9	4740.1	2480.3
VMF2CR	12.13	Martis Creek / NW4	68.5	10083	7739.9	4760.7	2495.4
YNS26	13.27	Martis Creek / NW4	65.5	11231	8605.1	5289.7	2775.4
YNS27	15.21	Martis Creek / NW5	59.5	8888.5	7266.2	5273.3	3047.1
YNS28B	15.28	Martis Creek / NW5	57.5	8933.3	7302	5300.2	3063.6
YNS28A	15.32	Martis Creek / NW5	56.5	8961.4	7324.6	5317.7	3073.4
YNSALL	21.04	Martis Creek / NW5	56	12448	10094	7125.3	4087.5
YR21B	4.33	Martis Creek / W1	49.5	2691.2	1968.1	1104.2	587.6
MAR22B	4.36	Martis Creek / W1	47	235	225.5	213.1	204.2
YR22A	4.38	Martis Creek / W1	44	258.2	243.1	223.5	209.5
XMAR23	4.42	Martis Creek / W1	41	306.9	278.1	242.3	218.9
YMAR23	4.62	Martis Creek / W1	40	490.3	414.4	322.3	259.2
XMAR24	4.62	Martis Creek / W1	39.5	247.2	244.7	241.8	224.3
UHWY	25.69	Martis Creek / MAIN	39.5	9993.1	8446.8	5796.9	3793.3
NS22	0.2	Martis Creek / SP2	189.5	174	131.5	77.6	39.3
YNS31	0.26	Martis Creek / SP2	188.5	234.7	177.1	104.5	53.3
YNS22B	0.27	Martis Creek / SP2	185.5	245.1	185.1	109.3	56
MG7	0.92	Martis Creek / SP1	199	1290	979.4	599.3	311.9
YNS24C	1	Martis Creek / SP1	195.5	1394.6	1058.5	646.1	335.6
NS18	0.19	Martis Creek / SP1	20	142	107.9	64	32.7

Calibration of the Flood Events:

On previous projects in the Tahoe basin we have utilized two other methods for computing peak flow rates:

"The Squaw Creek Memo" - The memo compares the measured peak flow rates from Blackwood Creek and Ward Creek to Squaw Creek citing that they "share several reasonably similar characteristics: size, exposure, orientation, elevation and slope. This memo published the runoff rates for the 7.5 square mile Squaw Creek watershed. The values shown in Table I.II.B.6 were summarized in the memo.

TABLE I.II.B.6 : COMPARISON OF SQUAW CREEK FLOW RATES

Design Event	* Squaw Creek Published Flow (cfs/mi^2)	RANGE OF WARM EVENT (cfs/mi^2)	WARM Rate at 7.5 mi Sq. (cfs/mi^2)	RANGE OF FROZEN EVENT (cfs/mi^2)	FROZEN Rate at 7.5 mi Sq. (cfs/mi^2)
100-year	493	270-1000	510	330 to 1100	640
50-year	360	N/.A	N/A	N/A	N/A
25-year	213	N/A	N/A	N/A	N/A
10-year	133	170-600	250	225-650	390

* At 7.5 square mile watershed point. N/A – These events were not analyzed in this study.

This analysis of Martis Creek for a 25.6 square mile watershed reported a peak 100-year "Frozen Condition" runoff of 8446 cfs, and a Warm event 100-year peak flow value of 7043 cfs. This translates to roughly **328 cfs per square mile** for the **frozen** event (worst case scenario) and **274 cfs per square mile** for the **Warm** design event criteria. The study area of the Martis Creek watershed is lower in average elevation and flatter in slope than the Squaw Creek shed area. Also, the total area is roughly 4 times the Squaw Creek criteria. The results of the design storm warm event seem to represent a good correlation in the 100-year event given the slope and elevation factors. The Frozen Event appears more conservative than the values of the Squaw Creek study (computed flows in this study may be in excess of other correlated data).

USGS 'Magnitude and Frequency of Floods in California'. USGS, WRI 77-21, 1977: A generalized relationship for peak flows in the "Sierra Nevada Mountain region" is offered in the form of a simple equation. Q=Qo * (DA)^(0.8) where Qo = 740 (100-year), 540 (50-year), 320 (25-year) and 200 (10-year).

For this project 100-year storm : Q = 740 * (25.6) ^ (0.8) = **9904 cfs.** The comparison of the USGS estimate with the HEC-1 FROZEN event computed value of **8447 cfs** tend to indicate that computed peak flows from this study are comparable to the USGS estimate equation, and perhaps less conservative. However it should be noted that some flows in the south area of Martis Creek bypass this section of the Martis Valley creeks, and divert directly to areas east of Highway 267. It should also be noted that the assumption of a downstream base flood elevation of 5845 creates significant backwater conditions within the project analysis reaches… This results in significant attenuation of peak flows, in excess of those estimated by the calibration methods.

The WARM storm event 100-year HEC-1 analysis yields a value of **7043 cfs**, which correlated to a yield of 274 cfs per square mile. The WARM storm event values present a less conservative correlation to the USGS equation estimates.

1.II.C Post-Project Mitigated Model:

A Post-project Mitigated model was developed to represent the post-project hydrologic conditions of the Martis Creek Watershed. Changes from the pre-project watershed analysis include modifications to the sub-watershed impervious areas for the proposed trail system. Two versions of the hydrology were created for the Post project WARM event models. One with the northern trail segments + the Valley Trail alternative (called the Valley Trail Analysis) and onw with the northern trail segments + the Highway Trail alternative. The Base HEC-1 PDP input file is included in Appendix B. Tables I.II.C.1 to I.II.C.6 identify the watershed factors utilized in the post-project WARM event analysis for the Valley Trail alternative.. Tables I.II.C.8 to I.II.C.13 identify the watershed factors utilized in the post-project WARM event analysis for the Highway Trail alternative. Impervious surface areas were computed for each watershed and applied in each model according to the existing conditions plus the appropriate trail alternative's impervious areas.

A FROZEN event analysis for the post-project conditions is not required as it would yield the same results as the pre-project FROZEN analysis since the snow cover condition dictates impervious values in excess of those that would be computed for the project watersheds.

TABLE 1.II.C.7 summarizes the computed post-project peak flow rates for the 2-year, 10-year, 100-year and 500-year events, and also summarizes the changes from the pre-project WARM event peak flow results, for the Valley Trail alternative. TABLE 1.II.C.14 summarizes the computed post-project peak flow rates for the 2-year, 10-year, 100-year and 500-year events, and also summarizes the changes from the pre-project WARM event peak flow results, for the Highway Trail alternative. Table 1.II.C.15 shows the peak flow computed in either analysis, and compares those to the pre-project conditions peak flow rates. The peak flow values listed in Table 1.II.C.15 were used in the Hydraulic (HEC-RAS) analysis for the post-project WARM Event.

TABLE I.II.C.1 : POST-PROJECT HYDROLOGIC FACTORS

Valley Trail

					PLANE 1 - NON-URBAN AND URBAN PLANE PARAMETERS							PLANE 2 - URBAN PLANE PARAMETERS						
SHED	DESCRIPTION	Centroid Elevation (ft)	BA AREA (mi^2)	BA AREA (acre)	Initial Abst (in)	Constant Infiltration (in/hr)	% Imperv. WARM	Overland Length (ft)	Overland Slope	Overland 'n' Value	Plane % of Shed	Initial Abst (in)	Constant Infiltration (in/hr)	% Imperv WARM	Overland Length (ft)	Overland Slope	Overland 'n' Value	Plane % of Shed
E2	Large Offsite Shed 155.8ac	6231	0.2434	155.79	0.1	0.211	2	1600	0.083	0.6	100							
E15	Other Large Upstream offsite shed	6006	0.1736	111.1	0.1	0.147	2	1000	0.050	0.6	100							
E10	Large Undeveloped upstream	6096	0.0311	19.9	0.1	0.179	2	2000	0.075	0.6	100							
E20A	12.8 AC	5940	0.0106	6.78	0.1	0.243	3	1200	0.058	0.6	100							
E14A	Small Roadway Shed 4 ac	5909	0.0063	4.03	0.1	0.1	10	500	0.03	0.6	100							
E10A	Small Hopkins Roadway Drain	5958	0.0057	3.65	0.1	0.207	10	450	0.03	0.6	100							
E16A	Small Hopkins Roadway Drain	5960	0.0006	0.38	0.1	0.213	90	50	0.07	0.6	100							
E20B	10.9 AC	5951	0.0182	11.65	0.1	0.2	5	800	0.07	0.6	100							
E20C	4.8 AC	5949	0.0075	4.8	0.1	0.25	2	500	0.05	0.6	90	0.1	0.25	90	18	0.02	0.11	10
E20D	10.6 AC	5924	0.0166	10.62	0.1	0.25	15	500	0.05	0.6	89	0.1	0.25	90	18	0.02	0.11	11
E20E	8.4 AC Mostly diverted area added	5952	0.0132	8.45	0.1	0.25	12	900	0.02	0.6	90	0.1	0.25	90	18	0.02	0.11	10
E30	MAIN SHED ABOVE TWIN	5901	0.0638	40.83	0.1	0.25	8.93	800	0.038	0.6	100							
E19	HILLSIDE ABOVE SM RD. 4.2AC	5951	0.0065	4.16	0.1	0.25	2	400	0.010	0.6	89	0.1	0.25	90	18	0.02	0.11	11
E21	HILLSIDE ABOVE ROAD 5.7AC	5941	0.0084	5.38	0.1	0.25	7	600	0.017	0.6	74	0.1	0.25	90	18	0.02	0.11	26
E22	* HILLSIDE ABOVE 15" CULVERT	5935	0.0045	2.88	0.1	0.25	7	350	0.027	0.6	100							
E23	PORTION OF S MILL RD. 0.5AC	5920	0.0008	0.51	0.1	0.25	90	18	0.02	0.11	100							
E40	LARGE SHED DOWNSTREAM OF	5906	0.1147	73.41	0.1	0.19	0.40	1800	0.024	0.6	100							
E40B	LARGE SHED DOWNSTREAM OF	5884	0.019	12.16	0.1	0.248	10.92	600	0.01	0.6	100							
E14C	OFF SITE SHED WEST OF S	6033	0.0059	3.78	0.1	0.25	2	600	0.08	0.6	100							
E64A	EAST OF S. MILL RD. 16.1AC	5991	0.0240	15.07	0.1	0.159	14	1000	0.05	0.6	94	0.1	0.159	90	18	0.02	0.11	6
E64B	EAST OF S. MILL RD. 12.1AC	5956	0.019	12.16	0.1	0.175	15	800	0.07	0.6	97	0.1	0.175	90	18	0.02	0.11	3
E70	OFF SITE LAHONTAN UNITS 7&8	5952	0.1255	80.32	0.1	0.171	8	1200	0.041	0.6	95	0.1	0.171	90	18	0.02	0.11	5
E71	OFF SITE PORTION OF	5968	0.0279	17.86	0.1	0.227	19.1	1400	0.05	0.6	100							
E72	OFF-SITE PORTION OF	5957	0.0178	11.39	0.1	0.190	9.6	1700	0.037	0.6	100							
E75	MOSTLY OFF-SITE AND	5981	0.0905	57.92	0.1	0.191	3.2	1200	0.050	0.6	100							
E14B	OFF SITE SHED WEST OF S	6018	0.0397	25.41	0.1	0.192	2	800	0.08	0.6	100							
E55A	EAST OF S. MILL RD. 16.7AC	5987	0.0261	16.7	0.1	0.138	20	500	0.04	0.6	100							
E58D	EAST OF S. MILL RD. 23.7AC	5911	0.0229	14.66	0.1	0.25	9.5	800	0.04	0.6	100							
E55B	EAST OF S. MILL RD. 3.2AC	5851	0.005	3.2	0.1	0.192	40	200	0.05	0.6	100							
E55C	EAST OF S. MILL RD. 7.7AC	5926	0.012	7.68	0.1	0.247	22	200	0.05	0.6	100							
E55E	EAST OF S. MILL RD. 3.6AC	5951	0.0056	3.58	0.1	0.25	25	300	0.02	0.6	100							
E55F	EAST OF S. MILL RD. 1.8AC	5948	0.0028	1.79	0.1	0.25	25	250	0.03	0.6	100							
E55G	EAST OF S. MILL RD. 1AC	5940	0.0015	0.96	0.1	0.25	11	150	0.02	0.6	100							
E58C	EAST OF S. MILL RD. 5.6AC	5897	0.0088	5.63	0.1	0.25	36	250	0.06	0.6	100							
E55H	EAST OF S. MILL RD. 44.1AC	5936	0.0057	3.65	0.1	0.25	24	400	0.02	0.6	100							
E58A	EAST OF S. MILL RD. 5.3AC	5921	0.0083	5.31	0.1	0.25	22	300	0.04	0.6	100							
E58E	EAST OF S. MILL RD. 3.7AC	5885	0.037	23.68	0.1	0.225	22	300	0.02	0.6	100							
E80	LAST DOWNSTREAM SHED	5869	0.0462	28.93	0.1	0.131	2	1300	0.04	0.6	100							
E40C	LARGE SHED DOWNSTREAM OF	5871	0.0344	22.02	0.1	0.166	9.31	1200	0.01	0.6	100							
E40E	LARGE SHED DOWNSTREAM OF	5874	0.0058	3.71	0.1	0.25	10.51	600	0.01	0.6	100							
E40D	LARGE SHED DOWNSTREAM OF	5866	0.0074	4.74	0.1	0.194	8.27	800	0.01	0.6	100							
E85	OFF SITE DOWNSTREAM SHED	5859	0.4599	294.34	0.1	0.175	2.27	2600	0.0625	0.6	100							
E85B	E85B	5870	0.0312	19.97	0.1	0.23	3.35	400	0.02	0.6	100							
E85C	E85C	5864	0.0079	5.06	0.1	0.238	2.39	400	0.02	0.6	100							
E5A1	E5A1 Drop Inlet	6484	0.073	46.72	0.1	0.204	2	1350	0.133	0.6	98	0.1	0.204	95	200	0.02	0.11	3
E5B	E5B	6348	0.0139	8.9	0.1	0.245	2	600	0.09	0.6	91	0.1	0.245	95	200	0.02	0.11	9
E5C	E5C	6260	0.0051	3.26	0.1	0.25	2	600	0.07	0.6	92	0.1	0.25	95	200	0.02	0.11	8
E5D	E5D	6279	0.085	54.4	0.1	0.25	2	1500	0.05	0.6	100							
E6A1	E6A1	6119	0.057	36.48	0.1	0.25	2	1000	0.068	0.6	100							
E6A2	E6A2	6217	0.0149	9.54	0.1	0.25	2	600	0.060	0.6	100							
E6C	E6C	6047	0.0939	60.1	0.1	0.246	2	1600	0.09	0.6	100							
GS10D	GS10D	6257	0.0124	7.94	0.1	0.25	2	900	0.07	0.6	79	0.1	0.25	95	100	0.02	0.11	21
GS10C	GS10C	6239	0.0169	10.82	0.1	0.25	2	300	0.06	0.6	91	0.1	0.25	95	100	0.02	0.11	9
GS10B	GS10B	6226	0.0044	2.82	0.1	0.25	2	600	0.09	0.6	86	0.1	0.25	95	100	0.02	0.11	14
GS10A1	GS10A1	6209	0.029	18.56	0.1	0.25	2	600	0.08	0.6	96	0.1	0.25	95	100	0.02	0.11	4
GS10F	GS10F	6163	0.0248	15.87	0.1	0.25	2	600	0.08	0.6	92	0.1	0.25	95	100	0.02	0.11	8
GS10E	GS10E	6152	0.0153	9.79	0.1	0.25	2	300	0.08	0.6	78	0.1	0.25	95	100	0.02	0.11	22
GS10A2	GS10A2	6190	0.0278	17.79	0.1	0.25	2	1400	0.08	0.6	96	0.1	0.25	95	100	0.02	0.11	4
GS10J	GS10J	6144	0.0099	6.34	0.1	0.25	83	300	0.08	0.6	92	0.1	0.25	95	200	0.02	0.11	8
GS10G	GS10G	6108	0.0081	5.18	0.1	0.25	83	300	0.08	0.6	90	0.1	0.25	95	200	0.02	0.11	10
GS10H	GS10H	6104	0.0066	4.22	0.1	0.25	2	300	0.09	0.6	81	0.1	0.25	95	200	0.02	0.11	19
GS10I	GS10I	6070	0.0071	4.54	0.1	0.25	2	300	0.06	0.6	78	0.1	0.25	95	200	0.02	0.11	22
E8A	E8A	6187	0.0049	3.14	0.1	0.25	2	200	0.12	0.6	73	0.1	0.25	95	100	0.02	0.11	27
E8B	E8B	6129	0.0122	7.81	0.1	0.25	2	400	0.08	0.6	95	0.1	0.25	95	100	0.02	0.11	5
E8C	E8C	6063	0.0244	15.62	0.1	0.25	2	800	0.09	0.6	100							
E8	E8	6004	0.0213	13.63	0.1	0.25	2	600	0.08	0.6	100							
GS11B	GS11B	6068	0.0031	1.98	0.1	0.25	2	700	0.1	0.6	100							
GS11A	GS11A	5999	0.0354	22.66	0.1	0.237	2	700	0.1	0.6	100							
GS13C	GS13C	6083	0.0066	4.22	0.1	0.25	2	300	0.07	0.6	100							
GS13B	GS13B	6034	0.0168	10.75	0.1	0.25	2	300	0.07	0.6	100							
GS18A	GS18A	8108	0.002	1.28	0.1	0.25	3	800	0.094	0.6	100							
GS18	GS18	6041	0.0248	15.07	0.1	0.25	2	800	0.094	0.6	100							
GS13A	GS13A	5992	0.0196	12.54	0.1	0.181	2	600	0.067	0.6	100							
GS19	GS19	5993	0.0617	39.49	0.1	0.192	2	700	0.086	0.6	100							
GS20	GS20	5982	0.0178	11.39	0.1	0.168	2	800	0.1	0.6	100							
GS21B1	4.2 AC	6106	0.0065	4.16	0.1	0.25	10.06	300	0.07	0.6	100							
GS21B2	3.2 AC	6133	0.005	3.2	0.1	0.25	15	300	0.07	0.6	100							
GS21A	GS21A	6083	0.0412	26.37	0.1	0.25	2	1000	0.07	0.6	80	0.1	0.25	15	200	0.02	0.24	20
GS22	GS22	6000	0.0741	47.42	0.1	0.249	2	700	0.057	0.6	100							
GS23	GS23	5903	0.0596	38.14	0.1	0.25	2	2000	0.04	0.6	100							
GS24	GS24	6002	0.0352	22.53	0.1	0.25	2	500	0.1	0.6	100							
GS25B3	1.2 AC	6133	0.0019	1.22	0.1	0.25	15	300	0.07	0.6	100							
GS25B4	1.8 AC	6125	0.0029	1.86	0.1	0.25	15	300	0.07	0.6	100							
GS25C4	4.4 AC	6121	0.0069	4.42	0.1	0.25	11.75	300	0.07	0.6	100							
GS25C5	1.7 AC	6119	0.0026	1.66	0.1	0.25	9.8	300	0.07	0.6	100							
GS25C6	1.6 AC	6106	0.0023	1.47	0.1	0.25	4.6	300	0.07	0.6	100							
GS25C9	3.0 AC	6085	0.0047	3.01	0.1	0.25	11.36	300	0.07	0.6	100							
GS21A2	1.3 AC	6104	0.002	1.29	0.1	0.25	15	300	0.07	0.6	100							
GS25C1	.4 AC	6087	0.0006	0.39	0.1	0.25	15	300	0.07	0.6	100							
GS25C3	3.9 AC	6099	0.006	3.84	0.1	0.25	11.23	300	0.07	0.6	100							
GS25C7	3.8 AC	6083	0.006	3.84	0.1	0.25	13.10	300	0.07	0.6	100							
GS27C	2.8 AC	6061	0.0044	2.82	0.1	0.25	15	300	0.07	0.6	100							
GS23B	0	6064	0.0061	3.9	0.1	0.25	15	300	0.07	0.6	100							

TABLE I.II.C.2 : POST-PROJECT HYDROLOGIC FACTORS (CONT)

Valley Trail

					PLANE 1 - NON-URBAN AND URBAN PLANE PARAMETERS							PLANE 2 - URBAN PLANE PARAMETERS						
SHED	DESCRIPTION	Centroid Elevation (ft)	BA AREA (mi^2)	BA AREA (acre)	Initial Abst (in)	Constant Infiltration (in/hr)	% Imperv. WARM	Overland Length (ft)	Overland Slope	Overland 'n' Value	Plane % of Shed	Initial Abst (in)	Constant Infiltration (in/hr)	% Imperv WARM	Overland Length (ft)	Overland Slope	Overland 'n' Value	Plane % of Shed
GS26E	GS26E	6024	0.034	21.76	0.1	0.25	2	900	0.1	0.6	100							
GS25A2	1.8 AC	6169	0.0029	1.86	0.1	0.25	8.5	300	0.07	0.6	100							
GS25A1	.4 AC	6174	0.0007	0.45	0.1	0.25	8.5	300	0.07	0.6	100							
GS25A3	1.2 AC	6148	0.0018	1.15	0.1	0.25	8.5	300	0.07	0.6	100							
GS25D3	1.8 AC	6169	0.0022	1.41	0.1	0.25	11.1	300	0.07	0.6	100							
GS25D2	2.8 AC	6157	0.0045	2.88	0.1	0.25	8.5	300	0.07	0.6	100							
GS25D1	4.1 AC	6140	0.0062	3.97	0.1	0.25	8.5	300	0.07	0.6	100							
GS28B2	6.7 AC	6123	0.0105	6.72	0.1	0.25	5.25	300	0.07	0.6	100							
GS27B1	5.5 AC	6117	0.0087	5.57	0.1	0.25	8.5	300	0.07	0.6	100							
GS25C2	3.0 AC	6096	0.0047	3.01	0.1	0.25	9.93	300	0.07	0.6	100							
GS27B3	3.3 AC	6068	0.0052	3.33	0.1	0.25	15	300	0.07	0.6	100							
GS27B2	0	6062	0.0053	3.39	0.1	0.25	15	300	0.07	0.6	100							
GS26E1	GS26E	6012	0.0131	8.38	0.1	0.25	2	900	0.1	0.6	100							
GS30B	1.1 AC	6127	0.0018	1.15	0.1	0.25	15	300	0.07	0.6	100							
GS28B1	1.6 AC	6117	0.0025	1.6	0.1	0.25	15	300	0.07	0.6	100							
GS28B3	.09 AC	6093	0.0015	0.96	0.1	0.25	15	300	0.07	0.6	100							
GS28A1	7.8 AC	6079	0.012	7.68	0.1	0.25	15	300	0.07	0.6	100							
GS28A2	GS28A	6054	0.0154	9.86	0.1	0.25	2	500	0.071	0.6	50	0.1	0.25	15	200	0.02	0.24	50
GS30A	GS30	6104	0.0427	27.33	0.1	0.25	2	900	0.056	0.6	89	0.1	0.25	95	50	0.02	0.11	11
GS31A	GS31A	5990	0.0843	53.95	0.1	0.25	2	1000	0.05	0.6	90	0.1	0.25	15	200	0.02	0.4	10
GS32	GS32	5934	0.032	20.48	0.1	0.23	2	500	0.1	0.6	100							
MD1H3	MD1H3	6510	0.004	2.56	0.1	0.25	2	300	0.12	0.6	75	0.1	0.25	95	50	0.02	0.11	25
MD1H2	MD1H2	6464	0.0027	1.73	0.1	0.25	2	300	0.12	0.6	75	0.1	0.25	95	50	0.02	0.11	25
MD1E4	MD1E4	6442	0.0132	8.45	0.1	0.25	2	300	0.1	0.6	87	0.1	0.25	95	50	0.02	0.11	13
MD1E3	MD1E3	6379	0.0039	2.5	0.1	0.25	2	300	0.1	0.6	78	0.1	0.25	95	50	0.02	0.11	22
MD1E2	MD1E2	6315	0.0031	1.98	0.1	0.25	2	300	0.1	0.6	84	0.1	0.25	95	50	0.02	0.11	16
MD1E1E	MD1E1-2	6357	0.0042	2.69	0.1	0.25	2	1200	0.107	0.6	100							
MD1E1C	MD1E1-3	6238	0.0686	43.9	0.1	0.25	2	1000	0.08	0.6	100							
MD1E1B	MD1E1-2	6262	0.0141	9.02	0.1	0.25	2	1200	0.107	0.6	100							
MD1H1	MD1H1-1	6416	0.0073	4.67	0.1	0.25	2	400	0.08	0.6	100							
MD1H4	MD1H1-2	6403	0.0049	3.14	0.1	0.25	2	650	0.06	0.6	100							
MD1I_1	MD1I-1	6469	0.0242	15.49	0.1	0.25	2	1000	0.1	0.6	100							
MD1G3	MD1G3	6371	0.0096	6.14	0.1	0.25	2	300	0.08	0.6	90	0.1	0.25	95	50	0.02	0.11	10
MD1G2	MD1G2	6357	0.0033	2.11	0.1	0.25	2	200	0.08	0.6	72	0.1	0.25	95	50	0.02	0.11	28
MD1G2B	MD1G2B	6340	0.0055	3.52	0.1	0.25	2	200	0.085	0.6	100							
MD1G1B	MD1G1-2	6230	0.0195	12.48	0.1	0.25	2	1300	0.06	0.6	100							
GS26A	GS26A	6535	0.0074	4.74	0.1	0.25	2	600	0.1	0.6	85	0.1	0.25	95	50	0.02	0.11	15
GS26B	GS26B	6422	0.0139	8.9	0.1	0.25	2	600	0.2	0.6	89	0.1	0.25	95	50	0.02	0.11	11
GS26C	GS26C	6311	0.0126	8.06	0.1	0.25	2	600	0.2	0.6	90	0.1	0.25	95	50	0.02	0.11	10
GS26D	GS26D	6343	0.0144	9.22	0.1	0.25	2	600	0.1	0.6	89	0.1	0.25	95	50	0.02	0.11	11
GS26E	GS26E	6258	0.0028	1.79	0.1	0.25	2	300	0.08	0.6	75	0.1	0.25	95	50	0.02	0.11	25
GS26F	GS26F	6256	0.0074	4.74	0.1	0.25	2	400	0.1	0.6	87	0.1	0.25	95	50	0.02	0.11	13
GS26N1	GS26N-1	6226	0.0046	2.94	0.1	0.25	2	335	0.02	0.11	100							
GS26G	GS26G	6252	0.0231	14.78	0.1	0.25	2	600	0.1	0.6	91	0.1	0.25	95	50	0.02	0.11	9
GS26H	GS26H	6214	0.0026	1.66	0.1	0.25	2	100	0.08	0.6	75	0.1	0.25	95	50	0.02	0.11	25
GS15C	GS15C	6522	0.0106	6.78	0.1	0.25	2	600	0.15	0.6	91	0.1	0.25	95	50	0.02	0.11	9
GS15D	GS15D	6362	0.0133	8.51	0.1	0.25	2	300	0.135	0.6	91	0.1	0.25	95	50	0.02	0.11	9
GS15A	GS15A	6582	0.0913	58.43	0.1	0.237	2	1800	0.12	0.6	97	0.1	0.237	95	50	0.02	0.11	3
GS16B	GS16B	6351	0.0151	9.66	0.1	0.25	2	400	0.1	0.6	94	0.1	0.25	95	50	0.02	0.11	6
GS16A1	GS16A1	6287	0.019	12.16	0.1	0.25	2	400	0.1	0.6	96	0.1	0.25	95	50	0.02	0.11	4
GS16A2	GS16A2	6249	0.0137	8.77	0.1	0.25	2	400	0.1	0.6	91	0.1	0.25	95	50	0.02	0.11	9
GS16B	GS16B	6571	0.026	16.64	0.1	0.232	2	1800	0.15	0.6	93	0.1	0.232	95	50	0.02	0.11	7
GS16C	GS16C	6374	0.0141	9.02	0.1	0.25	2	400	0.15	0.6	89	0.1	0.25	95	50	0.02	0.11	11
GS17C	GS17C	6277	0.0147	9.41	0.1	0.25	2	600	0.12	0.6	91	0.1	0.25	95	50	0.02	0.11	9
E6A3	E6A3	6519	0.0421	26.94	0.1	0.18	2	1800	0.2	0.6	94	0.1	0.18	95	50	0.02	0.11	6
GS12B	GS12B	6327	0.0089	5.7	0.1	0.25	2	600	0.12	0.6	89	0.1	0.25	95	50	0.02	0.11	11
GS12C	GS12C	6382	0.0068	4.35	0.1	0.25	2	300	0.12	0.6	70	0.1	0.25	95	50	0.02	0.11	30
GS12F	GS12F	6291	0.0082	5.25	0.1	0.25	2	400	0.1	0.6	94	0.1	0.25	95	50	0.02	0.11	6
GS12H	GS12H	6301	0.0082	5.25	0.1	0.25	2	800	0.1	0.6	94	0.1	0.25	95	50	0.02	0.11	6
GS12D	GS12D	6445	0.0044	2.82	0.1	0.25	2	400	0.15	0.6	84	0.1	0.25	95	50	0.02	0.11	16
GS12E	GS12E	6365	0.0044	2.82	0.1	0.25	2	400	0.15	0.6	90	0.1	0.25	95	50	0.02	0.11	10
GS12I	GS12I	6263	0.0177	11.33	0.1	0.25	2	800	0.1	0.6	95	0.1	0.25	95	50	0.02	0.11	5
GS17A	GS17A	6206	0.0226	14.46	0.1	0.25	2	800	0.1	0.6	90	0.1	0.25	95	50	0.02	0.11	10
GS26N	GS26N-2	6195	0.0299	19.14	0.1	0.25	2	1419	0.066	0.6	100							
GS28OA	AREA=20.2 AC	6156	0.0321	20.54	0.1	0.25	86	800	0.05	0.6	95	0.1	0.25	90	50	0.02	0.11	5
GS28OB	AREA=3.3 AC UNIT 4A	6165	0.0047	3.01	0.1	0.25	2	600	0.05	0.6	95	0.1	0.25	90	50	0.02	0.11	5
MD1C2	MD1C2	6130	0.0063	4.03	0.1	0.25	2	250	0.05	0.6	90	0.1	0.25	90	50	0.02	0.11	10
GS28L3	AREA=0.7 AC UNIT 4A	6132	0.0012	0.77	0.1	0.25	2	500	0.058	0.6	90	0.1	0.25	90	50	0.02	0.11	10
MD1F-1	MD1F-1	6368	0.0069	4.42	0.1	0.25	2	600	0.08	0.6	90	0.1	0.25	95	50	0.02	0.11	10
MD1F	MD1F-2	6353	0.0035	2.24	0.1	0.25	2	500	0.08	0.6	90	0.1	0.25	95	50	0.02	0.11	10
MD1D1D	MD1D1D	6275	0.0124	7.94	0.1	0.25	2	800	0.08	0.6	100							
MD1D1C	MD1D1C	6254	0.0074	4.74	0.1	0.25	2	500	0.05	0.6	100							
MD1E	MD1E	6305	0.016	10.24	0.1	0.25	2	600	0.08	0.6	95	0.1	0.25	95	50	0.02	0.11	5
MD1D1A	MD1D1A	6225	0.0059	3.78	0.1	0.25	2	400	0.12	0.6	100							
MD1D1B	MD1D1B	6232	0.0028	1.79	0.1	0.25	2	400	0.12	0.6	100							
MD1D2	MD1D2	6197	0.0077	4.93	0.1	0.25	2	600	0.2	0.6	100							
GS26J	GS26J	6164	0.0023	1.47	0.1	0.25	2	230	0.078	0.6	100							
GS26K	GS26K	6168	0.0032	2.05	0.1	0.25	2	194	0.092	0.6	100							
GS26L	GS26L REVISED AREA = 5.9 AC	6149	0.0091	5.82	0.1	0.25	2	500	0.058	0.6	90	0.1	0.25	90	50	0.02	0.11	10
GS26L2	GS26L2	6110	0.0029	1.88	0.1	0.25	2	250	0.047	0.6	90	0.1	0.25	90	50	0.02	0.11	10
MD1C1	MD1C1	6100	0.0155	9.92	0.1	0.25	2	400	0.05	0.6	85	0.1	0.25	90	50	0.02	0.11	15
MD1C4	MD1C4	6067	0.0169	10.82	0.1	0.224	2	400	0.05	0.6	95	0.1	0.224	90	50	0.02	0.11	5
MA1	MA1	7303	0.2885	181.66	0.1	0.191	2	1800	0.234	0.6	100							
MA2	MA2	7054	0.5483	350.91	0.1	0.2	2	2200	0.284	0.6	100							
MA3	MA3	7366	0.6259	400.58	0.1	0.228	2	2300	0.272	0.6	100							
MA4	MA4	6453	0.287	183.68	0.1	0.227	2	2000	0.3	0.6	100							
MA5	MA5	6409	0.2025	129.6	0.1	0.214	2	1500	0.183	0.6	100							
MA6	MA6	6283	0.4152	265.73	0.1	0.228	2	1800	0.097	0.6	100							
MA7	MA7	6348	0.2326	148.86	0.1	0.233	2	3300	0.227	0.6	100							
MA8	MA8	6860	0.4308	275.71	0.1	0.165	2	1250	0.32	0.6	100							
MA9	MA9	6181	0.0913	58.43	0.1	0.287	2	800	0.209	0.6	100							
MA10A	MA10A	6267	0.2885	184.64	0.1	0.241	2	1600	0.038	0.6	35	0.1	0.241	15	200	0.02	0.24	15
MA10B	MA10B	6270	0.01	6.4	0.1	0.25	2	900	0.09	0.6	90	0.1	0.25	95	50	0.02	0.11	10

TABLE I.II.C.3 : POST-PROJECT HYDROLOGIC FACTORS (CONT)

Valley Trail

					PLANE 1 - NON-URBAN AND URBAN PLANE PARAMETERS							PLANE 2 - URBAN PLANE PARAMETERS						
SHED	DESCRIPTION	Centroid Elevation (ft)	BA AREA (mi^2)	BA AREA (acre)	Initial Abst (in)	Constant Infiltration (in/hr)	% Imperv. WARM	Overland Length (ft)	Overland Slope	Overland 'n' Value	Plane % of Shed	Initial Abst (in)	Constant Infiltration (in/hr)	% Imperv WARM	Overland Length (ft)	Overland Slope	Overland 'n' Value	Plane % of Shed
MB7B3A	MB7B3A	6302	0.0051	3.26	0.1	0.25	2	500	0.08	0.6	95	0.1	0.25	95	50	0.02	0.11	5
MB7B4A	MB7B4A	6252	0.0156	9.98	0.1	0.25	2	500	0.09	0.6	95	0.1	0.25	95	50	0.02	0.11	5
MB7B3B	MB7B3B	6302	0.0064	4.1	0.1	0.25	2	600	0.08	0.6	95	0.1	0.25	95	50	0.02	0.11	5
MB7B4B	MB7B4B	6257	0.0044	2.82	0.1	0.25	2	400	0.07	0.6	95	0.1	0.25	95	50	0.02	0.11	5
MB7B4C	MB7B4C	6216	0.0023	1.47	0.1	0.25	2	170	0.053	0.6	95	0.1	0.25	95	50	0.02	0.11	5
MB7B1A	MB7B1A	6400	0.0709	45.38	0.1	0.25	2	1800	0.192	0.6	100							
MB7B1C	MB7B1C	6369	0.0041	2.62	0.1	0.25	2	400	0.08	0.6	95	0.1	0.25	95	50	0.02	0.11	5
MB7B1B	MB7B1B	6341	0.0107	6.85	0.1	0.25	2	500	0.08	0.6	95	0.1	0.25	95	50	0.02	0.11	5
MB7B1D	MB7B1D	6250	0.0146	9.34	0.1	0.25	2	500	0.07	0.6	95	0.1	0.25	95	50	0.02	0.11	5
MB7B1E	MB7B1E	6217	0.0054	3.46	0.1	0.25	2	500	0.05	0.6	95	0.1	0.25	95	50	0.02	0.11	5
MB7B2	MB7B2	6198	0.0216	13.82	0.1	0.25	2	1300	0.192	0.6	95	0.1	0.25	95	50	0.02	0.11	5
MB1	MB1	7456	0.5333	341.31	0.1	0.188	2	4000	0.275	0.6	100							
MB2	MB2	6762	1.2867	610.69	0.1	0.192	2	2800	0.339	0.6	100							
MB3	MB3	6637	0.5006	320.38	0.1	0.218	2	1800	0.278	0.6	100							
MB4	MB4	6485	0.6535	418.24	0.1	0.245	2	1800	0.184	0.6	100							
MB5	MB5	6222	0.1602	102.53	0.1	0.25	2	1800	0.278	0.6	100							
MB6A	AREA = 7.0 AC	6193	0.0073	4.67	0.1	0.25	6.6	1335	0.1543	0.6	100							
MB6B	AREA = 3.9 AC	6190	0.0061	3.9	0.1	0.25	11.6	240	0.0708	0.6	100							
MB6C	AREA = 3.2 AC	6160	0.0039	2.5	0.1	0.25	7.6	370	0.1081	0.6	100							
MB6D	MB6D	6151	0.0223	14.27	0.1	0.246	2	200	0.125	0.6	65	0.1	0.246	15	200	0.02	0.24	35
MB6G	MB6G	6244	0.0109	6.98	0.1	0.25	2	500	0.125	0.6	30	0.1	0.25	15	200	0.02	0.24	70
MB6F	MB6F	6226	0.0062	3.97	0.1	0.25	2	500	0.125	0.6	30	0.1	0.25	15	200	0.02	0.24	70
MB6D1	MB6D1	6200	0.0036	2.3	0.1	0.25	2	500	0.125	0.6	30	0.1	0.25	15	200	0.02	0.24	70
MB6E	MB6E	6227	0.005	3.2	0.1	0.25	2	500	0.125	0.6	30	0.1	0.25	15	200	0.02	0.24	70
MB7A1	MB7A1	6467	0.1465	93.76	0.1	0.208	2	1300	0.192	0.6	97	0.1	0.208	95	50	0.02	0.11	3
MB7A2A	MB7A2A	6297	0.0247	15.81	0.1	0.25	2	550	0.192	0.6	92	0.1	0.25	95	50	0.02	0.11	8
MB7A2B	MB7A2B	6273	0.0059	3.78	0.1	0.25	2	300	0.192	0.6	100							
MB7C	MB7C	6246	0.0236	15.1	0.1	0.25	2	200	0.1	0.6	92	0.1	0.25	95	50	0.02	0.11	8
MB7D1A	MB7D1A	6321	0.0044	2.82	0.1	0.25	2	500	0.1	0.6	79	0.1	0.25	95	50	0.02	0.11	21
MB7D1B	MB7D1B	6331	0.0025	1.6	0.1	0.25	2	300	0.1	0.6	79	0.1	0.25	95	50	0.02	0.11	21
MB7D1	MB7D1	6281	0.0011	0.7	0.1	0.25	2	100	0.1	0.6	100							
MB7D2	MB7D2	6262	0.0215	13.76	0.1	0.25	2	200	0.1	0.6	95	0.1	0.25	95	50	0.02	0.11	5
MB7E	MB7E	6130	0.0585	37.44	0.1	0.247	2	200	0.1	0.6	96	0.1	0.247	95	50	0.02	0.11	4
MB9	MB9	6093	0.0545	34.88	0.1	0.214	2	1000	0.1	0.6	85	0.1	0.214	15	200	0.02	0.24	15
MC1	AREA = 268.8 AC	6609	0.4041	258.62	0.1	0.239	2	1530	0.4281	0.6	100							
MC2A	AREA = 59.1 AC	6585	0.0923	59.07	0.1	0.25	2.2	1035	0.401	0.6	100							
MC2B	AREA = 0.9 AC	6188	0.0014	0.9	0.1	0.25	10.3	550	0.0764	0.6	100							
MC2K	MC2K	6170	0.0001	0.06	0.1	0.25	4.7	1225	0.1551	0.6	100							
MD1D	MD1d AREA = 5.9 AC	6358	0.0092	5.89	0.1	0.25	3.4	800	0.2375	0.6	100							
MD1B	MD1b AREA = 5.9 AC	6304	0.0092	5.89	0.1	0.25	3.6	800	0.2375	0.6	100							
MC2A2	MC2A2	6157	0.0061	3.9	0.1	0.25	4.7	1225	0.1551	0.6	100							
MD1C	MD1c AREA = 2.9 AC	6274	0.0045	2.88	0.1	0.25	7.9	500	0.2178	0.6	100							
MC2A3	MC2A3	6174	0.0044	2.82	0.1	0.25	4.7	1225	0.1551	0.6	100							
MC2D	AREA = 7.8 AC	6293	0.0122	7.81	0.1	0.25	4.7	1225	0.1551	0.6	100							
MC2E	AREA = 3.9 AC	6236	0.006	3.84	0.1	0.25	6.5	895	0.1777	0.6	100							
MC2G	AREA = 9.7 AC	6189	0.0151	9.66	0.1	0.25	90	395	0.2051	0.6	100							
MC2H	AREA = 2.4 AC	6220	0.0038	2.43	0.1	0.25	9.5	365	0.1096	0.6	100							
MC2L	MC2L	6085	0.0519	33.22	0.1	0.25	10.3	550	0.0764	0.6	100							
MC2I	AREA = 0.7 AC	6195	0.0011	0.7	0.1	0.25	24.3	225	0.1288	0.6	100							
MC2J	AREA = 0.8 AC	6163	0.0011	0.7	0.1	0.25	19.2	225	0.16	0.6	100							
MD4A	MD4A	6944	0.1163	74.43	0.1	0.25	2.5	500	0.414	0.6	100							
MD3C	MD3c AREA = 6.9 AC = 0.01078	6436	0.0108	6.91	0.1	0.25	4.4	500	0.3184	0.6	100							
MD3B	MD3b AREA = 8.5 AC = 0.01328	6521	0.0133	8.51	0.1	0.25	3.6	500	0.3073	0.6	100							
MD3A1	MD3a AREA = 25.4 AC = 0.03969	6712	0.0397	25.41	0.1	0.25	2.5	500	0.3459	0.6	100							
MD1A1	MD1a AREA = 3.0 AC = 0.00469	6294	0.0047	3.01	0.1	0.25	6.4	500	0.242	0.6	100							
MC2A4	AREA = 59.1 AC	6186	0.0022	1.41	0.1	0.25	2.2	1035	0.401	0.6	100							
MD1B1	MD1B1	6294	0.0157	10.06	0.1	0.25	2	800	0.05	0.6	51	0.1	0.25	95	50	0.02	0.11	49
MD1B2	MD1B2	6137	0.0392	25.09	0.1	0.25	2	800	0.08	0.6	94	0.1	0.25	95	50	0.02	0.11	6
MD1A	MD1a AREA = 3.0 AC = 0.00469	6054	0.0581	37.18	0.1	0.194	6.4	500	0.242	0.6	100							
MD2D	MD2D	6074	0.004	2.56	0.1	0.25	2	560	0.035	0.6	90	0.1	0.25	95	50	0.02	0.11	10
MD3D	MD3d	6237	0.0094	6.02	0.1	0.25	8	682	0.161	0.6	100							
MD1E1A	MD1E1A	6218	0.0018	1.15	0.1	0.25	2	600	0.08	0.6	95	0.1	0.25	95	50	0.02	0.11	5
MD6	MD6	6145	0.0072	4.61	0.1	0.25	7.5	635	0.156	0.6	100							
MD1	MD1 AREA = 5.7 AC = 0.00891 SQ	6218	0.0088	5.63	0.1	0.25	13	483	0.1451	0.6	100							
MD2A	MD2A	6146	0.0026	1.66	0.1	0.25	2	290	0.035	0.6	90	0.1	0.25	95	50	0.02	0.11	10
MD27	MD27	6109	0.0048	3.07	0.1	0.25	11	559	0.05	0.6	100							
MD28A	MD28A	6099	0.0043	2.75	0.1	0.25	15.2	559	0.05	0.6	100							
MD28B	MD28B	6097	0.0092	5.89	0.1	0.25	4.8	559	0.05	0.6	100							
MD3A	MD3a AREA = 25.4 AC = 0.03969	6059	0.0076	4.86	0.1	0.25	2.5	500	0.3459	0.6	100							
MD7B	MD7B	6251	0.0042	2.69	0.1	0.25	9	760	0.05	0.6	100							
MD4C	MD4c	6240	0.0056	3.58	0.1	0.25	8.8	628	0.05	0.6	100							
MD4E	MD4E	6253	0.0016	1.02	0.1	0.25	2	1500	0.283	0.6	100							
MD4D	MD4d	6246	0.0062	3.97	0.1	0.25	7.5	895	0.101	0.6	100							
MD9	MD9	6160	0.0106	6.78	0.1	0.25	7.9	624	0.253	0.6	100							
MD8	MD8	6139	0.0047	3.01	0.1	0.25	4.8	519	0.126	0.6	100							
MD6A	MD6A	6018	0.1278	81.88	0.1	0.219	7.5	635	0.156	0.6	100							
MD7D	MD7d	6652	0.0051	3.26	0.1	0.25	2	500	0.106	0.6	100							
MD7C	MD7c	6458	0.0061	3.9	0.1	0.25	3.2	500	0.106	0.6	100							
MD7E	MD7E	6273	0.0094	6.02	0.1	0.25	2	1200	0.313	0.6	90	0.1	0.25	15	1200	0.3	0.24	10
MD7F	MD7F	6194	0.0067	4.29	0.1	0.25	2	1200	0.313	0.6	90	0.1	0.25	15	1200	0.3	0.24	10
MD11	MD11	6164	0.0056	3.58	0.1	0.25	4.8	595	0.05	0.6	100							
MD2B	MD2B	6071	0.0056	3.58	0.1	0.25	2	690	0.046	0.6	90	0.1	0.25	95	50	0.02	0.11	10
ME3A	ME3A	6061	0.004	2.56	0.1	0.25	2	420	0.038	0.6	90	0.1	0.25	95	50	0.02	0.11	10
MD17	MD17	6174	0.0075	4.8	0.1	0.25	5.7	830	0.176	0.6	100							
MD19	MD19	6137	0.0051	3.26	0.1	0.25	6	930	0.148	0.6	100							
MD18	MD19	6118	0.0056	3.58	0.1	0.25	6.1	1055	0.21	0.6	100							
MD2A1	MD2A	6089	0.0019	1.22	0.1	0.25	2	250	0.035	0.6	90	0.1	0.25	95	50	0.02	0.11	10
MD2	MD2	6074	0.0059	3.78	0.1	0.25	16.8	295	0.125	0.6	100							
ME3A2	ME3A2	6049	0.0062	3.97	0.1	0.25	2	500	0.044	0.6	90	0.1	0.25	95	50	0.02	0.11	10
MD13	MD13	6987	0.4368	279.55	0.1	0.25	2	500	0.477	0.6	100							
ME6_19	ME6_19	6649	0.0236	15.1	0.1	0.25	15	330	0.053	0.6	100							
ME6_14	ME6_14	6522	0.0063	4.03	0.1	0.25	15	330	0.053	0.6	100							
MD12	MD12	6813	0.0428	27.39	0.1	0.25	2.5	500	0.106	0.6	100							

TABLE I.II.C.4 : POST-PROJECT HYDROLOGIC FACTORS (CONT)

Valley Trail

					PLANE 1 - NON-URBAN AND URBAN PLANE PARAMETERS							PLANE 2 - URBAN PLANE PARAMETERS						
SHED	DESCRIPTION	Centroid Elevation (ft)	BA AREA (mi^2)	BA AREA (acre)	Initial Abst (in)	Constant Infiltration (in/hr)	% Imperv. WARM	Overland Length (ft)	Overland Slope	Overland 'n' Value	Plane % of Shed	Initial Abst (in)	Constant Infiltration (in/hr)	% Imperv WARM	Overland Length (ft)	Overland Slope	Overland 'n' Value	Plane % of Shed
MD12B	MD12b	6336	0.0024	1.54	0.1	0.25	24.7	352	0.256	0.6	100							
MD12C	MD12c	6408	0.0084	5.38	0.1	0.25	6.5	500	0.205	0.6	100							
MD14B	MD14b	6354	0.0016	1.02	0.1	0.25	12.6	500	0.106	0.6	100							
MD14C	MD14c	6384	0.006	3.84	0.1	0.25	4.3	500	0.106	0.6	100							
ME6_13	1.17 AC	6393	0.0022	1.41	0.1	0.25	2.9	525	0.175	0.6	100							
ME8_3	3.07 AC	6355	0.0048	3.07	0.1	0.25	7.4	675	0.164	0.6	100							
MD13B	MD13B	6240	0.0392	25.09	0.1	0.25	2	500	0.477	0.6	100							
MD14	MD14	6336	0.006	3.84	0.1	0.25	9.3	683	0.165	0.6	100							
MD14A	MD14A	6339	0.0009	0.58	0.1	0.25	9.3	683	0.165	0.6	100							
ME3_5	ME3_5	6224	0.0007	0.45	0.1	0.25	2	300	0.1	0.6	65	0.1	0.25	15	300	0.1	0.24	35
MD15	MD15	6266	0.0073	4.67	0.1	0.25	9.2	870	0.159	0.6	100							
MD15A	MD15A	6228	0.0002	0.13	0.1	0.25	9.2	870	0.159	0.6	100							
MD16A	MD16A	6219	0.0036	2.3	0.1	0.25	10	772	0.125	0.6	100							
MD16	MD16	6245	0.0063	4.03	0.1	0.25	10	772	0.125	0.6	100							
MD13C	MD13C	6095	0.0068	4.35	0.1	0.25	2	500	0.477	0.6	100							
MD20	MD20	6107	0.002	1.28	0.1	0.25	9	740	0.05	0.6	100							
ME3B	ME3B	5997	0.0182	11.65	0.1	0.25	2	300	0.1	0.6	65	0.1	0.25	15	300	0.1	0.24	35
GS31B1	GS31B1	6007	0.0029	1.86	0.1	0.25	2	590	0.038	0.6	90	0.1	0.25	95	50	0.02	0.11	10
GS31B2	GS31B2	6078	0.0047	3.01	0.1	0.25	2	680	0.057	0.6	90	0.1	0.25	95	50	0.02	0.11	10
GS31B3	GS31B3	6089	0.0056	3.58	0.1	0.25	2	530	0.06	0.6	90	0.1	0.25	95	50	0.02	0.11	10
GS31B4	GS31B4	6054	0.0012	0.77	0.1	0.25	2	250	0.048	0.6	90	0.1	0.25	95	50	0.02	0.11	10
GS31B5	GS31B5	6052	0.0056	3.58	0.1	0.25	2	500	0.05	0.6	90	0.1	0.25	95	50	0.02	0.11	10
ME6_1	0.48 AC	6239	0.0007	0.45	0.1	0.25	36	190	0.066	0.6	100							
ME3_1	ME3_1	6336	0.0009	0.58	0.1	0.25	2	300	0.1	0.6	65	0.1	0.25	15	300	0.1	0.24	35
ME3_2	ME3_2	6335	0.0024	1.54	0.1	0.25	2	300	0.1	0.6	65	0.1	0.25	15	300	0.1	0.24	35
ME3_3	ME3_3	6201	0.0031	1.98	0.1	0.25	2	300	0.1	0.6	65	0.1	0.25	15	300	0.1	0.24	35
ME3_4	ME3_4	6267	0.0024	1.54	0.1	0.25	2	300	0.1	0.6	65	0.1	0.25	15	300	0.1	0.24	35
MD21	MD21	6186	0.0033	2.11	0.1	0.25	7.2	640	0.05	0.6	100							
ME3C3	ME3C3	6096	0.0066	4.22	0.1	0.25	2	300	0.1	0.6	65	0.1	0.25	15	300	0.1	0.24	35
ME3C1	ME3C1	6102	0.0016	1.02	0.1	0.25	2	300	0.1	0.6	65	0.1	0.25	15	300	0.1	0.24	35
ME4A	ME4A	5971	0.0939	60.1	0.1	0.232	2	500	0.12	0.6	90	0.1	0.232	15	300	0.12	0.24	10
ME6_11	0.13 AC	6328	0.0002	0.13	0.1	0.25	49.1	30	0.02	0.11	100							
ME6_10	0.21 AC	6326	0.0003	0.19	0.1	0.25	67.3	30	0.02	0.11	100							
ME6_25	7.81 AC	6275	0.0094	6.02	0.1	0.25	7.1	125	0.16	0.6	100							
ME6_33	ME6_33	6258	0.0026	1.66	0.1	0.25	15	330	0.053	0.6	100							
ME6_26	0.43 AC	6214	0.0008	0.51	0.1	0.25	3	200	0.13	0.6	100							
ME7_1	9.34 AC	6223	0.0127	8.13	0.1	0.25	4.6	470	0.2469	0.6	100							
ME7_2	0.35 AC	6168	0.0004	0.26	0.1	0.25	83.6	30	0.02	0.11	100							
ME7D6	ME7D6	6213	0.006	3.84	0.1	0.25	2	500	0.19	0.6	75	0.1	0.25	15	300	0.18	0.24	25
ME7D14	ME7D14	6138	0.0037	2.37	0.1	0.25	15	150	0.13	0.6	100							
ME7D16	ME7D16	6148	0.0018	1.15	0.1	0.25	15	177	0.045	0.6	100							
ME7D15	ME7D15	6145	0.0031	1.98	0.1	0.25	15	175	0.057	0.6	100							
ME7D24	ME7D24	6115	0.0022	1.41	0.1	0.25	15	144	0.09	0.6	100							
ME4B13	ME4B13	6103	0.0056	3.58	0.1	0.25	15	270	0.02	0.6	100							
ME7C4	ME7C4	6182	0.0054	3.46	0.1	0.25	2	500	0.15	0.6	5	0.1	0.25	15	300	0.15	0.24	95
ME7C5	ME7C5	6202	0.0061	3.9	0.1	0.25	2	500	0.15	0.6	5	0.1	0.25	15	300	0.15	0.24	95
ME4B3	ME4B3	6134	0.0029	1.86	0.1	0.25	2	300	0.05	0.6	15	0.1	0.25	15	300	0.05	0.24	85
ME4B12	ME4B12	6096	0.0065	4.16	0.1	0.25	15	430	0.019	0.6	100							
ME4B23	ME4B23	6081	0.0088	5.63	0.1	0.25	15	210	0.07	0.6	100							
ME4B22	ME4B22	6053	0.0074	4.74	0.1	0.25	15	220	0.1	0.6	100							
ME3C2	ME3C2	6113	0.0032	2.05	0.1	0.25	2	300	0.16	0.6	60	0.1	0.25	15	300	0.16	0.24	40
ME4B11	ME4B11	6086	0.0049	3.14	0.1	0.25	15	340	0.053	0.6	100							
ME4B21	ME4B21	6044	0.0024	1.54	0.1	0.25	15	220	0.1	0.6	100							
ME4B10	ME4B-10	6068	0.0027	1.73	0.1	0.25	15	150	0.08	0.6	100							
ME4B	ME4B	6037	0.0055	3.52	0.1	0.25	2	300	0.05	0.6	15	0.1	0.25	15	300	0.05	0.24	85
MG3_3B	MG3_3B	6828	0.146	93.44	0.1	0.25	2.8	575	0.225	0.6	100							
MG3_3C	MG3_3C	6589	0.0127	8.13	0.1	0.25	2.8	575	0.225	0.6	100							
ME6_12	14.48 AC	6583	0.0096	6.14	0.1	0.25	3.4	600	0.295	0.6	100							
ME6_16	10.41 AC	6370	0.0002	0.13	0.1	0.25	4.4	600	0.295	0.6	100							
ME6_18	2.92 AC	6343	0.0046	2.94	0.1	0.25	10.2	150	0.2133	0.6	100							
ME6_20	3.75 AC	6339	0.006	3.84	0.1	0.25	6.3	200	0.21	0.6	100							
ME6_24	0.70 AC	6287	0.0026	1.66	0.1	0.25	18.6	305	0.091	0.6	100							
ME6_23	4.19 AC	6222	0.0065	4.16	0.1	0.25	8.2	200	0.17	0.6	100							
ME6_32	0.39 AC	6194	0.0006	0.38	0.1	0.25	33.9	24	0.02	0.11	100							
ME6_28	4.93 AC	6163	0.0077	4.93	0.1	0.25	2	355	0.113	0.6	100							
ME627	1.77 AC	6157	0.0027	1.73	0.1	0.25	2	120	0.107	0.6	100							
ME6_29	1.37 AC	6127	0.0021	1.34	0.1	0.25	2	370	0.114	0.6	100							
ME6_30	1.27 AC	6098	0.002	1.28	0.1	0.25	2	295	0.098	0.6	100							
ME6A25	ME6A25	6096	0.0029	1.86	0.1	0.25	15	330	0.053	0.6	100							
ME7B	ME7B	6069	0.027	17.28	0.1	0.25	2	400	0.05	0.6	75	0.1	0.25	15	300	0.05	0.24	25
ME7A	ME7A	5927	0.1404	89.86	0.1	0.227	2	1300	0.192	0.6	10	0.1	0.227	15	300	0.19	0.24	90
MF1	MF1	5957	0.378	241.92	0.1	0.205	2	1500	0.087	0.6	100							
MF2	MF2	5903	0.0582	37.25	0.1	0.247	2	1000	0.07	0.6	100							
MD4_1A	MD4	6976	0.1899	121.54	0.1	0.25	2	1500	0.283	0.6	100							
MG4_1B	6.35 AC	6466	0.01	6.4	0.1	0.25	2.1	500	0.35	0.6	100							
MG5_2A	0.61 AC	6536	0.0134	6.58	0.1	0.25	3.2	600	0.2033	0.6	100							
MG3_1	1.78 AC	6486	0.0028	1.79	0.1	0.25	5.4	500	0.20	0.6	100							
MG3_1A	1.00 AC	6345	0.0016	1.02	0.1	0.25	5.4	498	0.28	0.6	100							
MG3_1C	1.47 AC	6530	0.0023	1.47	0.1	0.25	5.4	498	0.2811	0.6	100							
MG3_6	0.09 AC	6301	0.0002	0.13	0.1	0.25	90	30	0.02	0.11	100							
MG4_2	4.81 AC	6451	0.0072	4.61	0.1	0.25	3.1	500	0.284	0.6	100							
MG4_3B	MG4_3B	6300	0.0002	0.13	0.1	0.25	2	2300	0.326	0.6	95	0.1	0.25	15	600	0.25	0.24	5
MG4_3A	0.07 AC	6303	0.0001	0.06	0.1	0.25	90	30	0.02	0.11	100							
MG5_2B	0.08 AC	6330	0.0001	0.06	0.1	0.25	90	12	0.01	0.6	100							
MG4_4	0.10 AC	6322	0.0002	0.13	0.1	0.25	90	30	0.02	0.11	100							
MG4_5C	MG4_5C	6258	0.0078	4.99	0.1	0.25	2	2300	0.326	0.6	95	0.1	0.25	15	600	0.25	0.24	5
MG5_1A	18.98 AC	6608	0.0296	18.94	0.1	0.25	2.8	600	0.155	0.6	100							
MG5_1B	MG5_1B	6455	0.009	5.76	0.1	0.25	2	200	0.1	0.6	5	0.1	0.25	15	200	0.1	0.24	95
MG5_3	0.04 AC	6301	0.0001	0.06	0.1	0.25	90	30	0.02	0.11	100							
MG5_4	0.15 AC	6281	0.0003	0.19	0.1	0.25	90	30	0.02	0.11	100							
MG5_5	MG5_5	6284	0.0024	1.54	0.1	0.25	2	200	0.1	0.6	5	0.1	0.25	15	200	0.1	0.24	95
MG3_3A	8.25 AC	6533	0.0129	8.26	0.1	0.25	2.8	575	0.225	0.6	100							
MG3_2	2.58 AC	6398	0.004	2.56	0.1	0.25	6.1	380	0.2051	0.6	100							

TABLE I.II.C.5 : POST-PROJECT HYDROLOGIC FACTORS (CONT)

Valley Trail

					PLANE 1 - NON-URBAN AND URBAN PLANE PARAMETERS							PLANE 2 - URBAN PLANE PARAMETERS						
SHED	DESCRIPTION	Centroid Elevation (ft)	BA AREA (mi^2)	BA AREA (acre)	Initial Abst (in)	Constant Infiltration (in/hr)	% Imperv. WARM	Overland Length (ft)	Overland Slope	Overland 'n' Value	Plane % of Shed	Initial Abst (in)	Constant Infiltration (in/hr)	% Imperv WARM	Overland Length (ft)	Overland Slope	Overland 'n' Value	Plane % of Shed
MG3_4	014 AC	6297	0.0002	0.13	0.1	0.25	89.8	30	0.02	0.11	100							
MG3_1B	0.87 AC	6425	0.0014	0.8	0.1	0.25	5.4	500	0.28	0.6	100							
MG3_1D	0.57 AC	6370	0.0009	0.58	0.1	0.25	5.4	504	0.2778	0.6	100							
MG3_5	0.07 AC	6291	0.0001	0.06	0.1	0.25	90	30	0.02	0.11	100							
MG3_5A	MG3_5A	6261	0.0073	4.67	0.1	0.25	7.9	575	0.225	0.6	100							
ME6_1	10.24 AC	6361	0.0082	5.25	0.1	0.25	3.8	310	0.174	0.6	100							
ME6_2	1.28 AC	6385	0.0099	6.34	0.1	0.25	6.9	505	0.194	0.6	100							
ME6_3	0.02 AC	6288	0.0003	0.19	0.1	0.25	86.5	15	0.02	0.6	100							
ME6_5	1.40 AC	6276	0.0022	1.41	0.1	0.25	16.5	180	0.15	0.6	100							
ME6_7	0.81 AC	6264	0.0013	0.83	0.1	0.25	18.2	190	0.168	0.6	100							
ME6_8	44 AC	6231	0.0007	0.45	0.1	0.25	87.8	20	0.02	0.6	100							
MG1_2	0.67 AC	6285	0.001	0.64	0.1	0.25	11.1	100	0.14	0.6	100							
MG1_3	1.88 AC	6315	0.0025	1.6	0.1	0.25	9.5	300	0.07	0.6	100							
MG1_1	1.38 AC	6338	0.0026	1.66	0.1	0.25	2	105	0.1946	0.6	100							
MG1_4	0.18 AC	6272	0.0003	0.19	0.1	0.25	46.9	30	0.02	0.11	100							
MG3_33	MG3_33	6210	0.0087	5.57	0.1	0.25	2.9	575	0.225	0.6	100							
ME6_8A	ME6_8A	6168	0.0006	0.38	0.1	0.25	15	330	0.053	0.6	100							
MG2	MG2	5975	0.1195	76.48	0.1	0.245	2	700	0.143	0.6	90	0.1	0.245	15	700	0.14	0.24	10
ME6_6	0.18 AC	6283	0.0003	0.19	0.1	0.25	73	30	0.02	0.11	100							
ME6_21	2.50 AC	6249	0.0039	2.5	0.1	0.25	12	200	0.125	0.6	100							
ME6_31	0.44 AC	6219	0.0007	0.45	0.1	0.25	42.9	24	0.02	0.11	100							
MG1B19	MG1B19	6177	0.0072	4.61	0.1	0.25	15	150	0.04	0.6	100							
MG1B20	MG1B20	6164	0.0039	2.5	0.1	0.25	15	240	0.08	0.6	100							
ME6A	ME6A	6164	0.003	1.92	0.1	0.25	2	300	0.12	0.6	50	0.1	0.25	15	300	0.12	0.24	50
MG1B26	MG1B26	6089	0.0038	2.43	0.1	0.25	15	250	0.086	0.6	100							
MG1B	MG1B	6094	0.0119	7.62	0.1	0.25	2	300	0.1	0.6	50	0.1	0.25	15	300	0.1	0.24	50
ME6A27	ME6A27	6055	0.0094	6.02	0.1	0.25	15	230	0.095	0.6	100							
MG1A	MG1A	6022	0.0185	11.84	0.1	0.25	2	200	0.1	0.6	50	0.1	0.25	15	200	0.1	0.24	50
MG5B1	MG5B1	6458	0.1242	79.48	0.1	0.25	2	200	0.1	0.6	5	0.1	0.25	15	200	0.1	0.24	95
MG5A2	MG5A2	6240	0.0613	39.23	0.1	0.25	2	200	0.1	0.6	5	0.1	0.25	15	200	0.1	0.24	95
MG6B	MG6B	6058	0.0479	30.66	0.1	0.201	2	1000	0.25	0.6	85	0.1	0.201	15	400	0.25	0.24	15
MG5A1	MG5A1	6069	0.0134	8.58	0.1	0.25	2	200	0.1	0.6	5	0.1	0.25	15	200	0.1	0.24	95
MG7	MG7	5894	0.1439	92.1	0.1	0.207	2.18	800	0.25	0.6	100							
NS24A	NS24A	6045	0.0297	19.01	0.1	0.25	2.08	900	0.1	0.6	100							
NS24B	NS24B	5932	0.012	7.68	0.1	0.25	5.58	300	0.1	0.6	100							
NS24C	NS24C	5862	0.04	25.6	0.1	0.182	2.68	800	0.1	0.6	100							
NS25	NS25	5904	0.037	23.68	0.1	0.249	2.14	800	0.05	0.6	100							
NS26	NS26	5842	0.1102	70.53	0.1	0.122	2.8	1000	0.05	0.6	100							
NS22A	NS22A	6078	0.0103	6.59	0.1	0.25	2.83	750	0.1	0.6	100							
NS22C	NS22C	5988	0.0063	4.03	0.1	0.25	4.58	300	0.1	0.6	100							
NS23A	NS23A	5878	0.0374	23.94	0.1	0.19	2	950	0.07	0.6	100							
NS27	NS27	5834	0.0574	36.74	0.1	0.1	2.18	830	0.03	0.6	100							
NS28B	NS28B	5818	0.0417	26.69	0.1	0.1	2	500	0.01	0.6	100							
E852	E852	5864	0.0291	18.62	0.1	0.25	2	400	0.02	0.6	100							
NS28A	NS28A	5841	0.0415	26.56	0.1	0.1	2	500	0.01	0.6	100							
NS22	NS22	6304	0.2037	130.37	0.1	0.25	2.07	2100	0.08	0.6	100							
NS31	NS31	6214	0.0592	37.09	0.1	0.25	2.37	1250	0.1	0.6	100							
NS22B	NS22B	6014	0.0098	6.27	0.1	0.25	4.91	500	0.1	0.6	100							
NS23B	NS23B	5966	0.1061	67.9	0.1	0.191	2.04	1350	0.05	0.6	100							
NS32A	NS32A	6168	0.0191	12.22	0.1	0.25	3.08	500	0.1	0.6	100							
NS32B	NS32B	5855	0.1481	94.78	0.1	0.165	2.13	1500	0.08	0.6	100							
NS1	BASIN 1 - 330 Ac	7825	0.5174	331.14	0.1	0.178	2	3300	0.24	0.8	57	0.1	0.178	2	3300	0.24	0.6	43
NS2	BASIN 2 - 267 Ac	7697	0.4184	267.78	0.1	0.25	2	2800	0.25	0.8	54	0.1	0.25	2	2800	0.25	0.6	46
NS3	BASIN 3 - 331 Ac	7343	0.5218	333.95	0.1	0.25	65	2950	0.18	0.24	3	0.1	0.25	2	2950	0.18	0.6	98
NS4	BASIN 4 - 166 Ac	6727	0.2602	166.53	0.1	0.25	65	2110	0.22	0.24	29	0.1	0.25	2	2110	0.22	0.6	71
NS5	BASIN 5 - 21 Ac	6520	0.0319	20.42	0.1	0.25	65	1400	0.25	0.24	36	0.1	0.25	2	1400	0.25	0.6	64
NS6	BASIN 6 - 178 Ac	6685	0.2162	138.37	0.1	0.25	65	3100	0.27	0.24	71	0.1	0.25	2	3100	0.27	0.8	29
NS7	BASIN 7 - 38 Ac	6362	0.0602	38.53	0.1	0.25	65.27	1570	0.19	0.24	69	0.1	0.25	2	1570	0.19	0.6	31
NS8	BASIN 8 - 673 Ac	7112	1.1304	723.46	0.1	0.239	2	4200	0.21	0.8	92	0.1	0.239	2	4200	0.21	0.8	9
NS9	BASIN 9 - 144 Ac	6837	0.1855	118.72	0.1	0.248	2	4400	0.2	0.6	100							
NS10	BASIN 10 - 214 Ac	6657	0.3581	229.18	0.1	0.223	2	3905	0.2	0.8	100							
NS11	BASIN 11 - 60 Ac	6559	0.0389	24.9	0.1	0.249	65	1600	0.34	0.24	6	0.1	0.249	2	1600	0.34	0.6	95
NS11B	BASIN 11 - 60 Ac	6270	0.0546	34.94	0.1	0.25	65	1600	0.34	0.24	6	0.1	0.25	2	1600	0.34	0.8	95
NS12	BASIN 12 - 40 Ac	6210	0.0619	39.62	0.1	0.25	65.34	400	0.1	0.24	71	0.1	0.25	2	400	0.1	0.8	30
NS13	BASIN 13 - 15 Ac	6452	0.1459	93.39	0.1	0.25	65.2	500	0.16	0.24	86	0.1	0.25	98	500	0.16	0.11	14
NS14	BASIN 14 - 47 Ac	6261	0.0434	27.78	0.1	0.25	65.96	775	0.35	0.24	90	0.1	0.25	98	775	0.35	0.11	10
NS14B	NS14B	6178	0.0204	13.06	0.1	0.25	2.86	500	0.1	0.6	100							
NS20B	NS20B	6358	0.0322	20.61	0.1	0.25	3.4	640	0.1	0.6	100							
NS15	NS15	6103	0.086	55.04	0.1	0.25	2.4	1000	0.08	0.6	100							
NS16	NS16	6564	0.1019	65.22	0.1	0.246	2	1600	0.1	0.6	100							
NS17	NS17	6282	0.0811	51.9	0.1	0.25	2	1500	0.08	0.6	100							
NS18	NS18	6405	0.1877	120.13	0.1	0.25	2	3200	0.1	0.6	100							
NS19	NS19	6169	0.0434	27.78	0.1	0.25	2	1600	0.05	0.6	100							
NS20	NS20	6070	0.0548	35.07	0.1	0.25	2	600	0.08	0.6	100							
NS21	NS21	6056	0.139	88.96	0.1	0.246	2.13	1450	0.05	0.6	100							
NS30D	NS30D	6288	0.0577	36.93	0.1	0.25	2.5	900	0.08	0.6	100							
NS30A	NS30A	6014	0.0266	17.02	0.1	0.244	2.78	600	0.08	0.6	100							
NS30B	NS30B	5979	0.14	89.6	0.1	0.238	2.06	1600	0.1	0.6	100							
NS30E	NS30E	6133	0.0022	1.41	0.1	0.25	4.37	200	0.1	0.6	100							
NS30F	NS30F	6150	0.0023	1.47	0.1	0.25	5.36	200	0.1	0.6	100							
NS30C	NS30C	5872	0.1237	79.17	0.1	0.151	2.01	1600	0.09	0.6	100							
NS33B	NS33B	5818	0.0301	19.26	0.1	0.1	2	1000	0.06	0.8	100							
NS34	NS34	6122	0.0437	27.97	0.1	0.25	2	800	0.08	0.6	100							
NS35	NS35	5869	0.1517	97.09	0.1	0.185	2	1900	0.05	0.6	100							
XMAR1	XMAR1	6837	0.2922	187.01	0.1	0.244	2	1900	0.1	0.6	100							
XMAR2	XMAR2	6837	0.4066	260.22	0.1	0.241	2	2200	0.1	0.6	100							
XMAR3	XMAR3	6837	0.8221	526.14	0.1	0.249	2	3500	0.1	0.6	100							
XMAR4	XMAR4	6837	0.2489	159.3	0.1	0.25	2	2300	0.1	0.6	100							
XMAR5	XMAR5	6837	0.3335	213.44	0.1	0.25	2	1700	0.1	0.6	100							
XMAR6	XMAR6	6837	0.1147	73.41	0.1	0.25	2	1500	0.1	0.6	100							
XMAR7	XMAR7	6837	0.3439	220.1	0.1	0.25	2	2800	0.1	0.6	100							
XMAR8	XMAR8	6837	0.2218	141.95	0.1	0.25	2	2200	0.1	0.6	100							
XMAR9	XMAR9	6837	0.25	160	0.1	0.25	2	2100	0.1	0.6	100							

TABLE I.II.C.6 : POST-PROJECT HYDROLOGIC FACTORS (CONT)

Valley Trail

					PLANE 1 - NON-URBAN AND URBAN PLANE PARAMETERS							PLANE 2 - URBAN PLANE PARAMETERS						
SHED	DESCRIPTION	Centroid Elevation (ft)	BA AREA (mi^2)	BA AREA (acre)	Initial Abst (in)	Constant Infiltration (in/hr)	% Imperv. WARM	Overland Length (ft)	Overland Slope	Overland 'n' Value	Plane % of Shed	Initial Abst (in)	Constant Infiltration (in/hr)	% Imperv WARM	Overland Length (ft)	Overland Slope	Overland 'n' Value	Plane % of Shed
XMAR10	XMAR10	6837	0.2273	145.47	0.1	0.25	2	2300	0.1	0.6	100							
XMAR11	XMAR11	6837	0.1037	66.37	0.1	0.185	2	1100	0.1	0.6	100							
XMAR12	XMAR12	6837	0.1361	87.1	0.1	0.208	2	1250	0.1	0.6	100							
XMAR13	XMAR13	6837	0.2679	171.46	0.1	0.249	2	1800	0.1	0.6	100							
XMAR14	XMAR14	6837	0.0483	30.91	0.1	0.25	2	600	0.1	0.6	100							
XMAR15	XMAR15	6837	0.014	8.96	0.1	0.25	2	500	0.1	0.6	100							
XMAR17	XMAR17	6837	0.2268	145.15	0.1	0.22	2	1300	0.1	0.6	100							
MAR18A	MAR18A	6244	0.0295	18.88	0.1	0.25	2	1000	0.1	0.6	100							
MAR18B	MAR18B	6120	0.0074	4.74	0.1	0.25	2	500	0.1	0.6	100							
XMAR19	XMAR19	6837	0.1517	97.09	0.1	0.248	2	1800	0.1	0.6	100							
XMAR20	XMAR20	6837	0.2009	128.58	0.1	0.244	2	1700	0.1	0.6	100							
MAR21A	MAR21A	6180	0.0602	38.53	0.1	0.25	2	500	0.1	0.6	100							
MAR21B	MAR21B	6055	0.0241	15.42	0.1	0.245	2	500	0.1	0.6	100							
MAR22B	MAR22B	5942	0.0266	17.02	0.1	0.23	2	500	0.1	0.6	100							
MAR22A	MAR22A	6026	0.0165	10.56	0.1	0.25	2	500	0.1	0.6	100							
XMAR23	XMAR23	6837	0.0439	28.1	0.1	0.138	2	500	0.05	0.6	100							
XMAR24	XMAR24	6837	0.0055	3.52	0.1	0.1	2	200	0.02	0.6	100							
XMAR25	XMAR25	6837	0.0147	9.41	0.1	0.126	2	1000	0.02	0.6	100							
NS33A	NS33A	5849	0.0118	7.55	0.1	0.197	2	1000	0.02	0.6	100							
E30A	Drains Away	5941	0.0064	4.1	0.1	0.25	10.66	600	0.039	0.6	100							

TABLE I.II.C.7A : EST. POST-PROJECT PEAK FLOW RATES – WARM EVENT- VALLEY TRAIL

HEC-1 Watershed Node	HEC-RAS River/Stream	HEC-RAS Cross Section	500-YEAR FLOW (cfs)	100-YEAR FLOW (cfs)	10-YEAR FLOW (cfs)	2-YEAR FLOW (cfs)
YE20D	Martis Creek / NW	100	477	345.5	179.4	62.6
UE30CR	Martis Creek / NW	96	548.7	399.2	208	73
YE40BC	Martis Creek / NW	91	632.4	463.7	243.8	85.7
YE80C	Martis Creek / NW	89	1097	805.8	428.6	156.4
E40C	Martis Creek / NW2	110	26.2	19.2	10	3.3
YE40D	Martis Creek / NW2	108	37.9	27.6	14.4	4.7
YE40DC	Martis Creek / NW3	79.5	1134.8	833.4	443	161.1
YE85	Martis Creek / NW3	78	1468.9	1076	566.1	192.7
YE85B	Martis Creek / NW3	77	1490.9	1091.6	574.4	196
YE85CC	Martis Creek / NW3	73	604.6	557.2	500.3	196.8
VMF1CR	Martis Creek / NW4	69.5	8564.1	6190.3	3077.9	1100.3
VMF2CR	Martis Creek / NW4	68.5	8610.7	6225.2	3097.8	1106
YNS26	Martis Creek / NW4	65.5	9600.7	6951.2	3461.4	1265.1
YNS27	Martis Creek / NW5	59.5	7744.5	6206.1	3838.1	1451.9
YNS28B	Martis Creek / NW5	57.5	7786.7	6241	3863.3	1464.1
YNS28A	Martis Creek / NW5	56.5	7814.6	6264.4	3880.3	1472.8
YNSALL	Martis Creek / NW5	56	10636	8335.7	4942.5	1982.6
YR21B	Martis Creek / W1	49.5	1639.6	1064.7	483.1	240.7
MAR22B	Martis Creek / W1	47	230.7	221.2	208.9	199.9
YR22A	Martis Creek / W1	44	251.5	236.3	216.9	202.5
XMAR23	Martis Creek / W1	41	296.3	267	230.9	208.2
YMAR23	Martis Creek / W1	40	459.2	383.8	289.6	224.8
XMAR24	Martis Creek / W1	39.5	246.7	244.3	239.7	212.3
UHWY	Martis Creek / MAIN	39.5	8463	7077	4441.8	2142.9
NS22	Martis Creek / SP2	189.5	142.7	100.1	42.5	12.8
YNS31	Martis Creek / SP2	188.5	194.7	135.8	59.4	17.7
YNS22B	Martis Creek / SP2	185.5	203.4	141.9	61.8	19.2
MG7	Martis Creek / SP1	199	1172	861.8	461.4	180.2
YNS24C	Martis Creek / SP1	195.5	1267.9	930.4	498.2	192.9
NS18	Martis Creek / SP1	20	112.6	78.5	30.3	10.4

TABLE I.II.C.7B : PROJECT FLOW CHANGES – WARM EVENT-VALLEY TRAIL

HEC-1 Watershed Node	HEC-RAS River/Stream	HEC-RAS Cross Section	POST-PROJECT - PRE-PROJECT DIFFERENCE				POST - PRE DIFFERENCE %			
			500-YEAR (cfs)	100-YEAR (cfs)	10-YEAR (cfs)	2-YEAR (cfs)	500-YEAR (cfs)	100-YEAR (cfs)	10-YEAR (cfs)	2-YEAR (cfs)
YE20D	Martis Creek / NW	100	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00
UE30CR	Martis Creek / NW	96	0.1	0.1	0.1	0.1	0.02	0.03	0.05	0.14
YE40BC	Martis Creek / NW	91	0.2	0.3	0.3	0.4	0.03	0.06	0.12	0.47
YE80C	Martis Creek / NW	89	0.3	0.3	0.3	0.4	0.03	0.04	0.07	0.26
E40C	Martis Creek / NW2	110	0.1	0.1	0.1	0.1	0.38	0.52	1.00	3.03
YE40D	Martis Creek / NW2	108	0.1	0.1	0.1	0.1	0.26	0.36	0.69	2.13
YE40DC	Martis Creek / NW3	79.5	0.3	0.4	0.4	0.6	0.03	0.05	0.09	0.37
YE85	Martis Creek / NW3	78	0.5	0.7	0.6	0.9	0.03	0.07	0.11	0.47
YE85B	Martis Creek / NW3	77	0.6	0.7	0.7	1.0	0.04	0.06	0.12	0.51
YE85CC	Martis Creek / NW3	73	0.1	0.1	0.6	1.0	0.02	0.02	0.12	0.51
VMF1CR	Martis Creek / NW4	69.5	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00
VMF2CR	Martis Creek / NW4	68.5	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00
YNS26	Martis Creek / NW4	65.5	0.4	0.2	0.3	0.1	0.00	0.00	0.01	0.01
YNS27	Martis Creek / NW5	59.5	0.3	0.2	1.0	1.2	0.00	0.00	0.03	0.08
YNS28B	Martis Creek / NW5	57.5	0.3	0.3	1.0	1.2	0.00	0.00	0.03	0.08
YNS28A	Martis Creek / NW5	56.5	0.3	0.2	1.0	1.2	0.00	0.00	0.03	0.08
YNSALL	Martis Creek / NW5	56	0.0	0.9	1.7	2.3	0.00	0.01	0.03	0.12
YR21B	Martis Creek / W1	49.5	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00
MAR22B	Martis Creek / W1	47	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00
YR22A	Martis Creek / W1	44	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00
XMAR23	Martis Creek / W1	41	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00
YMAR23	Martis Creek / W1	40	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00
XMAR24	Martis Creek / W1	39.5	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00
UHWY	Martis Creek / MAIN	39.5	0.4	0.7	1.2	2.2	0.00	0.01	0.03	0.10
NS22	Martis Creek / SP2	189.5	0.1	0.0	0.1	0.0	0.07	0.00	0.24	0.00
YNS31	Martis Creek / SP2	188.5	0.1	0.1	0.1	0.1	0.05	0.07	0.17	0.56
YNS22B	Martis Creek / SP2	185.5	0.1	0.1	0.2	0.2	0.05	0.07	0.32	1.04
MG7	Martis Creek / SP1	199	0.5	-0.2	-0.1	0.1	0.04	-0.02	-0.02	0.06
YNS24C	Martis Creek / SP1	195.5	0.5	-0.2	0.0	0.4	0.04	-0.02	0.00	0.21
NS18	Martis Creek / SP1	20	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00

TABLE I.II.C.8 : POST-PROJECT HYDROLOGIC FACTORS HIGHWAY TRAIL

					PLANE 1 - NON-URBAN AND URBAN PLANE PARAMETERS							PLANE 2 - URBAN PLANE PARAMETERS						
SHED	DESCRIPTION	Centroid Elevation (ft)	BA AREA (mi^2)	BA AREA (acre)	Initial Abst (in)	Constant Infiltration (in/hr)	% Imperv. WARM	Overland Length (ft)	Overland Slope	Overland 'n' Value	Plane % of Shed	Initial Abst (in)	Constant Infiltration (in/hr)	% Imperv WARM	Overland Length (ft)	Overland Slope	Overland 'n' Value	Plane % of Shed
E2	Large Offsite Shed 155.8ac	6231	0.2434	155.78	0.1	0.211	2	1500	0.083	0.6	100							
E15	Other Large Upstream offsite shed	6008	0.1736	111.1	0.1	0.147	2	1000	0.050	0.5	100							
E10	Large Undeveloped upstream	6096	0.0311	19.9	0.1	0.179	2	2000	0.075	0.8	100							
E20A	12.0 AC	5840	0.0106	6.78	0.1	0.243	3	1200	0.058	0.6	100							
E14A	Small Roadway Shed 4 ac	5989	0.0063	4.03	0.1	0.1	10	500	0.03	0.6	100							
E10A	Small Hopkins Roadway Drain	5958	0.0057	3.65	0.1	0.207	10	450	0.03	0.5	100							
E16A	Small Hopkins Roadway Drain	5856	0.0006	0.38	0.1	0.213	90	50	0.02	0.6	100							
E20B	10.9 AC	5951	0.0182	11.65	0.1	0.2	5	800	0.07	0.6	100							
E20C	4.0 AC	5949	0.0075	4.8	0.1	0.25	2	500	0.05	0.6	90	0.1	0.25	90	18	0.02	0.11	10
E20D	10.6 AC	5924	0.0166	10.62	0.1	0.25	15	500	0.06	0.6	89	0.1	0.25	90	18	0.02	0.11	11
E20E	8.4 AC Mostly diverted area added	6962	0.0132	8.45	0.1	0.25	12	900	0.02	0.8	90	0.1	0.25	90	18	0.02	0.11	10
E30	MAIN SHED ABOVE TWIN	5901	0.0630	40.93	0.1	0.25	8.99	600	0.030	0.5	100							
E19	HILLSIDE ABOVE SM RD. 4.2AC	5861	0.0065	4.16	0.1	0.25	2	400	0.018	0.6	89	0.1	0.25	90	18	0.02	0.11	11
E21	HILLSIDE ABOVE ROAD 5.7AC	5941	0.0084	5.38	0.1	0.25	7	600	0.017	0.8	74	0.1	0.25	90	18	0.02	0.11	26
E22	" HILLSIDE ABOVE 15"" CULVERT	5935	0.0045	2.88	0.1	0.25	7	350	0.027	0.8	100							
E23	PORTION OF S MILL RD. 0.5AC	5920	0.0008	0.51	0.1	0.25	90	10	0.02	0.11	100							
E40	LARGE SHED DOWNSTREAM OF	5888	0.1147	73.41	0.1	0.19	9.48	1800	0.034	0.8	100							
E40B	LARGE SHED DOWNSTREAM OF	5884	0.019	12.16	0.1	0.249	10.92	600	0.01	0.6	100							
E14C	OFF-SITE SHED WEST OF S.	6030	0.0059	3.70	0.1	0.25	2	600	0.08	0.8	100							
E64A	EAST OF S. MILL RD. 16.1AC	5991	0.0248	15.87	0.1	0.159	14	1000	0.06	0.8	94	0.1	0.159	90	18	0.02	0.11	6
E64B	EAST OF S. MILL RD. 12.1AC	5968	0.019	12.18	0.1	0.175	15	900	0.07	0.8	97	0.1	0.175	90	18	0.02	0.11	3
E70	OFF-SITE- LAHONTAN UNITS 7&8	5952	0.1255	80.32	0.1	0.171	8	1200	0.041	0.6	95	0.1	0.171	90	10	0.02	0.11	5
E71	OFF-SITE PORTION OF	5968	0.0279	17.86	0.1	0.227	19.1	1400	0.06	0.8	100							
E72	OFF-SITE PORTION OF	5967	0.0179	11.39	0.1	0.198	9.6	1700	0.037	0.6	100							
E75	MOSTLY OFF-SITE AND	5881	0.0905	57.92	0.1	0.191	3.2	1200	0.050	0.6	100							
E14B	OFF-SITE SHED WEST OF S.	6018	0.0397	25.41	0.1	0.192	2	800	0.06	0.8	100							
E56A	EAST OF S. MILL RD. 16.7AC	5967	0.0261	16.7	0.1	0.136	20	500	0.04	0.8	100							
E59D	EAST OF S. MILL RD. 23.7AC	5911	0.0229	14.66	0.1	0.25	9.5	800	0.04	0.6	100							
E56B	EAST OF S. MILL RD. 3.2AC	5951	0.005	3.2	0.1	0.192	40	200	0.05	0.6	100							
E56C	EAST OF S. MILL RD. 7.7AC	5928	0.012	7.68	0.1	0.247	22	200	0.05	0.6	100							
E55E	EAST OF S. MILL RD. 3.8AC	5951	0.0058	3.58	0.1	0.25	25	300	0.02	0.6	100							
E56F	EAST OF S. MILL RD. 1.0AC	5948	0.0028	1.78	0.1	0.35	35	250	0.03	0.6	100							
E56G	EAST OF S. MILL RD. 1AC	5940	0.0015	0.96	0.1	0.25	11	150	0.07	0.6	100							
E58C	EAST OF S. MILL RD. 5.8AC	5897	0.0089	5.63	0.1	0.25	38	250	0.06	0.6	100							
E56H	EAST OF S. MILL RD. 44.1AC	5936	0.0057	3.65	0.1	0.35	24	400	0.02	0.6	100							
E58A	EAST OF S. MILL RD. 5.3AC	5921	0.0083	5.31	0.1	0.25	22	300	0.04	0.6	100							
E59E	EAST OF S. MILL RD. 3.7AC	5986	0.037	23.69	0.1	0.225	22	300	0.02	0.8	100							
E60	LAST DOWNSTREAM SHED	5866	0.0452	28.93	0.1	0.131	2	1300	0.04	0.6	100							
E40C	LARGE SHED DOWNSTREAM OF	5871	0.0344	22.02	0.1	0.166	9.31	1200	0.01	0.6	100							
E40E	LARGE SHED DOWNSTREAM OF	5874	0.0058	3.71	0.1	0.25	10.51	800	0.01	0.6	100							
E40D	LARGE SHED DOWNSTREAM OF	5868	0.0074	4.74	0.1	0.194	8.27	600	0.01	0.6	100							
E85	OFFSITE DOWNSTREAM SHED	5858	0.4598	294.34	0.1	0.175	2.15	2600	0.0025	0.6	100							
E85B	E85B	5870	0.0312	19.97	0.1	0.23	3.95	400	0.02	0.6	100							
E85C	E85C	5864	0.0079	5.06	0.1	0.238	2.43	400	0.02	0.6	100							
E5A1	E5A1 Drop Inlet	6491	0.073	46.72	0.1	0.204	2	1350	0.133	0.6	98	0.1	0.204	85	200	0.02	0.11	2
E5B	E5B	6348	0.0139	8.9	0.1	0.245	2	800	0.08	0.6	91	0.1	0.245	95	200	0.02	0.11	9
E5C	E5C	6260	0.0051	3.26	0.1	0.25	2	800	0.07	0.6	92	0.1	0.25	95	200	0.02	0.11	8
E5D	E5D	6278	0.085	54.4	0.1	0.25	2	1500	0.05	0.6	100							
E6A1	E6A1	6119	0.057	36.48	0.1	0.25	2	1000	0.068	0.6	100							
E6A2	E6A2	6217	0.0149	9.54	0.1	0.25	2	800	0.068	0.6	100							
E6C	E6C	6042	0.0939	60.1	0.1	0.246	2	1600	0.09	0.6	100							
GS10D	GS10D	6257	0.0124	7.94	0.1	0.25	2	900	0.07	0.6	79	0.1	0.25	95	100	0.02	0.11	21
GS10C	GS10C	6230	0.0169	10.82	0.1	0.25	2	300	0.06	0.6	91	0.1	0.25	95	100	0.02	0.11	9
GS10B	GS10B	6226	0.0044	2.82	0.1	0.35	2	600	0.08	0.6	86	0.1	0.25	85	100	0.02	0.11	14
GS10A1	GS10A1	6208	0.029	18.56	0.1	0.25	2	600	0.08	0.6	96	0.1	0.25	95	100	0.02	0.11	4
GS10F	GS10F	6165	0.0248	15.87	0.1	0.25	2	600	0.06	0.6	92	0.1	0.25	95	100	0.02	0.11	8
GS10E	GS10E	6152	0.0153	9.78	0.1	0.35	2	300	0.06	0.6	78	0.1	0.25	85	100	0.02	0.11	22
GS10A2	GS10A2	6190	0.0278	17.79	0.1	0.25	2	1400	0.06	0.6	96	0.1	0.25	85	100	0.02	0.11	4
GS10J	GS10J	6144	0.0099	6.34	0.1	0.25	63	300	0.06	0.6	92	0.1	0.25	95	200	0.02	0.11	8
GS10G	GS10G	6109	0.0081	5.18	0.1	0.25	63	300	0.08	0.6	90	0.1	0.25	95	200	0.02	0.11	10
GS10H	GS10H	6104	0.0066	4.22	0.1	0.25	2	300	0.06	0.6	81	0.1	0.25	85	200	0.02	0.11	19
GS10I	GS10I	6076	0.0071	4.54	0.1	0.25	2	300	0.06	0.6	78	0.1	0.25	95	200	0.02	0.11	22
E8A	E8A	6197	0.0049	3.14	0.1	0.25	2	200	0.12	0.6	73	0.1	0.25	95	100	0.02	0.11	27
E8B	E8B	6128	0.0122	7.81	0.1	0.35	2	400	0.06	0.6	95	0.1	0.25	85	100	0.02	0.11	5
E8C	E8C	6063	0.0244	15.62	0.1	0.25	2	800	0.08	0.6	100							
E9	E9	6004	0.0213	13.63	0.1	0.25	2	600	0.06	0.8	100							
GS11B	GS11B	6068	0.0031	1.98	0.1	0.25	2	700	0.1	0.6	100							
GS11A	GS11A	5999	0.0354	22.66	0.1	0.237	2	700	0.1	0.6	100							
GS13C	GS13C	6063	0.0066	4.22	0.1	0.25	2	300	0.07	0.6	100							
GS13B	GS13B	6034	0.0168	10.75	0.1	0.25	2	300	0.07	0.6	100							
GS18A	GS18A	6108	0.002	1.28	0.1	0.25	3	800	0.094	0.6	100							
GS18	GS18	6041	0.0248	15.87	0.1	0.25	2	800	0.094	0.6	100							
GS13A	GS13A	5992	0.0196	12.54	0.1	0.181	2	800	0.067	0.6	100							
GS19	GS19	5993	0.0617	39.49	0.1	0.192	2	700	0.086	0.6	100							
GS20	GS20	5962	0.0178	11.39	0.1	0.160	2	600	0.1	0.6	100							
GS21B1	4.2 AC.	6168	0.0065	4.16	0.1	0.25	10.06	300	0.07	0.6	100							
GS21B2	3.2 AC.	6133	0.005	3.2	0.1	0.25	15	300	0.07	0.6	100							
GS21A	GS21A	6083	0.0412	26.37	0.1	0.25	2	1000	0.07	0.6	80	0.1	0.25	15	200	0.02	0.24	20
GS22	GS22	6000	0.0741	47.42	0.1	0.249	2	700	0.057	0.6	100							
GS23	GS23	5983	0.0596	38.14	0.1	0.25	2	2000	0.04	0.6	100							
GS24	GS24	6002	0.0352	22.53	0.1	0.25	2	500	0.1	0.6	100							
GS25B3	1.2 AC.	6133	0.0019	1.22	0.1	0.25	15	300	0.07	0.6	100							
GS25B4	1.0 AC.	6125	0.0029	1.86	0.1	0.25	15	300	0.07	0.6	100							
GS25C4	4.4 AC.	6121	0.0069	4.42	0.1	0.25	11.75	300	0.07	0.6	100							
GS25C5	1.7 AC.	6118	0.0026	1.66	0.1	0.25	9.0	300	0.07	0.6	100							
GS25C6	1.6 AC.	6106	0.0023	1.47	0.1	0.25	4.6	300	0.07	0.6	100							
GS25C9	3.0 AC.	6085	0.0047	3.01	0.1	0.25	11.36	300	0.07	0.6	100							
GS21A2	1.3 AC.	6104	0.002	1.20	0.1	0.25	15	300	0.07	0.6	100							
GS25C1	.4 AC.	6087	0.0006	0.38	0.1	0.25	15	300	0.07	0.6	100							
GS25C3	3.8 AC.	6099	0.006	3.84	0.1	0.25	11.23	300	0.07	0.6	100							
GS25C7	3.8 AC.	6083	0.006	3.84	0.1	0.25	13.18	300	0.07	0.6	100							
GS27C	2.0 AC.	6061	0.0044	2.82	0.1	0.25	15	300	0.07	0.6	100							
GS23B	0	6064	0.0061	3.9	0.1	0.25	15	300	0.07	0.6	100							

TABLE I.II.C.9 : POST-PROJECT HYDROLOGIC FACTORS HIGHWAY(CONT)

					PLANE 1 - NON-URBAN AND URBAN PLANE PARAMETERS							PLANE 2 - URBAN PLANE PARAMETERS						
SHED	DESCRIPTION	Centroid Elevation (ft)	BA AREA (mi^2)	BA AREA (acre)	Initial Abst (in)	Constant Infiltration (in/hr)	% Imperv. WARM	Overland Length (ft)	Overland Slope	Overland 'n' Value	Plane % of Shed	Initial Abst (in)	Constant Infiltration (in/hr)	% Imperv WARM	Overland Length (ft)	Overland Slope	Overland 'n' Value	Plane % of Shed
GS25E	GS25E	6024	0.034	21.76	0.1	0.25	2	800	0.1	0.6	100							
GS25A2	1.9 AC	6169	0.0029	1.86	0.1	0.25	6.5	300	0.07	0.6	100							
GS25A1	.4 AC	6174	0.0007	0.45	0.1	0.25	6.5	300	0.07	0.6	100							
GS25A3	1.2 AC	6148	0.0018	1.15	0.1	0.25	6.5	300	0.07	0.6	100							
GS25D3	1.9 AC	6169	0.0022	1.41	0.1	0.25	11.1	300	0.07	0.6	100							
GS25D2	2.9 AC	6157	0.0045	2.88	0.1	0.25	6.5	300	0.07	0.6	100							
GS25D1	4.1 AC	6140	0.0062	3.97	0.1	0.25	6.5	300	0.07	0.6	100							
GS28B2	6.7 AC	6123	0.0105	6.72	0.1	0.25	5.25	300	0.07	0.6	100							
GS27B1	5.5 AC	6117	0.0087	5.57	0.1	0.25	8.5	300	0.07	0.6	100							
GS25C2	3.0 AC	6098	0.0047	3.01	0.1	0.25	9.93	300	0.07	0.6	100							
GS27B3	3.3 AC	6068	0.0052	3.33	0.1	0.25	15	300	0.07	0.6	100							
GS27B2	0	6082	0.0053	3.39	0.1	0.25	15	300	0.07	0.6	100							
GS26E1	GS25E	6012	0.0131	8.38	0.1	0.25	2	800	0.1	0.6	100							
GS30B	1.1 AC	6127	0.0018	1.15	0.1	0.25	15	200	0.07	0.6	100							
GS20B1	1.6 AC	6117	0.0025	1.6	0.1	0.25	15	200	0.07	0.6	100							
GS20B3	.09 AC	6099	0.0015	0.96	0.1	0.25	15	300	0.07	0.6	100							
GS28A1	7.6 AC	6079	0.012	7.68	0.1	0.25	15	300	0.07	0.6	100							
GS28A2	GS28A	6054	0.0154	9.86	0.1	0.25	2	500	0.071	0.6	50	0.1	0.25	15	200	0.02	0.24	50
GS30A	GS30	6104	0.0427	27.33	0.1	0.25	2	800	0.056	0.6	89	0.1	0.25	95	50	0.02	0.11	11
GS31A	GS31A	5990	0.0843	53.95	0.1	0.25	2	1000	0.05	0.6	90	0.1	0.25	15	200	0.02	0.4	10
GS32	GS32	5924	0.032	20.48	0.1	0.23	2	500	0.1	0.6	100							
MD1H3	MD1H3	6510	0.004	2.56	0.1	0.25	2	300	0.12	0.6	75	0.1	0.25	95	50	0.02	0.11	25
MD1H2	MD1H2	6464	0.0027	1.73	0.1	0.25	2	300	0.12	0.6	75	0.1	0.25	95	50	0.02	0.11	25
MD1E4	MD1E4	6442	0.0132	8.45	0.1	0.25	2	300	0.1	0.6	87	0.1	0.25	95	50	0.02	0.11	13
MD1E3	MD1E3	6379	0.0039	2.5	0.1	0.25	2	300	0.1	0.6	78	0.1	0.25	95	50	0.02	0.11	22
MD1E2	MD1E2	6315	0.0031	1.98	0.1	0.25	2	300	0.1	0.6	84	0.1	0.25	95	50	0.02	0.11	16
MD1E1E	MD1E1-2	6357	0.0042	2.69	0.1	0.25	2	1200	0.107	0.6	100							
MD1E1C	MD1E1-3	6238	0.0686	43.9	0.1	0.25	2	1000	0.08	0.6	100							
MD1E1B	MD1E1-2	6262	0.0141	9.02	0.1	0.25	2	1200	0.107	0.6	100							
MD1H1	MD1H1-1	6415	0.0073	4.67	0.1	0.25	2	400	0.06	0.6	100							
MD1H4	MD1H1-2	6403	0.0049	3.14	0.1	0.25	2	650	0.06	0.6	100							
MD1I_1	MD1I-1	6469	0.0242	15.49	0.1	0.25	2	1000	0.1	0.6	100							
MD1G3	MD1G3	6371	0.0096	6.14	0.1	0.25	2	300	0.08	0.6	90	0.1	0.25	95	50	0.02	0.11	10
MD1G2	MD1G2	6357	0.0023	2.11	0.1	0.25	2	200	0.08	0.6	72	0.1	0.25	95	50	0.02	0.11	28
MD1G2B	MD1G2B	6340	0.0055	3.52	0.1	0.25	2	200	0.085	0.6	100							
MD1G1B	MD1G1-2	6230	0.0195	12.48	0.1	0.25	2	1300	0.06	0.6	100							
GS26A	GS26A	6535	0.0074	4.74	0.1	0.25	2	600	0.1	0.6	85	0.1	0.25	95	50	0.02	0.11	15
GS26B	GS26B	6422	0.0139	8.9	0.1	0.25	2	800	0.2	0.6	89	0.1	0.25	95	50	0.02	0.11	11
GS26C	GS26C	6311	0.0126	8.06	0.1	0.25	2	600	0.2	0.6	90	0.1	0.25	95	50	0.02	0.11	10
GS26D	GS26D	6343	0.0144	9.22	0.1	0.25	2	600	0.1	0.6	89	0.1	0.25	95	50	0.02	0.11	11
GS26E	GS26E	6256	0.0028	1.79	0.1	0.25	2	300	0.08	0.6	75	0.1	0.25	95	50	0.02	0.11	25
GS26F	GS26F	6256	0.0074	4.74	0.1	0.25	2	400	0.1	0.6	87	0.1	0.25	95	50	0.02	0.11	13
GS26N1	GS26N-1	6226	0.0046	2.94	0.1	0.25	2	335	0.02	0.11	100							
GS26G	GS26G	6252	0.0231	14.78	0.1	0.25	2	600	0.1	0.6	91	0.1	0.25	95	50	0.02	0.11	9
GS26H	GS26H	6214	0.0026	1.66	0.1	0.25	2	100	0.08	0.6	75	0.1	0.25	95	50	0.02	0.11	25
GS15C	GS15C	6522	0.0106	6.78	0.1	0.25	2	600	0.15	0.6	91	0.1	0.25	95	50	0.02	0.11	9
GS15D	GS15D	6362	0.0133	8.51	0.1	0.25	2	300	0.135	0.6	91	0.1	0.25	95	50	0.02	0.11	9
GS15A	GS15A	6582	0.0913	58.43	0.1	0.237	2	1800	0.12	0.6	97	0.1	0.237	95	50	0.02	0.11	3
GS15B	GS15B	6351	0.0151	9.66	0.1	0.25	2	400	0.1	0.6	94	0.1	0.25	95	50	0.02	0.11	6
GS16A1	GS16A1	6287	0.019	12.16	0.1	0.25	2	400	0.1	0.6	96	0.1	0.25	95	50	0.02	0.11	4
GS16A2	GS16A2	6243	0.0137	8.77	0.1	0.25	2	400	0.1	0.6	91	0.1	0.25	95	50	0.02	0.11	9
GS16B	GS16B	6571	0.026	16.64	0.1	0.233	2	1800	0.15	0.6	93	0.1	0.233	95	50	0.02	0.11	7
GS16C	GS16C	6374	0.0141	9.02	0.1	0.25	2	400	0.15	0.6	89	0.1	0.25	95	50	0.02	0.11	11
GS17C	GS17C	6277	0.0147	9.41	0.1	0.25	2	600	0.12	0.6	91	0.1	0.25	95	50	0.02	0.11	9
E6A3	E6A3	6519	0.0421	26.94	0.1	0.18	2	1800	0.2	0.6	94	0.1	0.18	95	50	0.02	0.11	6
GS12B	GS12B	6327	0.0089	5.7	0.1	0.25	2	600	0.12	0.6	89	0.1	0.25	95	50	0.02	0.11	11
GS12C	GS12C	6362	0.0068	4.35	0.1	0.25	2	300	0.12	0.6	70	0.1	0.25	95	50	0.02	0.11	30
GS12F	GS12F	6291	0.0082	5.25	0.1	0.25	2	400	0.1	0.6	94	0.1	0.25	95	50	0.02	0.11	6
GS12H	GS12H	6301	0.0082	5.25	0.1	0.25	2	800	0.1	0.6	94	0.1	0.25	95	50	0.02	0.11	6
GS12D	GS12D	6445	0.0044	2.82	0.1	0.25	2	400	0.15	0.6	84	0.1	0.25	95	50	0.02	0.11	16
GS12E	GS12E	6365	0.0044	2.82	0.1	0.25	2	400	0.15	0.6	90	0.1	0.25	95	50	0.02	0.11	10
GS12I	GS12I	6263	0.0177	11.33	0.1	0.25	2	800	0.1	0.6	95	0.1	0.25	95	50	0.02	0.11	5
GS17A	GS17A	6206	0.0226	14.46	0.1	0.25	2	800	0.1	0.6	90	0.1	0.25	95	50	0.02	0.11	10
GS26N	GS26N-2	6195	0.0289	18.14	0.1	0.25	2	1419	0.068	0.6	100							
GS26OA	AREA=20.2 AC	6155	0.0321	20.54	0.1	0.25	86	800	0.05	0.6	95	0.1	0.25	90	50	0.02	0.11	5
GS26OB	AREA=3.3 AC UNIT 4A	6186	0.0047	3.01	0.1	0.25	2	600	0.05	0.6	95	0.1	0.25	90	50	0.02	0.11	5
MD1C2	MD1C2	6130	0.0063	4.03	0.1	0.25	2	250	0.05	0.6	90	0.1	0.25	90	50	0.02	0.11	10
GS26L3	AREA=0.7 AC UNIT 4A	6132	0.0012	0.77	0.1	0.25	2	500	0.050	0.6	90	0.1	0.25	90	50	0.02	0.11	10
MD1F-1	MD1F-1	6368	0.0069	4.42	0.1	0.25	2	600	0.08	0.6	90	0.1	0.25	95	50	0.02	0.11	10
MD1F	MD1F-2	6353	0.0035	2.24	0.1	0.25	2	500	0.08	0.6	90	0.1	0.25	95	50	0.02	0.11	10
MD1D1D	MD1D1D	6275	0.0124	7.94	0.1	0.25	2	800	0.06	0.6	100							
MD1D1C	MD1D1C	6254	0.0074	4.74	0.1	0.25	2	500	0.06	0.6	100							
MD1E	MD1E	6305	0.016	10.24	0.1	0.25	2	600	0.08	0.6	95	0.1	0.25	95	50	0.02	0.11	5
MD1D1A	MD1D1A	6225	0.0059	3.78	0.1	0.25	2	400	0.12	0.6	100							
MD1D1B	MD1D1B	6232	0.0028	1.79	0.1	0.25	2	400	0.12	0.6	100							
MD1D2	MD1D2	6197	0.0077	4.93	0.1	0.25	2	800	0.2	0.6	100							
GS26J	GS26J	6164	0.0023	1.47	0.1	0.25	2	230	0.078	0.6	100							
GS26K	GS26K	6166	0.0032	2.05	0.1	0.25	2	184	0.092	0.6	100							
GS26L	GS26L REVISED AREA = 5.0 AC	6149	0.0091	5.82	0.1	0.25	2	500	0.058	0.6	90	0.1	0.25	90	50	0.02	0.11	10
GS26L2	GS26L2	6110	0.0029	1.86	0.1	0.25	2	250	0.047	0.6	90	0.1	0.25	90	50	0.02	0.11	10
MD1C1	MD1C1	6100	0.0155	9.92	0.1	0.25	2	400	0.05	0.6	85	0.1	0.25	90	50	0.02	0.11	15
MD1C4	MD1C4	6067	0.0169	10.82	0.1	0.224	2	400	0.05	0.6	95	0.1	0.224	90	50	0.02	0.11	5
MA1	MA1	7303	0.2995	191.68	0.1	0.191	2	1600	0.234	0.6	100							
MA2	MA2	7054	0.5483	350.91	0.1	0.2	2	2200	0.284	0.6	100							
MA3	MA3	7366	0.6259	400.58	0.1	0.229	2	2300	0.272	0.6	100							
MA4	MA4	6453	0.287	183.68	0.1	0.227	2	2000	0.3	0.6	100							
MA5	MA5	6409	0.2025	129.6	0.1	0.214	2	1500	0.183	0.6	100							
MA6	MA6	6293	0.4152	265.73	0.1	0.228	2	1800	0.097	0.6	100							
MA7	MA7	6346	0.2326	148.86	0.1	0.233	2	3300	0.227	0.6	100							
MA8	MA8	6860	0.4308	275.71	0.1	0.165	2	1350	0.32	0.6	100							
MA9	MA9	6181	0.0913	58.43	0.1	0.237	2	600	0.208	0.6	100							
MA10A	MA10A	6287	0.2886	184.64	0.1	0.241	2	1800	0.038	0.6	85	0.1	0.241	15	200	0.02	0.24	15
MA10B	MA10B	6270	0.01	6.4	0.1	0.25	2	800	0.09	0.6	90	0.1	0.25	95	50	0.02	0.11	10

TABLE I.II.C.10 : POST-PROJECT HYDROLOGIC FACTORS HIGHWAY(CONT)

					PLANE 1 - NON-URBAN AND URBAN PLANE PARAMETERS							PLANE 2 - URBAN PLANE PARAMETERS						
SHED	DESCRIPTION	Centroid Elevation (ft)	BA AREA (mi^2)	BA AREA (acre)	Initial Abst (in)	Constant Infiltration (in/hr)	% Imperv. WARM	Overland Length (ft)	Overland Slope	Overland 'n' Value	Plane % of Shed	Initial Abst (in)	Constant Infiltration (in/hr)	% Imperv WARM	Overland Length (ft)	Overland Slope	Overland 'n' Value	Plane % of Shed
MB7B3A	MB7B3A	6302	0.0051	3.26	0.1	0.25	2	500	0.08	0.6	95	0.1	0.25	95	50	0.02	0.11	5
MB7B4A	MB7B4A	6252	0.0156	9.98	0.1	0.25	2	500	0.09	0.6	95	0.1	0.25	95	50	0.02	0.11	5
MB7B3B	MB7B3B	6302	0.0064	4.1	0.1	0.25	2	600	0.08	0.6	95	0.1	0.25	95	50	0.02	0.11	5
MB7B4B	MB7B4B	6257	0.0044	2.82	0.1	0.25	2	400	0.07	0.6	95	0.1	0.25	95	50	0.02	0.11	5
MB7B4C	MB7B4C	6216	0.0023	1.47	0.1	0.25	2	170	0.053	0.6	95	0.1	0.25	95	50	0.02	0.11	5
MB7B1A	MB7B1A	6400	0.0709	45.38	0.1	0.25	2	1300	0.192	0.6	100							
MB7B1C	MB7B1C	6369	0.0041	2.62	0.1	0.25	2	400	0.08	0.6	95	0.1	0.25	95	50	0.02	0.11	5
MB7B1B	MB7B1B	6341	0.0107	6.85	0.1	0.25	2	500	0.08	0.6	95	0.1	0.25	95	50	0.02	0.11	5
MB7B1D	MB7B1D	6250	0.0146	9.34	0.1	0.25	2	500	0.07	0.6	95	0.1	0.25	95	50	0.02	0.11	5
MB7B1E	MB7B1E	6217	0.0054	3.46	0.1	0.25	2	500	0.05	0.6	95	0.1	0.25	95	50	0.02	0.11	5
MB7B2	MB7B2	6188	0.0216	13.82	0.1	0.25	2	1300	0.192	0.6	95	0.1	0.25	95	50	0.02	0.11	5
MB1	MB1	7456	0.5333	341.31	0.1	0.188	2	4000	0.275	0.6	100							
MB2	MB2	6762	1.2667	810.69	0.1	0.192	2	2800	0.339	0.6	100							
MB3	MB3	6632	0.5006	320.38	0.1	0.218	2	1800	0.278	0.6	100							
MB4	MB4	6485	0.6535	418.24	0.1	0.245	2	1900	0.184	0.6	100							
MB5	MB5	6222	0.1602	102.53	0.1	0.25	2	1800	0.278	0.6	100							
MB6A	AREA = 7.0 AC	6199	0.0073	4.67	0.1	0.25	6.6	1335	0.1543	0.6	100							
MB6B	AREA = 3.9 AC	6190	0.0061	3.9	0.1	0.25	11.8	240	0.0708	0.6	100							
MB6C	AREA = 3.2 AC	6160	0.0039	2.5	0.1	0.25	7.6	370	0.1081	0.6	100							
MB6D	MB6D	6151	0.0223	14.27	0.1	0.246	2	200	0.125	0.6	65	0.1	0.246	15	200	0.02	0.24	35
MB6G	MB6G	6244	0.0109	6.98	0.1	0.25	2	500	0.125	0.6	30	0.1	0.25	15	200	0.02	0.24	70
MB6F	MB6F	6226	0.0062	3.97	0.1	0.25	2	500	0.125	0.6	30	0.1	0.25	15	200	0.02	0.24	70
MB6D1	MB6D1	6200	0.0036	2.3	0.1	0.25	2	500	0.125	0.6	30	0.1	0.25	15	200	0.02	0.24	70
MB6E	MB6E	6227	0.005	3.2	0.1	0.25	2	500	0.125	0.6	30	0.1	0.25	15	200	0.02	0.24	70
MB7A1	MB7A1	6457	0.1465	93.76	0.1	0.208	2	1300	0.192	0.6	97	0.1	0.208	95	50	0.02	0.11	3
MB7A2A	MB7A2A	6297	0.0247	15.81	0.1	0.25	2	550	0.192	0.6	92	0.1	0.25	95	50	0.02	0.11	8
MB7A2B	MB7A2B	6273	0.0059	3.78	0.1	0.25	2	300	0.192	0.6	100							
MB7C	MB7C	6245	0.0236	15.1	0.1	0.25	2	200	0.1	0.6	92	0.1	0.25	95	50	0.02	0.11	8
MB7D1A	MB7D1A	6321	0.0044	2.82	0.1	0.25	2	500	0.1	0.6	79	0.1	0.25	95	50	0.02	0.11	21
MB7D1B	MB7D1B	6331	0.0025	1.6	0.1	0.25	2	300	0.1	0.6	79	0.1	0.25	95	50	0.02	0.11	21
MB7D1	MB7D1	6281	0.0011	0.7	0.1	0.25	2	100	0.1	0.6	100							
MB7D2	MB7D2	6262	0.0215	13.76	0.1	0.25	2	200	0.1	0.6	95	0.1	0.25	95	50	0.02	0.11	5
MB7E	MB7E	6130	0.0585	37.44	0.1	0.247	2	200	0.1	0.6	96	0.1	0.247	95	50	0.02	0.11	4
MB8	MB8	6093	0.0545	34.88	0.1	0.214	2	1000	0.1	0.6	85	0.1	0.214	15	200	0.02	0.24	15
MC1	AREA = 258.6 AC	6908	0.4041	258.62	0.1	0.239	2	1530	0.4281	0.6	100							
MC2A	AREA = 59.1 AC	6585	0.0923	59.07	0.1	0.25	2.2	1035	0.401	0.6	100							
MC2B	AREA = 0.9 AC	6188	0.0014	0.9	0.1	0.25	10.3	550	0.0764	0.6	100							
MC2K	MC2K	6170	0.0001	0.06	0.1	0.25	4.7	1225	0.1551	0.6	100							
MD1D	MD1d AREA = 5.9 AC	6358	0.0092	5.89	0.1	0.25	3.4	800	0.2375	0.6	100							
MD1B	MD1b AREA = 5.9 AC	6304	0.0092	5.89	0.1	0.25	3.6	800	0.2375	0.6	100							
MC2A2	MC2A2	6157	0.0061	3.9	0.1	0.25	4.7	1225	0.1551	0.6	100							
MD1C	MD1c AREA = 2.9 AC	6274	0.0045	2.88	0.1	0.25	7.9	500	0.2178	0.6	100							
MC2A3	MC2A3	6174	0.0044	2.82	0.1	0.25	4.7	1225	0.1551	0.6	100							
MC2D	AREA = 7.8 AC	6293	0.0122	7.81	0.1	0.25	4.7	1225	0.1551	0.6	100							
MC2E	AREA = 3.9 AC	6236	0.006	3.84	0.1	0.25	8.5	895	0.1777	0.6	100							
MC2G	AREA = 9.7 AC	6189	0.0151	9.66	0.1	0.25	90	395	0.2051	0.6	100							
MC2H	AREA = 2.4 AC	6220	0.0038	2.43	0.1	0.25	9.5	365	0.1096	0.6	100							
MC2L	MC2L	6085	0.0519	33.22	0.1	0.25	10.3	550	0.0764	0.6	100							
MC2I	AREA = 0.7 AC	6195	0.0011	0.7	0.1	0.25	24.3	225	0.1289	0.6	100							
MC2J	AREA = 0.6 AC	6163	0.0011	0.7	0.1	0.25	19.2	225	0.16	0.6	100							
MD4A	MD4A	6944	0.1163	74.43	0.1	0.25	2.5	500	0.414	0.6	100							
MD3C	MD3c AREA = 6.9 AC = 0.01078	6436	0.0108	6.91	0.1	0.25	4.4	500	0.3184	0.6	100							
MD3B	MD3b AREA = 8.5 AC = 0.01328	6521	0.0133	8.51	0.1	0.25	3.6	500	0.3073	0.6	100							
MD3A1	MD3a AREA = 25.4 AC = 0.03969	6712	0.0397	25.41	0.1	0.25	2.5	500	0.3458	0.6	100							
MD1A1	MD1a AREA = 3.0 AC = 0.00469	6294	0.0047	3.01	0.1	0.25	6.4	500	0.242	0.6	100							
MC2A4	AREA = 59.1 AC	6166	0.0022	1.41	0.1	0.25	2.2	1035	0.401	0.6	100							
MD1B1	MD1B1	6284	0.0157	10.05	0.1	0.25	2	800	0.05	0.6	51	0.1	0.25	95	50	0.02	0.11	49
MD1B2	MD1B2	6137	0.0392	25.09	0.1	0.25	2	800	0.08	0.6	94	0.1	0.25	95	50	0.02	0.11	6
MD1A	MD1a AREA = 3.0 AC = 0.00469	6054	0.0581	37.18	0.1	0.194	6.4	500	0.242	0.6	100							
MD2D	MD2D	6074	0.004	2.56	0.1	0.25	2	550	0.035	0.6	90	0.1	0.25	95	50	0.02	0.11	10
MD3D	MD3d	6237	0.0094	6.02	0.1	0.25	8	682	0.161	0.6	100							
MD1E1A	MD1E1A	6218	0.0018	1.15	0.1	0.25	2	600	0.08	0.6	95	0.1	0.25	95	50	0.02	0.11	5
MD6	MD6	6145	0.0072	4.61	0.1	0.25	7.5	635	0.156	0.6	100							
MD1	MD1 AREA = 5.7 AC = 0.00891 SQ	6218	0.0088	5.63	0.1	0.25	13	483	0.1451	0.6	100							
MD2A	MD2A	6146	0.0026	1.66	0.1	0.25	2	250	0.035	0.6	90	0.1	0.25	95	50	0.02	0.11	10
MD27	MD27	6109	0.0048	3.07	0.1	0.25	11	559	0.05	0.6	100							
MD28A	MD28A	6099	0.0043	2.75	0.1	0.25	15.2	559	0.05	0.6	100							
MD28B	MD28B	6087	0.0092	5.89	0.1	0.25	4.8	559	0.05	0.6	100							
MD3A	MD3a AREA = 25.4 AC = 0.03969	6059	0.0076	4.86	0.1	0.25	2.5	500	0.3458	0.6	100							
MD7B	MD7B	6251	0.0042	2.69	0.1	0.25	9	760	0.05	0.6	100							
MD4C	MD4c	6240	0.0056	3.58	0.1	0.25	8.8	626	0.05	0.6	100							
MD4E	MD4E	6253	0.0016	1.02	0.1	0.25	2	1500	0.283	0.6	100							
MD4D	MD4d	6246	0.0062	3.97	0.1	0.25	7.5	895	0.101	0.6	100							
MD9	MD9	6160	0.0106	6.78	0.1	0.25	7.9	824	0.253	0.6	100							
MD8	MD8	6139	0.0047	3.01	0.1	0.25	4.8	519	0.126	0.6	100							
MD6A	MD6A	6018	0.1279	81.86	0.1	0.219	7.5	635	0.156	0.6	100							
MD7D	MD7d	6652	0.0051	3.26	0.1	0.25	2	500	0.106	0.6	100							
MD7C	MD7c	6450	0.0061	3.9	0.1	0.25	3.2	500	0.106	0.6	100							
MD7E	MD7E	6273	0.0094	6.02	0.1	0.25	2	1200	0.313	0.6	90	0.1	0.25	15	1200	0.3	0.24	10
MD7F	MD7F	6194	0.0067	4.29	0.1	0.25	2	1200	0.313	0.6	90	0.1	0.25	15	1200	0.3	0.24	10
MD11	MD11	6164	0.0056	3.58	0.1	0.25	4.8	595	0.05	0.6	100							
MD2B	MD2B	6071	0.0056	3.58	0.1	0.25	2	690	0.046	0.6	90	0.1	0.25	95	50	0.02	0.11	10
ME3A	ME3A	6051	0.004	2.56	0.1	0.25	2	420	0.038	0.6	90	0.1	0.25	95	50	0.02	0.11	10
MD17	MD17	6174	0.0075	4.8	0.1	0.25	5.7	830	0.126	0.6	100							
MD18	MD18	6137	0.0051	3.26	0.1	0.25	6	930	0.148	0.6	100							
MD19	MD19	6118	0.0056	3.58	0.1	0.25	6.1	1055	0.21	0.6	100							
MD2A1	MD2A	6089	0.0019	1.22	0.1	0.25	2	250	0.035	0.6	90	0.1	0.25	95	50	0.02	0.11	10
MD2	MD2	6074	0.0059	3.78	0.1	0.25	18.8	295	0.125	0.6	100							
ME3A2	ME3A2	6049	0.0062	3.97	0.1	0.25	2	500	0.044	0.6	90	0.1	0.25	95	50	0.02	0.11	10
MD13	MD13	6987	0.4368	279.55	0.1	0.25	2	500	0.477	0.6	100							
ME6_19	ME6_19	6649	0.0236	15.1	0.1	0.25	15	330	0.053	0.6	100							
ME6_14	ME6_14	6522	0.0063	4.03	0.1	0.25	15	330	0.053	0.6	100							
MD12	MD12	6813	0.0428	27.39	0.1	0.25	2.5	500	0.106	0.6	100							

TABLE I.II.C.11 : POST-PROJECT HYDROLOGIC FACTORS HIGHWAY (CONT)

					PLANE 1 - NON-URBAN AND URBAN PLANE PARAMETERS								PLANE 2 - URBAN PLANE PARAMETERS						
SHED	DESCRIPTION	Centroid Elevation (ft)	BA AREA (mi^2)	BA AREA (acre)	Initial Abst (in)	Constant Infiltration (in/hr)	% Imperv. WARM	Overland Length (ft)	Overland Slope	Overland 'n' Value	Plane % of Shed	Initial Abst (in)	Constant Infiltration (in/hr)	% Imperv WARM	Overland Length (ft)	Overland Slope	Overland 'n' Value	Plane % of Shed
MD12B	MD12b	6338	0.0024	1.54	0.1	0.25	24.7	352	0.258	0.6	100							
MD12C	MD12c	6408	0.0084	5.38	0.1	0.25	6.5	500	0.205	0.6	100							
MD14B	MD14b	6354	0.0016	1.02	0.1	0.25	12.6	500	0.106	0.6	100							
MD14C	MD14c	6384	0.006	3.84	0.1	0.25	4.3	500	0.106	0.6	100							
ME6_13	1.17 AC	6393	0.0022	1.41	0.1	0.25	2.8	525	0.175	0.6	100							
ME0_3	3.07 AC	6355	0.0046	3.07	0.1	0.25	7.4	675	0.164	0.6	100							
MD13B	MD13B	6240	0.0392	25.09	0.1	0.25	2	500	0.477	0.6	100							
MD14	MD14	6338	0.006	3.84	0.1	0.25	9.3	663	0.165	0.6	100							
MD14A	MD14A	6330	0.0009	0.58	0.1	0.25	9.3	663	0.165	0.6	100							
ME3_5	ME3_5	6224	0.0007	0.45	0.1	0.25	2	300	0.1	0.6	65	0.1	0.25	15	300	0.1	0.24	35
MD15	MD15	6266	0.0073	4.67	0.1	0.25	9.2	870	0.159	0.6	100							
MD15A	MD15A	6228	0.0002	0.13	0.1	0.25	9.2	870	0.159	0.6	100							
MD16A	MD16A	6218	0.0036	2.3	0.1	0.25	10	772	0.125	0.6	100							
MD16	MD16	6245	0.0063	4.03	0.1	0.25	10	772	0.125	0.6	100							
MD13C	MD13C	6085	0.0060	4.35	0.1	0.25	2	500	0.477	0.6	100							
MD20	MD20	6107	0.002	1.28	0.1	0.25	9	740	0.05	0.6	100							
ME3B	ME3B	5987	0.0182	11.65	0.1	0.25	2	300	0.1	0.6	65	0.1	0.25	15	300	0.1	0.24	35
GS31B1	GS31B1	6087	0.0029	1.86	0.1	0.25	2	680	0.038	0.6	90	0.1	0.25	95	50	0.02	0.11	10
GS31B2	GS31B2	6079	0.0047	3.01	0.1	0.25	2	890	0.057	0.6	90	0.1	0.25	95	50	0.02	0.11	10
GS31B3	GS31B3	6068	0.0056	3.50	0.1	0.25	2	530	0.06	0.6	90	0.1	0.25	95	50	0.02	0.11	10
GS31B4	GS31B4	6054	0.0012	0.77	0.1	0.25	2	250	0.048	0.6	90	0.1	0.25	95	50	0.02	0.11	10
GS31B5	GS31B5	6052	0.0056	3.58	0.1	0.25	2	500	0.05	0.6	90	0.1	0.25	95	50	0.02	0.11	10
ME8_1	0.48 AC	6339	0.0007	0.45	0.1	0.25	28	180	0.066	0.6	100							
ME3_1	ME3_1	6336	0.0009	0.58	0.1	0.25	2	300	0.1	0.6	65	0.1	0.25	15	300	0.1	0.24	35
ME3_2	ME3_2	6335	0.0024	1.54	0.1	0.25	2	300	0.1	0.6	65	0.1	0.25	15	300	0.1	0.24	35
ME3_3	ME3_3	6301	0.0031	1.98	0.1	0.25	2	300	0.1	0.6	65	0.1	0.25	15	300	0.1	0.24	35
ME3_4	ME3_4	6267	0.0024	1.54	0.1	0.25	2	300	0.1	0.6	65	0.1	0.25	15	300	0.1	0.24	35
MD21	MD21	6186	0.0033	2.11	0.1	0.25	7.2	640	0.05	0.6	100							
ME3C3	ME3C3	6096	0.0066	4.22	0.1	0.25	2	300	0.1	0.6	65	0.1	0.25	15	300	0.1	0.24	35
ME3C1	ME3C1	6102	0.0016	1.02	0.1	0.25	2	300	0.1	0.6	65	0.1	0.25	15	300	0.1	0.24	35
ME4A	ME4A	5971	0.0939	60.1	0.1	0.232	2	500	0.12	0.6	90	0.1	0.232	15	300	0.12	0.24	10
ME6_11	0.13 AC	6328	0.0002	0.13	0.1	0.25	49.1	30	0.02	0.11	100							
ME6_10	0.21 AC	6328	0.0003	0.19	0.1	0.25	67.3	30	0.02	0.11	100							
ME6_25	7.81 AC	6275	0.0094	6.02	0.1	0.25	7.1	125	0.18	0.6	100							
ME6_33	ME6_33	6258	0.0026	1.66	0.1	0.25	15	330	0.053	0.6	100							
ME6_26	0.43 AC	6214	0.0008	0.51	0.1	0.25	3	200	0.13	0.6	100							
ME7_1	8.34 AC	6223	0.0127	8.13	0.1	0.25	4.6	470	0.2468	0.6	100							
ME7_2	0.25 AC	6160	0.0004	0.28	0.1	0.25	83.6	30	0.02	0.11	100							
ME7D6	ME7D6	6213	0.006	3.04	0.1	0.25	2	500	0.10	0.6	75	0.1	0.25	15	300	0.10	0.24	25
ME7D14	ME7D14	6138	0.0037	2.37	0.1	0.25	15	150	0.13	0.6	100							
ME7D16	ME7D16	6148	0.0018	1.15	0.1	0.25	15	177	0.045	0.6	100							
ME7D15	ME7D15	6145	0.0031	1.98	0.1	0.25	15	175	0.057	0.6	100							
ME7D24	ME7D24	6115	0.0022	1.41	0.1	0.25	15	144	0.09	0.6	100							
ME4B13	ME4B13	6103	0.0056	3.58	0.1	0.25	15	270	0.02	0.6	100							
ME7C4	ME7C4	6182	0.0054	3.46	0.1	0.25	2	500	0.15	0.6	5	0.1	0.25	15	300	0.15	0.24	95
ME7C5	ME7C5	6202	0.0061	3.9	0.1	0.25	2	500	0.15	0.6	5	0.1	0.25	15	300	0.15	0.24	95
ME4B3	ME4B3	6134	0.0029	1.86	0.1	0.25	2	300	0.05	0.6	15	0.1	0.25	15	300	0.05	0.24	85
ME4B12	ME4B12	6098	0.0065	4.16	0.1	0.25	15	430	0.018	0.6	100							
ME4B23	ME4B23	6061	0.0088	5.63	0.1	0.25	15	210	0.07	0.6	100							
ME4B22	ME4B22	6053	0.0074	4.74	0.1	0.25	15	220	0.1	0.6	100							
ME3C2	ME3C2	6113	0.0032	2.05	0.1	0.25	2	300	0.16	0.6	60	0.1	0.25	15	300	0.16	0.24	40
ME4B11	ME4B11	6068	0.0049	3.14	0.1	0.25	15	340	0.053	0.6	100							
ME4B21	ME4B21	6044	0.0024	1.54	0.1	0.25	15	220	0.1	0.6	100							
ME4B10	ME4B-10	6060	0.0027	1.73	0.1	0.25	15	150	0.08	0.6	100							
ME4B	ME4B	6037	0.0055	3.52	0.1	0.25	2	300	0.05	0.6	15	0.1	0.25	15	300	0.05	0.24	85
MG3_3B	MG3_3B	6928	0.146	93.44	0.1	0.25	2.9	675	0.225	0.6	100							
MG3_3C	MG3_3C	6589	0.0127	8.13	0.1	0.25	2.9	675	0.225	0.6	100							
ME6_12	14.48 AC	6583	0.0096	6.14	0.1	0.25	3.4	600	0.295	0.6	100							
ME6_16	10.41 AC	6370	0.0002	0.13	0.1	0.25	4.4	800	0.295	0.6	100							
ME6_18	2.92 AC	6343	0.0046	2.94	0.1	0.25	10.2	150	0.2133	0.6	100							
ME6_20	3.75 AC	6338	0.006	3.84	0.1	0.25	6.3	200	0.21	0.6	100							
ME6_24	0.70 AC	6287	0.0026	1.66	0.1	0.25	18.6	305	0.091	0.6	100							
ME6_23	4.19 AC	6222	0.0065	4.16	0.1	0.25	8.2	200	0.17	0.6	100							
ME6_32	0.39 AC	6194	0.0006	0.38	0.1	0.25	33.9	24	0.02	0.11	100							
ME6_28	4.93 AC	6163	0.0077	4.93	0.1	0.25	2	355	0.113	0.6	100							
ME627	1.77 AC	6157	0.0027	1.73	0.1	0.25	2	120	0.107	0.6	100							
ME6_29	1.37 AC	6127	0.0021	1.34	0.1	0.25	2	370	0.114	0.6	100							
ME6_30	1.27 AC	6090	0.002	1.28	0.1	0.25	2	295	0.088	0.6	100							
ME6A25	ME6A25	6086	0.0029	1.86	0.1	0.25	15	330	0.053	0.6	100							
ME7B	ME7B	6069	0.027	17.28	0.1	0.25	2	400	0.05	0.6	75	0.1	0.25	15	300	0.05	0.24	25
ME7A	ME7A	5927	0.1404	89.86	0.1	0.227	2	1300	0.192	0.6	10	0.1	0.227	15	300	0.19	0.24	90
MF1	MF1	5957	0.378	241.92	0.1	0.205	2	1500	0.087	0.6	100							
MF2	MF2	5903	0.0582	37.25	0.1	0.247	2	1000	0.07	0.6	100							
MD4_1A	MD4	5876	0.1899	121.54	0.1	0.25	2	1500	0.283	0.6	100							
MG4_1B	6.35 AC	6466	0.01	6.4	0.1	0.25	2.1	500	0.35	0.6	100							
MG5_2A	8.61 AC	6538	0.0134	8.58	0.1	0.25	3.2	800	0.2033	0.6	100							
MG3_1	1.78 AC	6408	0.0028	1.79	0.1	0.25	5.4	500	0.20	0.6	100							
MG3_1A	1.00 AC	6345	0.0016	1.02	0.1	0.25	5.4	480	0.20	0.6	100							
MG3_1C	1.47 AC	6530	0.0023	1.47	0.1	0.25	5.4	498	0.2811	0.6	100							
MG3_8	0.09 AC	6301	0.0002	0.13	0.1	0.25	90	30	0.02	0.11	100							
MG4_2	4.81 AC	6451	0.0072	4.61	0.1	0.25	3.1	600	0.284	0.6	100							
MG4_3B	MG4_3B	6300	0.0002	0.13	0.1	0.25	2	2300	0.326	0.6	95	0.1	0.25	15	600	0.25	0.24	5
MG4_3A	0.07 AC	6303	0.0001	0.06	0.1	0.25	90	30	0.02	0.11	100							
MG5_2B	0.06 AC	6330	0.0001	0.06	0.1	0.25	90	12	0.01	0.6	100							
MG4_4	0.10 AC	6322	0.0002	0.13	0.1	0.25	90	30	0.02	0.11	100							
MG4_5C	MG4_5C	6258	0.0078	4.99	0.1	0.25	2	2300	0.326	0.6	95	0.1	0.25	15	600	0.25	0.24	5
MG5_1A	18.90 AC	6608	0.0296	18.94	0.1	0.25	2.6	600	0.155	0.6	100							
MG5_1B	MG5_1B	6455	0.009	5.76	0.1	0.25	2	200	0.1	0.6	5	0.1	0.25	15	200	0.1	0.24	95
MG5_3	0.04 AC	6301	0.0001	0.06	0.1	0.25	90	30	0.02	0.11	100							
MG5_4	0.15 AC	6281	0.0003	0.19	0.1	0.25	90	30	0.02	0.11	100							
MG5_5	MG5_6	6284	0.0024	1.54	0.1	0.25	2	200	0.1	0.6	5	0.1	0.25	15	200	0.1	0.24	95
MG3_3A	0.25 AC	6533	0.0129	8.26	0.1	0.25	2.8	675	0.225	0.6	100							
MG3_2	2.58 AC	6398	0.004	2.56	0.1	0.25	6.1	390	0.2051	0.6	100							

TABLE I.II.C.12 : POST-PROJECT HYDROLOGIC FACTORS HIGHWAY (CONT)

					PLANE 1 - NON-URBAN AND URBAN PLANE PARAMETERS							PLANE 2 - URBAN PLANE PARAMETERS						
SHED	DESCRIPTION	Centroid Elevation (ft)	BA AREA (mi^2)	BA AREA (acre)	Initial Abst (in)	Constant Infiltration (in/hr)	% Imperv. WARM	Overland Length (ft)	Overland Slope	Overland 'n' Value	Plane % of Shed	Initial Abst (in)	Constant Infiltration (in/hr)	% Imperv WARM	Overland Length (ft)	Overland Slope	Overland 'n' Value	Plane % of Shed
MG3_4	014 AC	6297	0.0002	0.13	0.1	0.25	88.8	30	0.02	0.11	100							
MG3_1B	0.87 AC	6425	0.0014	0.9	0.1	0.25	5.4	500	0.28	0.6	100							
MG3_1D	0.57 AC	6370	0.0009	0.58	0.1	0.25	5.4	504	0.2770	0.6	100							
MG3_5	0.07 AC	6291	0.0001	0.08	0.1	0.25	90	30	0.02	0.11	100							
MG3_5A	MG3_5A	6261	0.0073	4.67	0.1	0.25	2.9	575	0.225	0.6	100							
ME6_1	10.24 AC	6361	0.0082	5.25	0.1	0.25	3.9	310	0.174	0.6	100							
ME6_2	1.28 AC	6365	0.0099	6.34	0.1	0.25	6.9	505	0.194	0.6	100							
ME6_3	0.02 AC	6286	0.0003	0.19	0.1	0.25	86.5	15	0.02	0.6	100							
ME6_5	1.40 AC	6278	0.0022	1.41	0.1	0.25	16.5	160	0.15	0.6	100							
ME6_7	0.01 AC	6264	0.0013	0.03	0.1	0.25	16.2	190	0.168	0.6	100							
ME6_8	.44 AC	6231	0.0007	0.45	0.1	0.25	87.8	20	0.02	0.6	100							
MG1_2	0.67 AC	6285	0.001	0.64	0.1	0.25	11.1	100	0.14	0.6	100							
MG1_3	1.89 AC	6315	0.0025	1.6	0.1	0.25	9.6	900	0.07	0.8	100							
MG1_1	1.38 AC	6336	0.0026	1.66	0.1	0.25	2	185	0.1946	0.6	100							
MG1_4	0.18 AC	6272	0.0003	0.19	0.1	0.25	46.9	30	0.02	0.11	100							
MG3_33	MG3_33	6210	0.0007	5.57	0.1	0.25	2.9	575	0.225	0.6	100							
ME6_8A	ME6_8A	6168	0.0006	0.38	0.1	0.25	15	330	0.053	0.6	100							
MG2	MG2	5975	0.1195	76.48	0.1	0.245	2	700	0.143	0.6	90	0.1	0.246	15	700	0.14	0.24	10
ME6_6	0.18 AC	6263	0.0003	0.19	0.1	0.25	79	30	0.02	0.11	100							
ME6_21	2.50 AC	6249	0.0039	2.5	0.1	0.25	12	200	0.125	0.6	100							
ME6_31	0.44 AC	6219	0.0007	0.45	0.1	0.25	42.9	24	0.02	0.11	100							
MG1B19	MG1B19	6177	0.0072	4.61	0.1	0.25	15	150	0.04	0.6	100							
MG1B20	MG1B20	6164	0.0039	2.5	0.1	0.25	15	240	0.08	0.6	100							
ME6A	ME6A	6164	0.003	1.92	0.1	0.25	2	300	0.12	0.6	50	0.1	0.25	15	300	0.12	0.24	50
MG1B26	MG1B26	6090	0.0038	2.43	0.1	0.25	15	250	0.096	0.6	100							
MG1B	MG1B	6094	0.0119	7.62	0.1	0.25	2	300	0.1	0.6	50	0.1	0.25	15	200	0.1	0.24	50
ME6A27	ME6A27	6055	0.0094	6.02	0.1	0.25	15	230	0.095	0.6	100							
MG1A	MG1A	6022	0.0185	11.84	0.1	0.25	2	200	0.1	0.6	50	0.1	0.25	15	200	0.1	0.24	50
MG5B1	MG5B1	6456	0.1242	79.48	0.1	0.25	2	200	0.1	0.6	5	0.1	0.25	15	200	0.1	0.24	95
MG5A2	MG5A2	6240	0.0613	39.23	0.1	0.25	2	200	0.1	0.6	5	0.1	0.25	15	200	0.1	0.24	95
MG6B	MG6B	6056	0.0479	30.66	0.1	0.201	2	1000	0.25	0.6	85	0.1	0.201	15	400	0.25	0.24	15
MG5A1	MG5A1	6069	0.0134	0.58	0.1	0.25	2	200	0.1	0.6	5	0.1	0.25	15	200	0.1	0.24	95
MG7	MG7	5894	0.1439	92.1	0.1	0.207	2	800	0.25	0.6	100							
NS24A	NS24A	6045	0.0297	19.01	0.1	0.25	2	900	0.1	0.6	100							
NS24B	NS24B	5932	0.012	7.68	0.1	0.25	2	300	0.1	0.6	100							
NS24C	NS24C	5862	0.04	25.6	0.1	0.182	2	800	0.1	0.6	100							
NS25	NS25	5804	0.037	23.68	0.1	0.248	2	800	0.05	0.6	100							
NS26	NS26	5842	0.1102	70.53	0.1	0.122	2	1000	0.05	0.8	100							
NS22A	NS22A	6070	0.0103	6.59	0.1	0.25	2	750	0.1	0.6	100							
NS22C	NS22C	5966	0.0063	4.03	0.1	0.25	2	300	0.1	0.6	100							
NS23A	NS23A	5878	0.0374	23.94	0.1	0.19	2	850	0.07	0.6	100							
NS27	NS27	5834	0.0574	36.74	0.1	0.1	2	830	0.03	0.6	100							
NS28B	NS28B	5818	0.0417	26.69	0.1	0.1	2.85	500	0.01	0.6	100							
E85Z	E85Z	5964	0.0291	18.62	0.1	0.25	2	400	0.02	0.8	100							
NS28A	NS28A	5841	0.0415	26.56	0.1	0.1	2	500	0.01	0.6	100							
NS22	NS22	6304	0.2037	130.37	0.1	0.25	2	2100	0.08	0.6	100							
NS31	NS31	6214	0.0592	37.89	0.1	0.25	2	1250	0.1	0.6	100							
NS22B	NS22B	6014	0.0098	6.27	0.1	0.25	2	600	0.1	0.6	100							
NS23B	NS23B	5866	0.1061	67.9	0.1	0.191	2	1350	0.05	0.6	100							
NS32A	NS32A	6186	0.0191	12.22	0.1	0.25	2	600	0.1	0.6	100							
NS32B	NS32B	5855	0.1481	94.78	0.1	0.165	2	1500	0.08	0.6	100							
NS1	BASIN 1 - 330 Ac	7025	0.5174	331.14	0.1	0.178	2	3300	0.24	0.8	57	0.1	0.178	2	3300	0.24	0.6	43
NS2	BASIN 2 - 267 Ac	7697	0.4184	267.78	0.1	0.25	2	2800	0.25	0.8	54	0.1	0.25	2	2800	0.25	0.6	46
NS3	BASIN 3 - 331 Ac	7343	0.5218	333.95	0.1	0.25	65	2850	0.18	0.24	3	0.1	0.25	2	2850	0.18	0.6	98
NS4	BASIN 4 - 166 Ac	6727	0.2602	166.53	0.1	0.25	65	2110	0.22	0.24	29	0.1	0.25	2	2110	0.22	0.6	71
NS5	BASIN 5 - 21 Ac	6520	0.0319	20.42	0.1	0.25	65	1400	0.25	0.24	36	0.1	0.25	2	1400	0.25	0.6	64
NS6	BASIN 6 - 178 Ac	6685	0.2162	138.97	0.1	0.25	65	3100	0.27	0.24	71	0.1	0.25	2	3100	0.27	0.6	29
NS7	BASIN 7 - 30 Ac	6362	0.0602	38.53	0.1	0.25	65.79	1570	0.19	0.24	69	0.1	0.25	2	1570	0.19	0.6	31
NS8	BASIN 8 - 673 Ac	7113	1.1304	723.46	0.1	0.239	2	4200	0.21	0.8	92	0.1	0.239	2	4200	0.21	0.6	8
NS9	BASIN 9 - 144 Ac	6837	0.1855	118.72	0.1	0.249	2	4400	0.2	0.6	100							
NS10	BASIN 10 - 214 Ac	6657	0.3581	229.18	0.1	0.223	2	3905	0.2	0.6	100							
NS11	BASIN 11 - 60 Ac	6559	0.0389	24.9	0.1	0.249	65.07	1600	0.34	0.24	6	0.1	0.249	2	1600	0.34	0.6	95
NS11B	BASIN 11 - 60 Ac	6270	0.0546	34.94	0.1	0.25	72.44	1600	0.34	0.24	6	0.1	0.25	2	1600	0.34	0.6	95
NS12	BASIN 12 - 40 Ac	6210	0.0619	39.62	0.1	0.25	65	400	0.1	0.24	71	0.1	0.25	2	400	0.1	0.8	30
NS13	BASIN 13 - 15 Ac	6452	0.1459	93.38	0.1	0.25	65	500	0.16	0.24	86	0.1	0.25	98	500	0.16	0.11	14
NS14	BASIN 14 - 47 Ac	6261	0.0434	27.78	0.1	0.25	65	775	0.35	0.24	90	0.1	0.25	98	775	0.35	0.11	10
NS14B	NS14B	6176	0.0204	13.06	0.1	0.25	2	500	0.1	0.6	100							
NS20B	NS20B	6358	0.0322	20.61	0.1	0.25	2	640	0.1	0.8	100							
NS15	NS15	6103	0.086	55.04	0.1	0.25	2	1000	0.08	0.8	100							
NS16	NS16	6564	0.1019	65.22	0.1	0.248	2.13	1800	0.1	0.8	100							
NS17	NS17	6282	0.0811	51.9	0.1	0.25	3.47	1500	0.08	0.6	100							
NS18	NS18	6405	0.1877	120.13	0.1	0.25	2.61	3200	0.1	0.6	100							
NS19	NS19	6169	0.0434	27.78	0.1	0.25	3.07	1600	0.05	0.6	100							
NS20	NS20	6070	0.0548	35.07	0.1	0.25	2	600	0.08	0.8	100							
NS21	NS21	6058	0.139	88.96	0.1	0.248	2.05	1450	0.06	0.8	100							
NS30D	NS30D	6286	0.0577	36.93	0.1	0.25	2	900	0.08	0.6	100							
NS30A	NS30A	6014	0.0266	17.02	0.1	0.244	2	800	0.08	0.8	100							
NS30B	NS30B	5979	0.14	89.6	0.1	0.280	2	1600	0.1	0.6	100							
NS30E	NS30E	6133	0.0022	1.41	0.1	0.25	2	200	0.1	0.6	100							
NS30F	NS30F	6158	0.0023	1.47	0.1	0.25	2	200	0.1	0.6	100							
NS30C	NS30C	5872	0.1237	79.17	0.1	0.151	2	1600	0.08	0.8	100							
NS33B	NS33B	5918	0.0301	19.28	0.1	0.1	2.49	1000	0.05	0.8	100							
NS34	NS34	6122	0.0437	27.97	0.1	0.25	2	900	0.08	0.6	100							
NS35	NS35	5869	0.1517	97.09	0.1	0.185	2.15	1900	0.05	0.6	100							
XMAR1	XMAR1	6837	0.2922	187.01	0.1	0.244	2	1900	0.1	0.6	100							
XMAR2	XMAR2	6837	0.4066	260.22	0.1	0.241	2	2200	0.1	0.8	100							
XMAR3	XMAR3	6837	0.6221	398.14	0.1	0.248	2	3500	0.1	0.8	100							
XMAR4	XMAR4	6837	0.2489	159.3	0.1	0.25	2	2300	0.1	0.8	100							
XMAR5	XMAR5	6837	0.3335	213.44	0.1	0.25	2	1700	0.1	0.6	100							
XMAR6	XMAR6	6837	0.1147	73.41	0.1	0.25	2	1500	0.1	0.6	100							
XMAR7	XMAR7	6837	0.3439	220.1	0.1	0.25	2	2800	0.1	0.6	100							
XMAR8	XMAR8	6837	0.2218	141.95	0.1	0.25	2	2200	0.1	0.8	100							
XMAR9	XMAR9	6837	0.25	160	0.1	0.25	2	2100	0.1	0.8	100							

TABLE I.II.C.13 : POST-PROJECT HYDROLOGIC FACTORS HIGHWAY (CONT)

					PLANE 1 - NON-URBAN AND URBAN PLANE PARAMETERS							PLANE 2 - URBAN PLANE PARAMETERS						
SHED	DESCRIPTION	Centroid Elevation (ft)	BA AREA (mi^2)	BA AREA (acre)	Initial Abst (in)	Constant Infiltration (in/hr)	% Imperv. WARM	Overland Length (ft)	Overland Slope	Overland 'n' Value	Plane % of Shed	Initial Abst (in)	Constant Infiltration (in/hr)	% Imperv WARM	Overland Length (ft)	Overland Slope	Overland 'n' Value	Plane % of Shed
XMAR10	XMAR10	6837	0.2272	145.41	0.1	0.25	2	2300	0.1	0.8	100							
XMAR11	XMAR11	6837	0.1037	66.37	0.1	0.185	2	1100	0.1	0.8	100							
XMAR12	XMAR12	6837	0.1361	87.1	0.1	0.206	2	1250	0.1	0.8	100							
XMAR13	XMAR13	6837	0.2679	171.46	0.1	0.249	2	1800	0.1	0.8	100							
XMAR14	XMAR14	6837	0.0483	30.91	0.1	0.25	3.52	500	0.1	0.8	100							
XMAR15	XMAR15	6837	0.014	8.96	0.1	0.25	2.23	500	0.1	0.8	100							
XMAR17	XMAR17	6837	0.2288	146.43	0.1	0.22	2	1300	0.1	0.8	100							
MAR19A	MAR19A	6744	0.0295	18.88	0.1	0.25	7.48	1000	0.1	0.6	100							
MAR19B	MAR19B	6120	0.0074	4.74	0.1	0.25	4.11	500	0.1	0.8	100							
XMAR18	XMAR18	6837	0.1517	97.09	0.1	0.248	2	1600	0.1	0.6	100							
XMAR20	XMAR20	6837	0.2009	128.58	0.1	0.244	2	1700	0.1	0.8	100							
MAR21A	MAR21A	6190	0.0602	38.53	0.1	0.25	2.47	500	0.1	0.8	100							
MAR21B	MAR21B	6055	0.0241	15.42	0.1	0.245	4.75	500	0.1	0.6	100							
MAR22B	MAR22B	5942	0.0266	17.02	0.1	0.23	3.02	500	0.1	0.8	100							
MAR22A	MAR22A	6025	0.0165	10.56	0.1	0.25	3.4	500	0.1	0.8	100							
XMAR23	XMAR23	6837	0.0439	28.1	0.1	0.138	2.69	500	0.05	0.6	100							
XMAR24	XMAR24	6837	0.0055	3.52	0.1	0.1	2.43	200	0.02	0.8	100							
XMAR25	XMAR25	6837	0.0147	9.41	0.1	0.126	7.95	1000	0.02	0.8	100							
NS38A	NS38A	5840	0.0118	7.55	0.1	0.197	2	1000	0.02	0.6	100							
E30A	Drains Away	5841	0.0064	4.1	0.1	0.25	8	600	0.038	0.8	100							

TABLE I.II.C.14A : EST. POST-PROJECT PEAK FLOW RATES – WARM EVENT-HIGHWAY TRAIL

HEC-1 Watershed Node	HEC-RAS River/Stream	HEC-RAS Cross Section	500-YEAR FLOW (cfs)	100-YEAR FLOW (cfs)	10-YEAR FLOW (cfs)	2-YEAR FLOW (cfs)
YE20D	Martis Creek / NW	100	477	345.5	179.4	62.6
UE30CR	Martis Creek / NW	96	548.7	399.2	208	73
YE40BC	Martis Creek / NW	91	632.4	463.7	243.8	85.7
YE80C	Martis Creek / NW	89	1097	805.8	428.6	156.4
E40C	Martis Creek / NW2	110	26.2	19.2	10	3.3
YE40D	Martis Creek / NW2	108	37.9	27.6	14.4	4.7
YE40DC	Martis Creek / NW3	79.5	1134.8	833.4	443	161.1
YE85	Martis Creek / NW3	78	1468.9	1075.9	566.1	192.5
YE85B	Martis Creek / NW3	77	1490.8	1091.5	574.3	195.7
YE85CC	Martis Creek / NW3	73	604.6	557.1	500.2	196.5
VMF1CR	Martis Creek / NW4	69.5	8564.1	6190.3	3077.9	1100.3
VMF2CR	Martis Creek / NW4	68.5	8610.7	6225.2	3097.8	1106
YNS26	Martis Creek / NW4	65.5	9600.3	6951	3461.1	1265
YNS27	Martis Creek / NW5	59.5	7744.3	6205.9	3837.8	1451.6
YNS28B	Martis Creek / NW5	57.5	7786.5	6240.8	3863	1463.8
YNS28A	Martis Creek / NW5	56.5	7814.4	6264.3	3879.9	1472.5
YNSALL	Martis Creek / NW5	56	10636	8335.5	4942.7	1982.1
YR21B	Martis Creek / W1	49.5	1639.7	1065	482.8	241.2
MAR22B	Martis Creek / W1	47	231	221.2	209	200
YR22A	Martis Creek / W1	44	252.1	236.4	217	202.7
XMAR23	Martis Creek / W1	41	296.6	266.9	231.1	208.4
YMAR23	Martis Creek / W1	40	459.8	384	289.9	225.1
XMAR24	Martis Creek / W1	39.5	246.8	244.3	239.7	212.4
UHWY	Martis Creek / MAIN	39.5	8463	7076.9	4442.1	2142.8
NS22	Martis Creek / SP2	189.5	142.7	100	42.5	12.8
YNS31	Martis Creek / SP2	188.5	194.6	135.7	59.2	17.6
YNS22B	Martis Creek / SP2	185.5	203.3	141.8	61.7	19
MG7	Martis Creek / SP1	199	1171.5	862	461.6	180.1
YNS24C	Martis Creek / SP1	195.5	1267.4	930.6	498.2	192.5
NS18	Martis Creek / SP1	20	112.8	78.7	30.8	10.7

TABLE I.II.C.14B : PROJECT FLOW CHANGES – WARM EVENT-HIGHWAY TRAIL

HEC-1 Watershed Node	HEC-RAS River/Stream	HEC-RAS Cross Section	POST-PROJECT - PRE-PROJECT DIFFERENCE				POST - PRE DIFFERENCE %			
			500-YEAR (cfs)	100-YEAR (cfs)	10-YEAR (cfs)	2-YEAR (cfs)	500-YEAR (cfs)	100-YEAR (cfs)	10-YEAR (cfs)	2-YEAR (cfs)
YE20D	Martis Creek / NW	100	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00
UE30CR	Martis Creek / NW	96	0.1	0.1	0.1	0.1	0.02	0.03	0.05	0.14
YE40BC	Martis Creek / NW	91	0.2	0.3	0.3	0.4	0.03	0.06	0.12	0.47
YE80C	Martis Creek / NW	89	0.3	0.3	0.3	0.4	0.03	0.04	0.07	0.26
E40C	Martis Creek / NW2	110	0.1	0.1	0.1	0.1	0.38	0.52	1.00	3.03
YE40D	Martis Creek / NW2	108	0.1	0.1	0.1	0.1	0.26	0.36	0.69	2.13
YE40DC	Martis Creek / NW3	79.5	0.3	0.4	0.4	0.6	0.03	0.05	0.09	0.37
YE85	Martis Creek / NW3	78	0.5	0.6	0.5	0.7	0.03	0.06	0.09	0.36
YE85B	Martis Creek / NW3	77	0.5	0.6	0.6	0.8	0.03	0.05	0.10	0.41
YE85CC	Martis Creek / NW3	73	0.1	0.1	0.6	0.7	0.02	0.02	0.12	0.36
VMF1CR	Martis Creek / NW4	69.5	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00
VMF2CR	Martis Creek / NW4	68.5	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00
YNS26	Martis Creek / NW4	65.5	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00
YNS27	Martis Creek / NW5	59.5	0.1	0.0	0.7	0.9	0.00	0.00	0.02	0.06
YNS28B	Martis Creek / NW5	57.5	0.1	0.1	0.7	0.9	0.00	0.00	0.02	0.06
YNS28A	Martis Creek / NW5	56.5	0.1	0.1	0.6	0.9	0.00	0.00	0.02	0.06
YNSALL	Martis Creek / NW5	56	0.0	0.7	1.9	1.8	0.00	0.01	0.04	0.09
YR21B	Martis Creek / W1	49.5	0.1	0.3	-0.3	0.5	0.01	0.03	-0.06	0.21
MAR22B	Martis Creek / W1	47	0.3	0.0	0.0	0.1	0.13	0.00	0.00	0.05
YR22A	Martis Creek / W1	44	0.6	0.1	0.1	0.2	0.24	0.04	0.05	0.10
XMAR23	Martis Creek / W1	41	0.2	-0.1	0.2	0.3	0.07	-0.04	0.09	0.14
YMAR23	Martis Creek / W1	40	0.6	0.2	0.3	0.3	0.13	0.05	0.10	0.13
XMAR24	Martis Creek / W1	39.5	0.1	0.0	0.0	0.1	0.04	0.00	0.00	0.05
UHWY	Martis Creek / MAIN	39.5	0.4	0.6	1.5	2.1	0.00	0.01	0.03	0.10
NS22	Martis Creek / SP2	189.5	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00
YNS31	Martis Creek / SP2	188.5	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00
YNS22B	Martis Creek / SP2	185.5	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00
MG7	Martis Creek / SP1	199	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00
YNS24C	Martis Creek / SP1	195.5	0.0	0.0	0.0	0.0	0.00	0.00	0.00	0.00
NS18	Martis Creek / SP1	20	0.2	0.3	0.5	0.2	0.18	0.38	1.62	1.87

TABLE I.II.C.15 : EST. POST-PROJECT PEAK FLOW RATES – WARM EVENT-PEAK OF ALL ALTERNATIVES

HEC-1 Watershed Node	HEC-RAS River/Stream	HEC-RAS Cross Section	500-YEAR FLOW (cfs)	100-YEAR FLOW (cfs)	10-YEAR FLOW (cfs)	2-YEAR FLOW (cfs)	POST-PROJECT - PRE-PROJECT DIFFERENCE 500-YEAR (cfs)	100-YEAR (cfs)	10-YEAR (cfs)	2-YEAR (cfs)
YE20D	Martis Creek / NW	100	477	345.5	179.4	62.6	0.0	0	0	0
UE30CR	Martis Creek / NW	96	548.7	399.2	208	73	0.1	0.1	0.1	0.1
YE40BC	Martis Creek / NW	91	632.4	463.7	243.8	85.7	0.2	0.3	0.3	0.4
YE80C	Martis Creek / NW	89	1097	805.8	428.6	156.4	0.3	0.3	0.3	0.4
E40C	Martis Creek / NW2	110	26.2	19.2	10	3.3	0.1	0.1	0.1	0.1
YE40D	Martis Creek / NW2	108	37.9	27.6	14.4	4.7	0.1	0.1	0.1	0.1
YE40DC	Martis Creek / NW3	79.5	1134.8	833.4	443	161.1	0.3	0.4	0.4	0.6
YE85	Martis Creek / NW3	78	1468.9	1076	566.1	192.7	0.5	0.7	0.6	0.9
YE85B	Martis Creek / NW3	77	1490.9	1091.6	574.4	196	0.6	0.7	0.7	1
YE85CC	Martis Creek / NW3	73	604.6	557.2	500.3	196.8	0.1	0.1	0.6	1
VMF1CR	Martis Creek / NW4	69.5	8564.1	6190.3	3077.9	1100.3	0.0	0	0	0
VMF2CR	Martis Creek / NW4	68.5	8610.7	6225.2	3097.8	1106	0.0	0	0	0
YNS26	Martis Creek / NW4	65.5	9600.7	6951.2	3461.4	1265.1	0.4	0.2	0.3	0.1
YNS27	Martis Creek / NW5	59.5	7744.5	6206.1	3838.1	1451.9	0.3	0.2	1	1.2
YNS28B	Martis Creek / NW5	57.5	7786.7	6241	3863.3	1464.1	0.3	0.3	1	1.2
YNS28A	Martis Creek / NW5	56.5	7814.6	6264.4	3880.3	1472.8	0.3	0.2	1	1.2
YNSALL	Martis Creek / NW5	56	10636	8335.7	4942.7	1982.6	0.0	0.9	1.9	2.3
YR21B	Martis Creek / W1	49.5	1639.7	1065	483.1	241.2	0.1	0.3	0	0.5
MAR22B	Martis Creek / W1	47	231	221.2	209	200	0.3	0	0	0.1
YR22A	Martis Creek / W1	44	252.1	236.4	217	202.7	0.6	0.1	0.1	0.2
XMAR23	Martis Creek / W1	41	296.6	267	231.1	208.4	0.2	0	0.2	0.3
YMAR23	Martis Creek / W1	40	459.8	384	289.9	225.1	0.6	0.2	0.3	0.3
XMAR24	Martis Creek / W1	39.5	246.8	244.3	239.7	212.4	0.1	0	0	0.1
UHWY	Martis Creek / MAIN	39.5	8463	7077	4442.1	2142.9	0.4	0.7	1.5	2.2
NS22	Martis Creek / SP2	189.5	142.7	100.1	42.5	12.8	0.1	0	0.1	0
YNS31	Martis Creek / SP2	188.5	194.7	135.8	59.4	17.7	0.1	0.1	0.1	0.1
YNS22B	Martis Creek / SP2	185.5	203.4	141.9	61.8	19.2	0.1	0.1	0.2	0.2
MG7	Martis Creek / SP1	199	1172	862	461.6	180.2	0.5	0	0	0.1
YNS24C	Martis Creek / SP1	195.5	1267.9	930.6	498.2	192.9	0.5	0	0	0.4
NS18	Martis Creek / SP1	20	112.8	78.7	30.8	10.7	0.2	0.3	0.5	0.2
E30A	Offsite		6.8	4.9	2.5	0.9	0.3	0.3	0.3	0.3

1.II.D Peak Flow Impacts :

Some minor increases to peak flow rates are demonstrated in Tables I.II.C.7, I.II.C.14 and I.II.C.15. These potential changes to peak flows will be evaluated in the included hydraulic analysis to determine if water surface elevations are impacted by the peak flow rate changes. The values of the worst case peak flow of the Highway Trail or Valley Trail alternatives is shown in Table I.II.C.15, and these values are used in the post-project WARM event hydraulic analysis.

1-III. Hydraulics:

1-III.A Flood Plain Analysis:

The existing project site area includes FEMA Zone A delineation at Martis Creek as shown on the FEMA Flood Insurance Rate Map. A reduced scale version of this map is provided in Figure 1-III.A. The floodplain near the trail system results from local watershed runoff combining with a downstream backwater condition. The backwater condition has been estimated to flood to approximately elevation 5845 at the downstream side of Highway 267. The hydraulic analysis for the FROZEN event condition provides the maximum 100-year flood elevations within the project area. The FROZEN analysis results should be used for determining the required elevations of proposed insurable structures, and for evaluating potential 100-year storm event flood damages within the watershed. The hydraulic analysis for the WARM event condition is used to evaluate potential impacts of the project to watershed hydrology.

The Army Corps HEC-RAS software was utilized to develop the included hydraulic models for the proposed MVRT project. Floodplain limits were determined for the 2-year, 10-year and 100-year events, for the pre-project and post-project conditions, and for the warm season event and frozen ground conditions events. Floodplain elevations are shown on the included FP-1W, FP-2W, FP-1F and FP-2F for the 100-year storm event for each of the conditions. FP-1W and FP-1F show the pre-project conditions for the WARM and FROZEN storm events respectively.

The hydraulic evaluations also included analysis of the 500-year event which is not plotted or shown in the included exhibits, however, the results are summarized in the appendices of this report, with the other hydraulic results. The HEC-RAS summary tables for all events are provided in Appendices C and D for the pre-project and post-project respectively. Note cross culverts and bridges are being evaluated for the "FROZEN" & WARM event peak 100-year flow rates determined in the HEC-1 post-project analysis. Future bridges proposed with the project are included in the HEC-RAS analysis.

Culvert sizes were evaluated per project designs as described in Table 1.III.B below. Alternative culverts sizes may be substituted at the time of design with adequate support for design capacity.

FIGURE 1-III.1 - FIRMETTE MAP

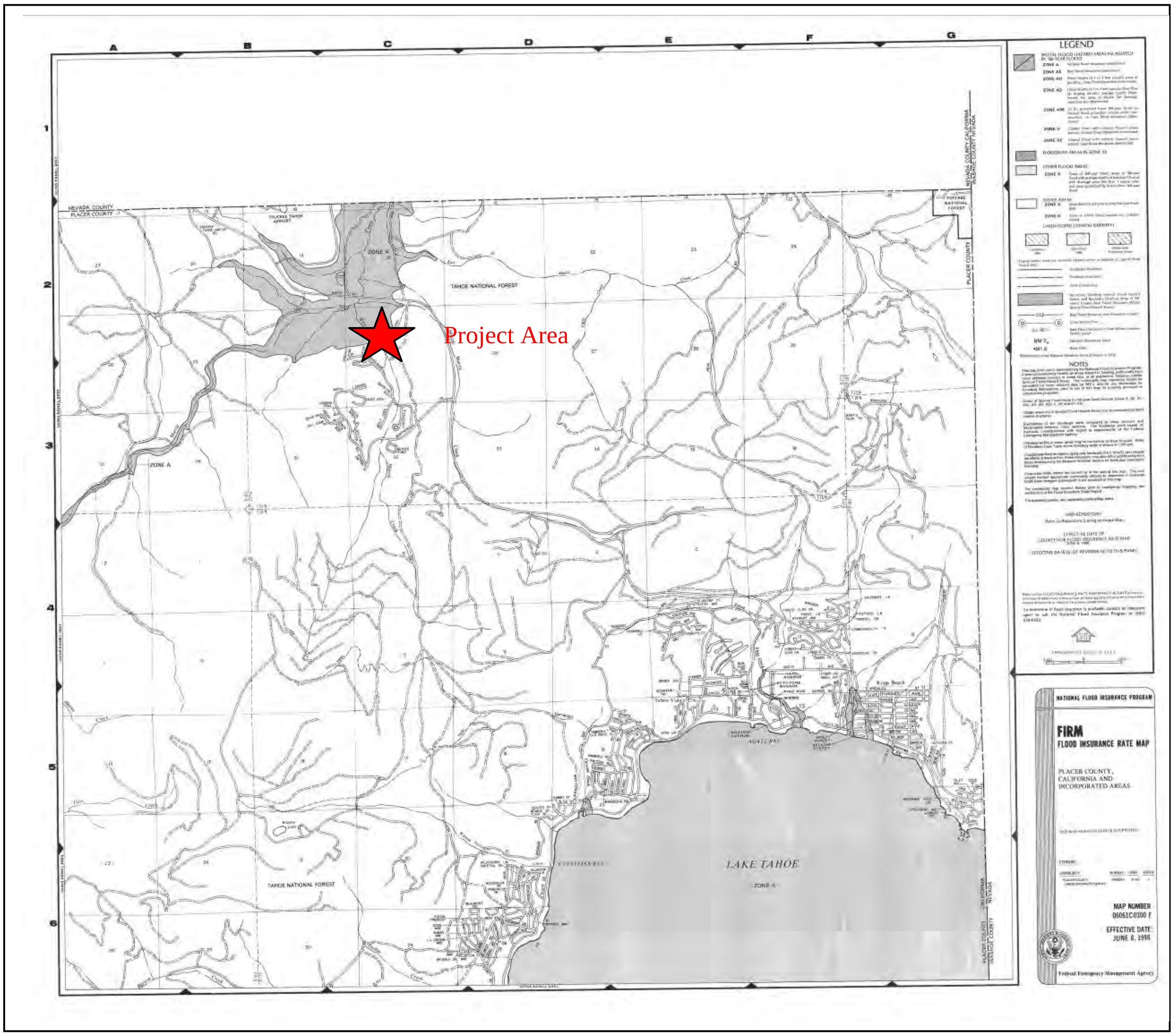
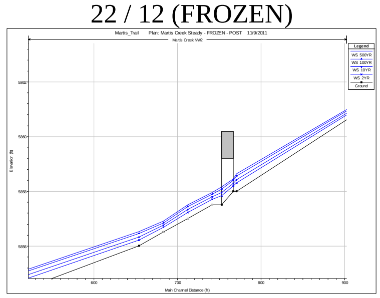
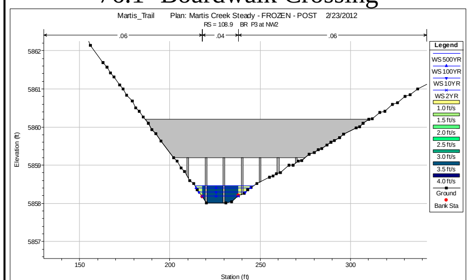
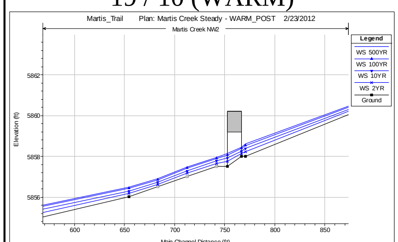
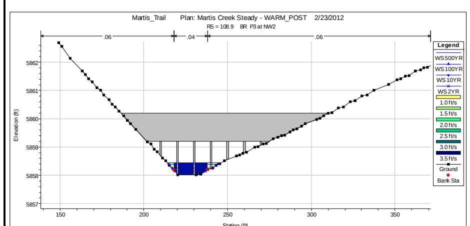
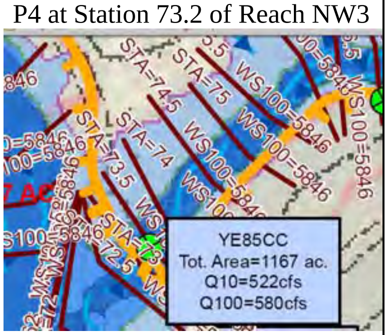
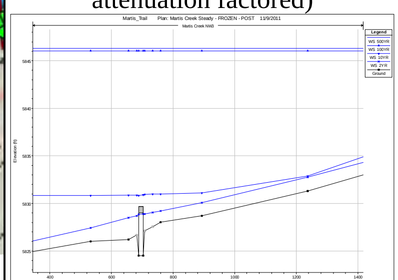
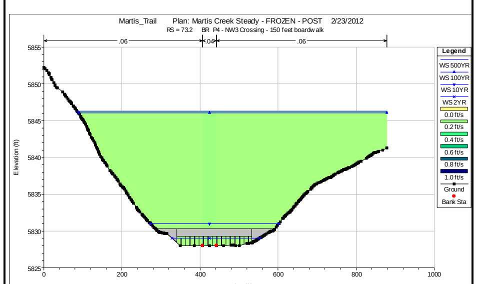
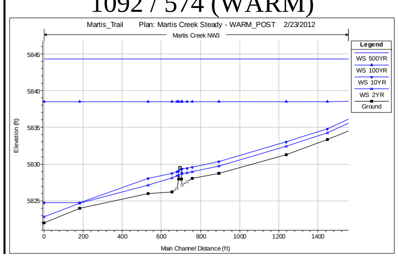
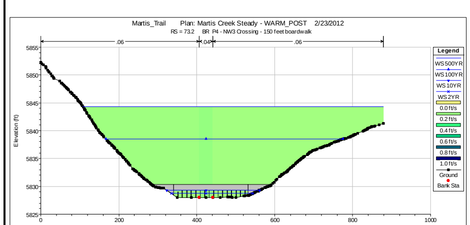
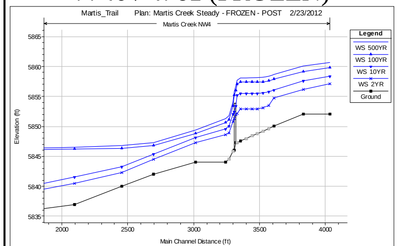
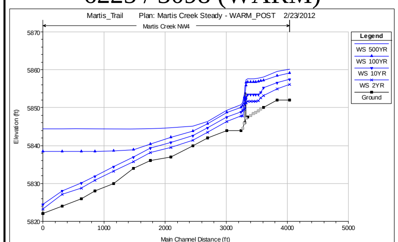
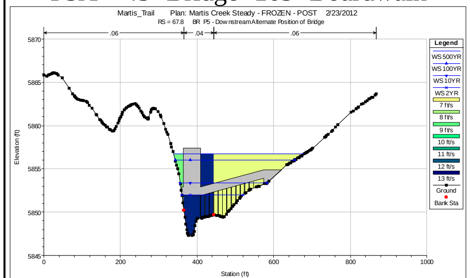
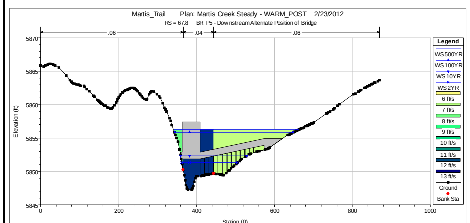
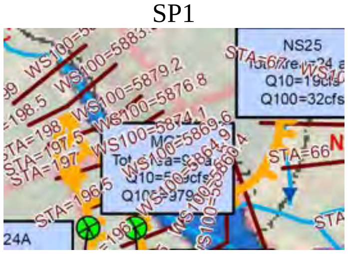
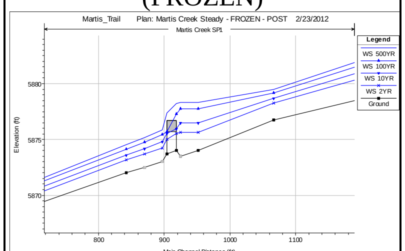
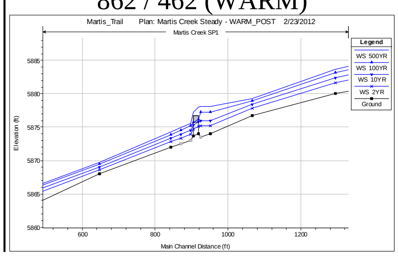
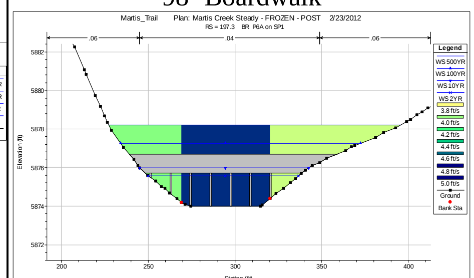
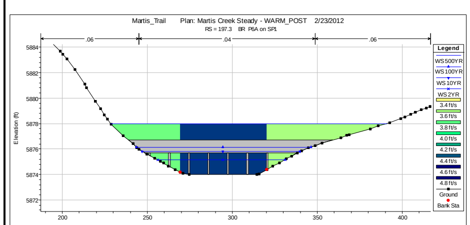
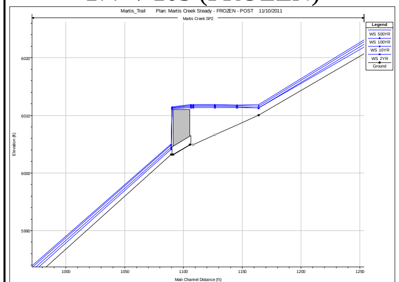
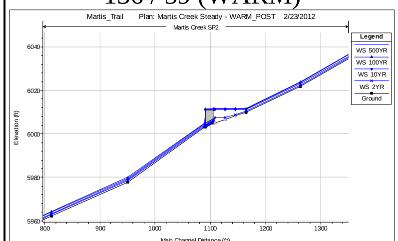
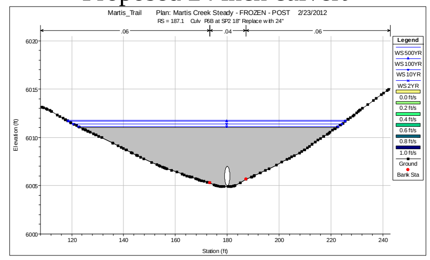
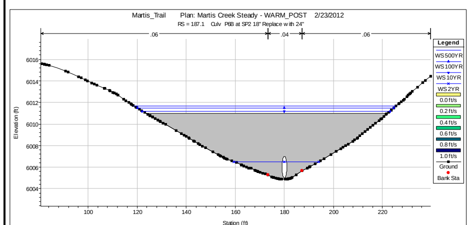
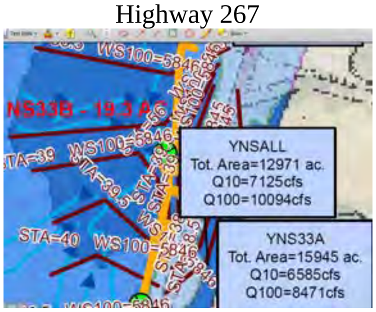
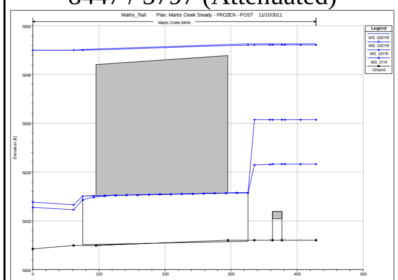
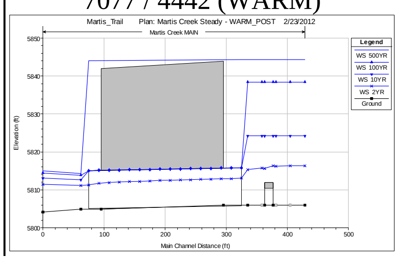
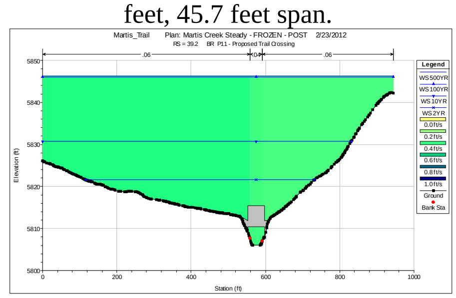
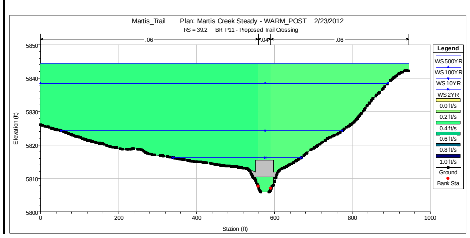


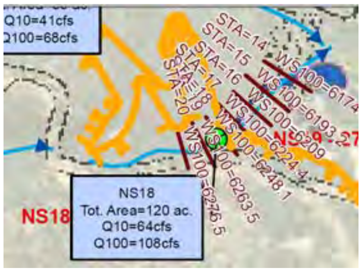
TABLE 1.III.A: Project Bridges and Culverts - Proposed

Culvert Station/Location	Frozen Event Peak Q100/Q10 Warm Event Peak Q100/Q10 (cfs)	Proposed Culvert Size
P3 at Station 108.9 of Reach NW2 	22 / 12 (FROZEN) 	76.1' Boardwalk Crossing 
	19 / 10 (WARM) 	
P4 at Station 73.2 of Reach NW3 	1247 / 739 (FROZEN) (580 / 522 with backwater attenuation factored) 	192' Boardwalk Crossing 
	1092 / 574 (WARM) 	

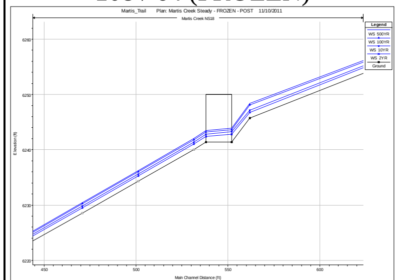
P5A at Station 67.8 of Reach NW4 	7740 / 4761 (FROZEN)  6225 / 3098 (WARM) 	P5A – 45' Bridge+165' Boardwalk  
P6A at Station 197.3 of Reach SP1 	1058 / 646 (FROZEN)  862 / 462 (WARM) 	98' Boardwalk  

P6B at Station 187.1 of Reach SP2	177 / 105 (FROZEN)	Proposed 24 inch culvert
	 136 / 59 (WARM) 	 
P11 at Station 39.2 of MAIN near Highway 267	8447 / 5797 (Attenuated)	New Franks Fish Bridge widened to 12 feet, 45.7 feet span.
	 7077 / 4442 (WARM) 	 

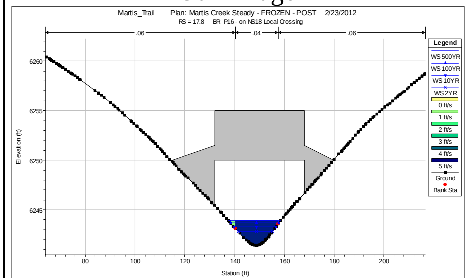
P16 at Station 17.8 of NS18



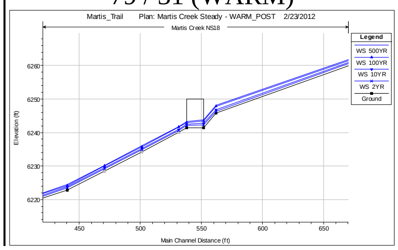
108 / 64 (FROZEN)



36’ Bridge



79 / 31 (WARM)



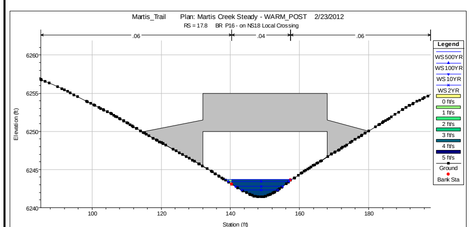


TABLE 1.III.B: Additional Proposed Culverts

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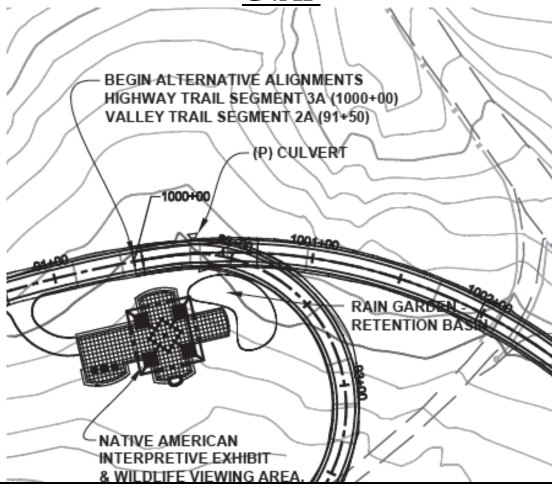
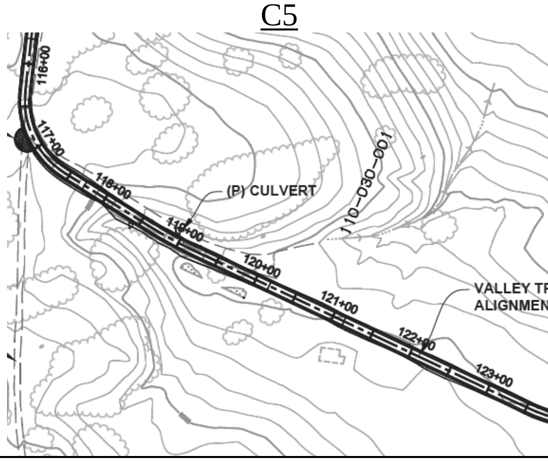
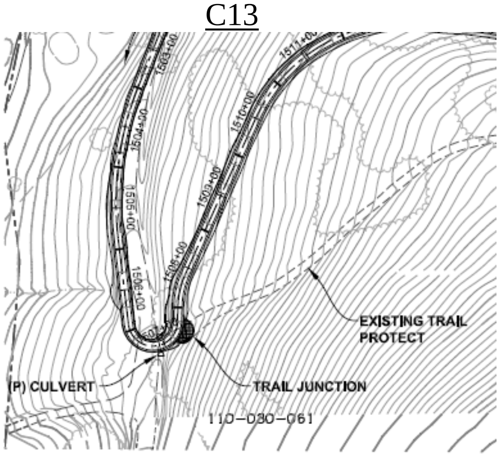
<tr><th>Culvert Station/Location</th><th>Culvert Design Information</th></tr>
<tr><td>C4AF

</td><td>Tributary Watershed Area= 1.5 ac
Part of Watershed: E85C

FROZEN 100YR Q= 1.7cfs
FROZEN 10YR Q= 1.0cfs
WARM 100YR Q= 1.5cfs
WARM 10YR Q= 0.8cfs

Recommended Culvert:
12 inch concrete
(or equiv.)</td></tr>
<tr><td>C5

</td><td>Tributary Watershed Area= 1.0 ac
Part of Watershed: NS26

FROZEN 100YR Q= 1.3cfs
FROZEN 10YR Q= 0.8cfs
WARM 100YR Q= 1.3cfs
WARM 10YR Q= 0.7cfs

Recommended Culvert:
12 inch concrete
(or equiv.)</td></tr>
<tr><td>C13

</td><td>Tributary Watershed Area
= 24.88 ac
However, existing drainage ditch will overtop existing trail and only 7 cfs can make it to this culvert crossing.
Part of Watershed: NS35

FROZEN 100YR Q= 27.2cfs (7cfs)
FROZEN 10YR Q= 15.7cfs (7 cfs)
WARM 100YR Q= 23.6cfs (7cfs)
WARM 10YR Q= 11.9cfs (7cfs)

Recommended Culvert Size:
18 inch concrete (or equiv.)</td></tr>
</table>

The project may identify and require additional drainage pipeline and culverts to be located at other concentrated flow locations not listed in Table 1.III.A or in the preliminary layout plans.

An ‘n’ value of 0.060 was selected to be utilized throughout the analysis of this project for the native channel overbank areas. Since very little vegetation is present at this project (near the channels), and the surface conditions at the channels appear smooth from the photographic data provided, an ‘n’ value of 0.040 was selected for the existing low flow channels.

1-III.B Sheet Flow Trail Crossings :

Much of the proposed length of trail is placed along existing slopes where sheet flows will cross the trails. Where concentrated flows are not anticipated, pipe drain crossings are not proposed and the trail will be designed to pass the sheet flows over the trail and to the down slope maintaining the sheet flow conditions.

Information is being provided to the project design team to assess these sheet flows in this report. Peak combined flow rates are evaluated for watersheds at the locations of the sheet flow crossings. These combined peak flow rates could be divided by the length of the trail intersecting each watershed to evaluate a flowrate per linear foot of trail as a sheet flow rate.

1-III.C Water Quality:

The water quality components for this project are discussed and evaluated in the “MARTIS VALLEY REGIONAL TRAIL WATER QUALITY PLAN” prepared by AUERBACH ENGINEERING CORP., January 27, 2012.

2. SECTION 2 - APPENDICES

A-1. HEC-1 Pre-Project PDP Input WARM EVENT

```
ID DRY CREEK WATERSHED, PLACER COUNTY, CA
ID WATERSHED UPDATE MODELS - DRAFT ULT BUILDOUT
ID DRAFT MODEL FOR HYD ROUTING - DCTOOLBOX SOURCE
ID CESI/RBF 8/29/2011
ID
IT     5 13FEB08       0     300
IO     5               0
IN     5       0       0
*DIAGRAM
*
*
KK    E2
KM    Large Offsite Shed  155.8ac
BA0.2434
PB
* PI
BF -38.7
LU  0.10  0.2110   2.000
UK  1500  0.0830   0.600  100.00
RD  4000  0.0300   0.060            TRAP     2.0    25.0
ZW C=FLOW
*
KK   E15
KM   Other Large Upstream offsite shed 111.1 ac
BA0.1736
PB
* PI
BF -38.7
LU  0.10  0.1470   2.000
UK  1000  0.0580   0.600  100.00
RD  2500  0.0300   0.060            TRAP     2.0    10.0     YES
ZW C=FLOW
*
KK   E10
KM    Large Undeveloped upstream watershed. (139.2)
BA0.0311
PB
* PI
BF -38.7
LU  0.10  0.1790   2.000
UK  2000  0.0750   0.600  100.00
RD  3200  0.0700   0.060   .0500    TRAP    20.0    40.0
RD  3300  0.0010   0.040   .1500    TRAP    20.0    20.0
ZW C=FLOW
*
KK YE10C
KM    Upstream of Project
HC     2
ZW C=FLOW
*
KK VE12R
KM    ROUTE TO BOTTOM OF E20
RD  1500  0.0170   0.040            TRAP    15.0     5.0
ZW C=FLOW
*
KK  E20A
KM    12.0 AC
BA0.0106
PB
* PI
BF -38.7
LU  0.10  0.2430   3.000
UK  1200  0.0580   0.600  100.00
RD   700  0.0170   0.060            TRAP    15.0     5.0
ZW C=FLOW
*
KK YE20A
KM  0
HC     2
ZW C=FLOW
*
KK  E14A
KM    Small Roadway Shed 4 ac
BA0.0063
PB
* PI
BF -38.7
LU  0.10  0.1000  10.000
UK   500  0.0300   0.600  100.00
RD   500  0.0300   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  E18A
KM    Small Hopkins Roadway Drain 3.6ac
BA0.0057
PB
* PI
BF -38.7
LU  0.10  0.2070  10.000
UK   450  0.0300   0.600  100.00
RD   500  0.0300   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK  E16A
```

```
KM    Small Hopkins Roadway Drain 0.4ac
BA0.0006
PB
* PI
BF -38.7
LU  0.10  0.2130  90.000
UK    50  0.0200   0.600  100.00
RD   100  0.0300   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYE16AC
KM  0
HC     2
ZW C=FLOW
*
KK  E20B
KM    10.9 AC
BA0.0182
PB
* PI
BF -38.7
LU  0.10  0.2000   5.000
UK   800  0.0700   0.600  100.00
RD   200  0.0170   0.060           TRAP    15.0     5.0
ZW C=FLOW
*
KK YE20B
KM  0
HC     2
ZW C=FLOW
*
KKVE16AR
KM    ROUTE TO BOTTOM OF E20
RD  2000  0.0170   0.040           TRAP    15.0     5.0
ZW C=FLOW
*
KK  E20C
KM    4.8 AC
BA0.0075
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  90.000
UK   500  0.0500   0.600      90
UK    18  0.0200   0.110      10
RD   200  0.0170   0.060   .0500   TRAP    15.0     5.0
RD   500  0.0010   0.040           TRAP    15.0     5.0
ZW C=FLOW
*
KK YE20C
KM  0
HC     3
ZW C=FLOW
*
KK  E20D
KM    10.6 AC
BA0.0166
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000    0.10  0.2500  90.000
UK   500  0.0500   0.600      89
UK    18  0.0200   0.110      11
RD   200  0.0170   0.060   .0500   TRAP    15.0     5.0
RD   600  0.0010   0.040           TRAP    15.0     5.0
ZW C=FLOW
*
KK  E20E
KM    8.4 AC Mostly diverted area added to this shed
BA0.0132
PB
* PI
BF -38.7
LU  0.10  0.2500  12.000    0.10  0.2500  90.000
UK   900  0.0200   0.600      90
UK    18  0.0200   0.110      10
RD   200  0.0170   0.060   .0500   TRAP    15.0     5.0
RD   600  0.0010   0.040           TRAP    15.0     5.0
ZW C=FLOW
*
KK YE20D
KM  0
HC     3
ZW C=FLOW
*
KK   E30
KM    MAIN SHED ABOVE TWIN CULVERTS IN S. MILL RD.  40.8AC
BA0.0638
PB
* PI
BF -38.7
LU  0.10  0.2500   8.000
UK   600  0.0380   0.600  100.00
RD  1900  0.0140   0.060           TRAP    15.0    10.0     YES
```

```
ZW C=FLOW
*
KK   E19
KM    HILLSIDE ABOVE SM RD.     4.2AC
BA0.0065
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  90.000
UK   400  0.0180   0.600      89
UK    18  0.0200   0.110      11
RD   570  0.0140   0.060            TRAP     2.0    25.0
RD   550  0.0010   0.012            CIRC     1.0     0.0      NO
ZW C=FLOW
*
KK VE19R
KM    ROUTE TO BOTTOM OF E20
RD   600  0.0400   0.040            TRAP    10.0    40.0
ZW C=FLOW
*
KK   E21
KM    HILLSIDE ABOVE ROAD           5.7AC
BA0.0084
PB
* PI
BF -38.7
LU  0.10  0.2500   7.000    0.10  0.2500  90.000
UK   600  0.0170   0.600      74
UK    18  0.0200   0.110      26
RD   800  0.0150   0.060            TRAP     2.0    25.0
RD   800  0.0010   0.015            TRAP     2.0    25.0      NO
ZW C=FLOW
*
KK  YE21
KM  0
HC     2
ZW C=FLOW
*
KK   E22
KM  "  HILLSIDE ABOVE 15"" CULVERT   2.9AC                                                 "
BA0.0045
PB
* PI
BF -38.7
LU  0.10  0.2500   7.000
UK   350  0.0270   0.600  100.00
RD   250  0.0300   0.060            TRAP     2.0    10.0      NO
ZW C=FLOW
*
KK YE22C
KM    COMBINE E21 AND E22
HC     2
ZW C=FLOW
*
KK VE22R
KM    ROUTE TO BOTTOM OF E30
RD   700  0.0140   0.040            TRAP    15.0    10.0
ZW C=FLOW
*
KK   E23
KM    PORTION OF S.MILL RD.     0.5AC
BA0.0008
PB
* PI
BF -38.7
LU  0.10  0.2500  90.000
UK    18  0.0200   0.110  100.00
RD   500  0.0240   0.060            TRAP     2.0    25.0      NO
ZW C=FLOW
*
KK  YE23
KM  0
HC     2
ZW C=FLOW
*
KK VE23R
KM    ROUTE TO BOTTOM OF E30
RD   400  0.0140   0.040            TRAP    15.0    10.0
ZW C=FLOW
*
KK YE30C
KM     COMBINE AT BOTTOM OF E30
HC     2
ZW C=FLOW
*
*
KKUE30CR
KM  0
RS     1    FLOW      -1
SV  0.00    0.54    0.84    1.03    1.34    1.56    1.82    2.09    7.48
SQ   0.0    73.0   104.0   125.0   153.0   173.0   195.0   217.0   700.0
ZW C=FLOW
*
KK   E40
```

```
KM    LARGE SHED DOWNSTREAM OF S. MILL RD.    85.5Ac
BA0.1147
PB
* PI
BF -38.7
LU  0.10  0.1800   8.100
UK  1600  0.0340   0.600  100.00
RD   600  0.0400   0.060   .0100    TRAP    10.0    40.0
RD  3000  0.0010   0.040            TRAP    40.0    20.0     YES
ZW C=FLOW
*
KK  E40B
KM    LARGE SHED DOWNSTREAM OF S. MILL RD.    85.5Ac
BA0.0190
PB
* PI
BF -38.7
LU  0.10  0.2480   8.100
UK   600  0.0100   0.600  100.00
RD   600  0.0400   0.060   .0100    TRAP    10.0    40.0
RD  1000  0.0010   0.040            TRAP    40.0    20.0
ZW C=FLOW
*
KKYE40BC
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK  E14C
KM    OFF-SITE SHED WEST OF S. MILL RD.    3.6AC
BA0.0059
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   600  0.0800   0.600  100.00
RD   500  0.0070   0.060   .0030    TRAP     2.0    25.0
RD   500  0.0010   0.040            TRAP     2.0    10.0      NO
ZW C=FLOW
*
KK VE60R
KM    ROUTE TO MAIN CHANNEL OF E64
RD  1100  0.0700   0.060            TRAP    40.0    40.0
ZW C=FLOW
*
KK  E64A
KM    EAST OF S. MILL RD.      16.1AC
BA0.0248
PB
* PI
BF -38.7
LU  0.10  0.1590  14.000    0.10  0.1590  90.000
UK  1000  0.0500   0.600      94
UK    18  0.0200   0.110       6
RD  1000  0.0700   0.060   .0140    TRAP    40.0    40.0
RD   500  0.0010   0.040            TRAP    20.0    10.0
ZW C=FLOW
*
KK YE64A
KM  0
HC     2
ZW C=FLOW
*
KK  E64B
KM    EAST OF S. MILL RD.      12.1AC
BA0.0190
PB
* PI
BF -38.7
LU  0.10  0.1750  15.000    0.10  0.1750  90.000
UK   800  0.0700   0.600      97
UK    18  0.0200   0.110       3
RD  1000  0.0700   0.060   .0140    TRAP    40.0    40.0
RD   500  0.0010   0.040            TRAP    20.0    10.0
ZW C=FLOW
*
KK YE64B
KM  0
HC     2
ZW C=FLOW
*
KK VE64R
KM    ROUTE TO MAIN CHANNEL OF E75
RD  1000  0.0350   0.040            TRAP    40.0    10.0
ZW C=FLOW
*
* - - - - - -
*
*
KK   E70
KM    OFF-SITE- LAHONTAN UNITS 7&8 AND LAHONTAN II    78.6AC
```

```
BA0.1255
PB
* PI
BF -38.7
LU  0.10  0.1710   8.000    0.10  0.1710  90.000
UK  1200  0.0410   0.600      95
UK    18  0.0200   0.110       5
RD   450  0.0140   0.060   .0100    TRAP     2.0    25.0
RD  1800  0.0010   0.040            TRAP    20.0    10.0      NO
ZW C=FLOW
*
KK   E71
KM    OFF-SITE PORTION OF LAHONTAN II    17.8Ac
BA0.0279
PB
* PI
BF -38.7
LU  0.10  0.2270  19.100
UK  1400  0.0500   0.600  100.00
RD   700  0.0300   0.060   .0070    TRAP     2.0    25.0
RD   400  0.0010   0.040   .0150    TRAP     2.0     5.0
ZW C=FLOW
*
KK   E72
KM    OFF-SITE PORTION OF LAHONTAN II   12.1Ac
BA0.0178
PB
* PI
BF -38.7
LU  0.10  0.1980   9.600
UK  1700  0.0370   0.600  100.00
RD   850  0.0530   0.060   .0100    TRAP    20.0    20.0
RD   700  0.0010   0.040            TRAP    10.0    20.0      NO
ZW C=FLOW
*
KKYE7012
KM  0
HC     2
ZW C=FLOW
*
KK VE72R
KM    ROUTE TO MAIN CHANNEL OF E75
RD   750  0.0300   0.040            TRAP    40.0    10.0
ZW C=FLOW
*
KKY72&64
KM    ROUTE TO MAIN CHANNEL OF E75
HC     2
ZW C=FLOW
*
KK   E75
KM    MOSTLY OFF-SITE AND DOWNSTREAM SHED  57.9Ac
BA0.0905
PB
* PI
BF -38.7
LU  0.10  0.1910   3.200
UK  1200  0.0580   0.600  100.00
RD   600  0.0500   0.060   .0050    TRAP    20.0    20.0
RD  1400  0.0010   0.040            TRAP    10.0    50.0     YES
ZW C=FLOW
*
KK  YE75
KM  0
HC     2
ZW C=FLOW
*
*
KKUE75CR
KM  0
RS     1    FLOW      -1
SV  0.00    0.33    0.45    0.52    0.61    0.67    0.73    0.79    0.87    2.95
SQ   0.0    24.0    35.0    42.0    51.0    58.0    66.0    73.0    83.0   400.0
ZW C=FLOW
*
* - - - - - -
*
*
KK  E14B
KM    OFF-SITE SHED WEST OF S. MILL RD.
BA0.0397
PB
* PI
BF -38.7
LU  0.10  0.1920   2.000
UK   800  0.0800   0.600  100.00
RD   800  0.0300   0.060   .0200    TRAP    40.0    40.0
RD   400  0.0010   0.040            TRAP     2.0     6.0      NO
ZW C=FLOW
*
KK VE50R
KM    ROUTE TO MAIN CHANNEL OF E55
RD   850  0.0700   0.060            TRAP    40.0    40.0
ZW C=FLOW
```

```
*
KK  E55A
KM    EAST OF S. MILL RD.   16.7AC
BA0.0261
PB
* PI
BF -38.7
LU  0.10  0.1360  20.000
UK   500  0.0400   0.600  100.00
RD   400  0.0700   0.060   .0070    TRAP    40.0    40.0
RD   500  0.0010   0.040            TRAP    10.0     5.0
ZW C=FLOW
*
KK YE55A
KM  0
HC     2
ZW C=FLOW
*
*
KKUE55AR
KM  0
RS     1    FLOW      -1
SV  0.00    0.08    0.10    0.12    0.14    0.15    0.16    0.17    0.30
SQ   0.0    18.0    25.0    30.0    36.0    41.0    45.0    49.0    80.0
ZW C=FLOW
*
KK  E58D
KM    EAST OF S. MILL RD.   23.7AC
BA0.0229
PB
* PI
BF -38.7
LU  0.10  0.2500   9.500
UK   800  0.0400   0.600  100.00
RD   400  0.0700   0.060   .0070    TRAP    40.0    40.0
RD  1400  0.0010   0.040            TRAP    10.0     5.0
ZW C=FLOW
*
KK YE58D
KM  0
HC     2
ZW C=FLOW
*
KK  E55B
KM    EAST OF S. MILL RD.   3.2AC
BA0.0050
PB
* PI
BF -38.7
LU  0.10  0.1920  40.000
UK   200  0.0500   0.600  100.00
RD   400  0.0700   0.060   .0070    TRAP    40.0    40.0
RD   500  0.0010   0.040            TRAP    10.0     5.0
ZW C=FLOW
*
KK  E55C
KM    EAST OF S. MILL RD.   7.7AC
BA0.0120
PB
* PI
BF -38.7
LU  0.10  0.2470  22.000
UK   200  0.0500   0.600  100.00
RD   400  0.0700   0.060   .0070    TRAP    40.0    40.0
RD   500  0.0010   0.040            TRAP    10.0     5.0
ZW C=FLOW
*
KK YE55C
KM  0
HC     2
ZW C=FLOW
*
*
KKU55CCR
KM  0
RS     1    FLOW      -1
SV  0.00    0.55    0.76    0.91    1.13    1.28    1.62    2.09    2.89
SQ   0.0    20.0    28.0    34.0    42.0    47.0    53.0    59.0    80.0
ZW C=FLOW
*
KK  E55E
KM    EAST OF S. MILL RD.   3.6AC
BA0.0056
PB
* PI
BF -38.7
LU  0.10  0.2500  25.000
UK   300  0.0200   0.600  100.00
RD   400  0.0700   0.060   .0070    TRAP    40.0    40.0
RD   500  0.0010   0.040            TRAP    10.0     5.0
ZW C=FLOW
*
KK YE55E
KM  0
```

```
HC     2
ZW C=FLOW
*
KK  E55F
KM    EAST OF S. MILL RD.   1.8AC
BA0.0028
PB
* PI
BF -38.7
LU  0.10  0.2500  25.000
UK   250  0.0300   0.600  100.00
RD   200  0.0700   0.060   .0070    TRAP    40.0    40.0
RD   300  0.0010   0.040            TRAP    10.0     5.0
ZW C=FLOW
*
KK  E55G
KM    EAST OF S. MILL RD.   1AC
BA0.0015
PB
* PI
BF -38.7
LU  0.10  0.2500  11.000
UK   150  0.0200   0.600  100.00
RD   200  0.0700   0.060   .0070    TRAP    40.0    40.0
RD   300  0.0010   0.040            TRAP    10.0     5.0
ZW C=FLOW
*
KKYE55GC
KM  0
HC     2
ZW C=FLOW
*
KK YE55G
KM  0
HC     2
ZW C=FLOW
*
*
KKUE55CR
KM  0
RS     1    FLOW      -1
SV  0.00    0.55    0.76    0.91    1.13    1.28    1.62    2.09    2.89
SQ   0.0    20.0    28.0    34.0    42.0    47.0    53.0    59.0    80.0
ZW C=FLOW
*
KK  E58C
KM    EAST OF S. MILL RD.   5.6AC
BA0.0088
PB
* PI
BF -38.7
LU  0.10  0.2500  36.000
UK   250  0.0600   0.600  100.00
RD   200  0.0700   0.060   .0070    TRAP    40.0    40.0
RD   500  0.0010   0.040            TRAP    10.0     5.0
ZW C=FLOW
*
KK YE58C
KM  0
HC     2
ZW C=FLOW
*
KK  E55H
KM    EAST OF S. MILL RD.                              44.1AC
BA0.0057
PB
* PI
BF -38.7
LU  0.10  0.2500   2.400
UK   400  0.0200   0.600  100.00
RD   400  0.0700   0.060   .0300    TRAP    40.0    40.0
RD  1000  0.0010   0.040            TRAP    10.0     5.0
ZW C=FLOW
*
KK YE55H
KM  0
HC     2
ZW C=FLOW
*
KK  E58A
KM    EAST OF S. MILL RD.   5.3AC
BA0.0083
PB
* PI
BF -38.7
LU  0.10  0.2500  22.000
UK   300  0.0400   0.600  100.00
RD   200  0.0700   0.060   .0070    TRAP    40.0    40.0
RD   500  0.0010   0.040            TRAP    10.0     5.0
ZW C=FLOW
*
KK YE58A
KM  0
HC     2
```

```
ZW C=FLOW
*
KK  E58E
KM    EAST OF S. MILL RD.   3.7AC
BA0.0370
PB
* PI
BF -38.7
LU  0.10  0.2250  22.000
UK   300  0.0200   0.600  100.00
RD   200  0.0700   0.060   .0070    TRAP    40.0    40.0
RD   500  0.0010   0.040            TRAP    10.0     5.0
ZW C=FLOW
*
KK YE58E
KM  0
HC     2
ZW C=FLOW
*
KK   E80
KM    LAST DOWNSTREAM SHED
BA0.0452
PB
* PI
BF -38.7
LU  0.10  0.1310   2.000
UK  1300  0.0400   0.600  100.00
RD  1000  0.0250   0.060   .0200    TRAP    20.0    20.0
RD  1100  0.0010   0.040            TRAP    10.0    50.0     YES
ZW C=FLOW
*
KKYE5875
KM  0
HC     3
ZW C=FLOW
*
KK YE80C
KM    COMBINE WITH E40 FOR TOTAL AT LAST DOWNSTREAM POINT
HC     2
ZW C=FLOW
*
KK  E40C
KM    LARGE SHED DOWNSTREAM OF S. MILL RD.    85.5Ac
BA0.0344
PB
* PI
BF -38.7
LU  0.10  0.1660   8.100
UK  1200  0.0100   0.600  100.00
RD   600  0.0400   0.060   .0100    TRAP    10.0    40.0
RD  1000  0.0010   0.040            TRAP    40.0    20.0
ZW C=FLOW
*
KK  E40E
KM    LARGE SHED DOWNSTREAM OF S. MILL RD.    85.5Ac
BA0.0058
PB
* PI
BF -38.7
LU  0.10  0.2500   8.100
UK   600  0.0100   0.600  100.00
RD   600  0.0400   0.060   .0100    TRAP    10.0    40.0
RD  1000  0.0010   0.040            TRAP    40.0    20.0
ZW C=FLOW
*
KK  E40D
KM    LARGE SHED DOWNSTREAM OF S. MILL RD.    85.5Ac
BA0.0074
PB
* PI
BF -38.7
LU  0.10  0.1940   8.100
UK   600  0.0100   0.600  100.00
RD   600  0.0400   0.060   .0100    TRAP    10.0    40.0
RD  1000  0.0010   0.040            TRAP    40.0    20.0
ZW C=FLOW
*
KK YE40D
KM  0
HC     3
ZW C=FLOW
*
KKYE40DC
KM  0
HC     2
ZW C=FLOW
*
KK   E85
KM    OFFSITE DOWNSTREAM SHED     313.9
BA0.4599
PB
* PI
BF -38.7
LU  0.10  0.1750   2.000
```

```
UK  2500  0.0625   0.600  100.00
RD  2000  0.0250   0.060   .1000    TRAP    20.0    20.0
RD  5000  0.0010   0.040            TRAP    10.0    50.0
ZW C=FLOW
*
KK  YE85
KM  0
HC     2
ZW C=FLOW
*
KK  E85B
KM  E85B
BA0.0312
PB
* PI
BF -38.7
LU  0.10  0.2300   2.000
UK   400  0.0200   0.600  100.00
RD   500  0.0500   0.060            TRAP    20.0    10.0
ZW C=FLOW
*
KK YE85B
KM  0
HC     2
ZW C=FLOW
*
*
KKUW3END
KM  ROUTE FOR BACKWATER AT NW3
RS     1    FLOW      -1
SV  0.00    0.01    0.03    20.6     247     250
SQ   0.0    40.0   243.0     508     637   800.0
ZW C=FLOW
*
KK  E85C
KM  E85C
BA0.0079
PB
* PI
BF -38.7
LU  0.10  0.2380   2.000
UK   400  0.0200   0.600  100.00
RD   500  0.0500   0.060            TRAP    20.0    10.0
ZW C=FLOW
*
KKYE85CC
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK  E5A1
KM    E5A1 Drop Inlet
BA0.0730
PB
* PI
BF -38.7
LU  0.10  0.2040   2.000    0.10  0.2040  95.000
UK  1350  0.1330   0.600      98
UK   200  0.0200   0.110       3
RD  2000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK   E5B
KM    E5B
BA0.0139
PB
* PI
BF -38.7
LU  0.10  0.2450   2.000    0.10  0.2450  95.000
UK   600  0.0800   0.600      91
UK   200  0.0200   0.110       9
RD  2000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  YE5B
KM  0
HC     2
ZW C=FLOW
*
KK   E5C
KM    E5C
BA0.0051
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   600  0.0700   0.600      92
UK   200  0.0200   0.110       8
RD   500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
```

```
KK  YE5C
KM  0
HC     2
ZW C=FLOW
*
*
KKUE5ADT
KM  0
RS     1    FLOW      -1
SV  0.00    0.10    0.20    0.30    0.40    1.70    2.40
SQ   0.0     0.0     0.1     2.0    50.0    80.0   200.0
ZW C=FLOW
*
KK   E5D
KM    E5D
BA0.0850
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1500  0.0500   0.600  100.00
RD  1500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YE5DC
KM  0
HC     2
ZW C=FLOW
*
KK  E6A1
KM    E6A1
BA0.0570
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1000  0.0680   0.600  100.00
RD  2700  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK  E6A2
KM    E6A2
BA0.0149
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   600  0.0680   0.600  100.00
RD   800  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYE6A1C
KM  0
HC     2
ZW C=FLOW
*
KK   E6C
KM    E6C
BA0.0939
PB
* PI
BF -38.7
LU  0.10  0.2460   2.000
UK  1600  0.0900   0.600  100.00
RD  1400  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YE6CC
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK GS10D
KM    GS10D
BA0.0124
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   900  0.0700   0.600      79
UK   100  0.0200   0.110      21
RD   200  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK GS10C
KM    GS10C
BA0.0169
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
```

```
UK   300  0.0600   0.600      91
UK   100  0.0200   0.110       9
RD   400  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYS10CC
KM  0
HC     2
ZW C=FLOW
*
KK GS10B
KM    GS10B
BA0.0044
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   600  0.0800   0.600      86
UK   100  0.0200   0.110      14
RD   400  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKGS10A1
KM    GS10A1
BA0.0290
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   600  0.0800   0.600      96
UK   100  0.0200   0.110       4
RD   500  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK GS10F
KM    GS10F
BA0.0248
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   600  0.0800   0.600      92
UK   100  0.0200   0.110       8
RD   900  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKY10FCC
KM  0
HC     2
ZW C=FLOW
*
KK GS10E
KM    GS10E
BA0.0153
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   300  0.0800   0.600      78
UK   100  0.0200   0.110      22
RD   600  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYS10AC
KM   COMBINATION AT MEADOWS ROUTING AREA
HC     2
ZW C=FLOW
*
KKGS10A2
KM   GS10A2
BA0.0278
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK  1400  0.0800   0.600      96
UK   100  0.0200   0.110       4
RD  1400  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYGDTCC
KM  0
HC     2
ZW C=FLOW
*
*
KKUGS10R
KM   MEADOWS WQ AND DETENTION RESERVOIR AT GS10E
RS     1    FLOW      -1
SV 11.60   13.00   15.95
SQ  61.0   100.0   330.0
ZW C=FLOW
*
*
```

```
KKUS10ER
KM   Channel Attenuation downstream of GS10R
RS     1    FLOW      -1
SV  0.00    0.05    0.27    0.50    0.72    0.95    1.15
SQ   0.0     0.0     5.0    15.0    27.0    37.0    62.0
ZW C=FLOW
*
KK GS10J
KM    GS10J
BA0.0099
PB
* PI
BF -38.7
LU  0.10  0.2500  83.000    0.10  0.2500  95.000
UK   300  0.0800   0.600      92
UK   200  0.0200   0.110       8
RD   500  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKYS10JC
KM  0
HC     2
ZW C=FLOW
*
KK GS10G
KM    GS10G
BA0.0081
PB
* PI
BF -38.7
LU  0.10  0.2500  83.000    0.10  0.2500  95.000
UK   300  0.0800   0.600      90
UK   200  0.0200   0.110      10
RD   500  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
*
KKUS10JR
KM   Channel Attenuation From GS10J to GS10I
RS     1    FLOW      -1
SV  0.00    0.05    0.10    0.12    0.19    0.22    0.35
SQ   0.0     0.0     5.0    15.0    27.0    37.0    80.0
ZW C=FLOW
*
KK GS10H
KM    GS10H
BA0.0066
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   300  0.0800   0.600      81
UK   200  0.0200   0.110      19
RD   400  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KK GS10I
KM    GS10I
BA0.0071
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   300  0.0600   0.600      78
UK   200  0.0200   0.110      22
RD   400  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KK   E8A
KM    E8A
BA0.0049
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   200  0.1200   0.600      73
UK   100  0.0200   0.110      27
RD   300  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
*
KKUE8ASQ
KM  0
RS     1    FLOW      -1
SV  0.00    0.03    0.05    0.08    0.10    0.20    1.00
SQ   0.0     0.0     0.0     0.0     3.5    80.0   200.0
ZW C=FLOW
*
KK   E8B
KM    E8B
BA0.0122
PB
* PI
BF -38.7
```

```
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   400  0.0800   0.600      95
UK   100  0.0200   0.110       5
RD  1400  0.1000   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK   E8C
KM    E8C
BA0.0244
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   800  0.0800   0.600  100.00
RD  1400  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YE8CC
KM  0
HC     2
ZW C=FLOW
*
KKYGS10C
KM  0
HC     2
ZW C=FLOW
*
KKYS10IC
KM  0
HC     2
ZW C=FLOW
*
*
KKUS10IR
KM   Storage Upstream of Siller Ranch Road -  Channel Routing Meadow to Schaffer m
RS     1    FLOW      -1
SV  0.00    0.05    0.12    0.19    0.26    0.33    1.55
SQ   0.0     0.0     5.0    15.0    27.0    37.0   400.0
ZW C=FLOW
*
*
KK UGS9R
KM  0
RS     1    FLOW      -1
SV  0.00    0.09    0.17    0.24    0.41    0.59    0.83    0.94    4.03
SQ   0.0    33.0    55.0    76.0   114.0   145.0   177.0   206.0   644.0
ZW C=FLOW
*
KK    E9
KM    E9
BA0.0213
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   600  0.0800   0.600  100.00
RD  1000  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
*
KKUGS11R
KM  0
RS     1    FLOW      -1
SV  0.00    0.25    0.42    0.58    0.95    1.37    2.24    2.77    6.95
SQ   0.0    33.0    55.0    76.0   114.0   145.0   177.0   206.0   644.0
ZW C=FLOW
*
KK GS11B
KM    GS11B
BA0.0031
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   700  0.1000   0.600  100.00
RD   300  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK GS11A
KM    GS11A
BA0.0354
PB
* PI
BF -38.7
LU  0.10  0.2370   2.000
UK   700  0.1000   0.600  100.00
RD  1100  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKYGS11A
KM  0
HC     2
ZW C=FLOW
*
```

```
*
KKUS11RR
KM  0
RS     1    FLOW      -1
SV  0.00    1.25    1.51    1.75    2.27    2.78    3.53    4.26    4.67
SQ   0.0    33.0    55.0    76.0   114.0   145.0   177.0   206.0   244.0
ZW C=FLOW
*
KK GS13C
KM   GS13C
BA0.0066
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   300  0.0700   0.600  100.00
RD   300  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK GS13B
KM   GS13B
BA0.0168
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   300  0.0700   0.600  100.00
RD  1100  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK GS18A
KM   GS18A
BA0.0020
PB
* PI
BF -38.7
LU  0.10  0.2500   3.000
UK   800  0.0940   0.600  100.00
RD   300  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK  GS18
KM    GS18
BA0.0248
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   800  0.0940   0.600  100.00
RD  1600  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKYGS18C
KM  0
HC     2
ZW C=FLOW
*
KK GS13A
KM   GS13A
BA0.0196
PB
* PI
BF -38.7
LU  0.10  0.1810   2.000
UK   600  0.0670   0.600  100.00
RD  1100  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYGS13A
KM  0
HC     2
ZW C=FLOW
*
KK YGS13
KM  0
HC     2
ZW C=FLOW
*
KK  GS19
KM    GS19
BA0.0617
PB
* PI
BF -38.7
LU  0.10  0.1920   2.000
UK   700  0.0860   0.600  100.00
RD  1000  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK  GS20
KM    GS20
BA0.0178
PB
* PI
```

```
BF -38.7
LU  0.10  0.1680   2.000
UK   600  0.1000   0.600  100.00
RD   600  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYGS20C
KM  0
HC     2
ZW C=FLOW
*
*
KKUOOSED
KM   GOOSENECK LAKE RESERVOIR _ CURRENT ROUTING/DISCHARGE RATING
RS     1    FLOW      -1
SV  0.00   43.30   90.10  144.10  173.90  205.40  238.90  274.10
SQ   0.0     2.0    84.8   360.0   670.8  1273.0  3585.0  8880.0
ZW C=FLOW
*
* - - - - - -
*
*
KKGS21B1
KM            4.2 AC.
BA0.0065
PB
* PI
BF -38.7
LU  0.10  0.2500  10.060
UK   300  0.0700   0.600  100.00
RD   800  0.1000   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KKVR21B1
KM   ROUTE GS21B1
RD   540  0.0704   0.015           CIRC     2.0     0.0
ZW C=FLOW
*
KKGS21B2
KM            3.2 AC.
BA0.0050
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   300  0.0700   0.600  100.00
RD   900  0.0800   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KKYQG21B
KM     COMBINE
HC     2
ZW C=FLOW
*
KK GS21A
KM   GS21A
BA0.0412
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK  1000  0.0700   0.600      80
UK   200  0.0200   0.240      20
RD  2500  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK  GS22
KM    GS22
BA0.0741
PB
* PI
BF -38.7
LU  0.10  0.2490   2.000
UK   700  0.0570   0.600  100.00
RD  1000  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKYGS21A
KM     COMBINE
HC     2
ZW C=FLOW
*
*
KKUGS22R
KM  0
RS     1    FLOW      -1
SV  0.00    0.67    0.84    0.97    1.28    1.45    1.87    2.23    5.29
SQ   0.0    65.0    85.0   102.0   144.0   184.0   232.0   291.0   575.0
ZW C=FLOW
*
KK  GS23
KM    GS23
BA0.0596
PB
```

```
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  2000  0.0400   0.600  100.00
RD  1100  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK  GS24
KM    GS24
BA0.0352
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   500  0.1000   0.600  100.00
RD   900  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYGS24C
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KKGS25B3
KM           1.2 AC.
BA0.0019
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   300  0.0700   0.600  100.00
RD   310  0.0500   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KKGS25B4
KM            1.8 AC.
BA0.0029
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   300  0.0700   0.600  100.00
RD   440  0.1200   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KKYC25B4
KM     COMBINE
HC     2
ZW C=FLOW
*
KKGS25C4
KM            4.4 AC.
BA0.0069
PB
* PI
BF -38.7
LU  0.10  0.2500  11.750
UK   300  0.0700   0.600  100.00
RD   550  0.1000   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KKGS25C5
KM            1.7 AC.
BA0.0026
PB
* PI
BF -38.7
LU  0.10  0.2500   9.800
UK   300  0.0700   0.600  100.00
RD   450  0.1100   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KKYC25C5
KM     COMBINE
HC     2
ZW C=FLOW
*
KKGS25C6
KM            1.6 AC.
BA0.0023
PB
* PI
BF -38.7
LU  0.10  0.2500   4.600
UK   300  0.0700   0.600  100.00
RD   240  0.1080   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KKYC25C6
KM     COMBINE
HC     3
```

```
ZW C=FLOW
*
KKGS25C9
KM           3.0 AC.
BA0.0047
PB
* PI
BF -38.7
LU  0.10  0.2500  11.360
UK   300  0.0700   0.600  100.00
RD   550  0.0509   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KKGS21A2
KM           1.3 AC.
BA0.0020
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   300  0.0700   0.600  100.00
RD   750  0.0825   0.060            CIRC     2.0     0.0
ZW C=FLOW
*
KKGS25C1
KM           .4 AC.
BA0.0006
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   300  0.0700   0.600  100.00
RD   290  0.0621   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KKYC25C1
KM   COMBINE
HC     2
ZW C=FLOW
*
KKVR25C1
KM     ROUTR COMBINED GS25C1
RD   312  0.0401   0.015          CIRC       2.0     0.0
ZW C=FLOW
*
KKYC25C9
KM     COMBINE
HC     3
ZW C=FLOW
*
KKGS25C3
KM           3.9 AC.
BA0.0060
PB
* PI
BF -38.7
LU  0.10  0.2500  11.230
UK   300  0.0700   0.600  100.00
RD  1045  0.0670   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KKGS25C7
KM           3.8 AC.
BA0.0060
PB
* PI
BF -38.7
LU  0.10  0.2500  13.180
UK   300  0.0700   0.600  100.00
RD   620  0.0452   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KKYC25C7
KM     COMBINE
HC     3
ZW C=FLOW
*
KK GS27C
KM           2.8 AC.
BA0.0044
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   300  0.0700   0.600  100.00
RD   220  0.0636   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KK GS23B
KM  0
BA0.0061
PB
* PI
BF -38.7
```

```
LU  0.10  0.2500  15.000
UK   300  0.0700   0.600  100.00
RD   470  0.0638   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KKYWQ25C
KM     COMBINE
HC     3
ZW C=FLOW
*
KK GS25E
KM    GS25E
BA0.0340
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   900  0.1000   0.600  100.00
RD  1000  0.1000   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKY25ECC
KM  0
HC     2
ZW C=FLOW
*
KKGS25A2
KM            1.9 AC.
BA0.0029
PB
* PI
BF -38.7
LU  0.10  0.2500   8.500
UK   300  0.0700   0.600  100.00
RD   700  0.0500   0.060            TRAP     2.0     3.0
ZW C=FLOW
*
KKGS25A1
KM            .4 AC.
BA0.0007
PB
* PI
BF -38.7
LU  0.10  0.2500   8.500
UK   300  0.0700   0.600  100.00
RD  1400  0.0660   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KKGS25A3
KM            1.2 AC.
BA0.0018
PB
* PI
BF -38.7
LU  0.10  0.2500   8.500
UK   300  0.0700   0.600  100.00
RD  1010  0.0620   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KKYC25A3
KM     COMBINE
HC     3
ZW C=FLOW
*
KKVR25A3
KM       ROUTE COMBINED GS25A3
RD   561  0.0238   0.015            CIRC     2.0     0.0
ZW C=FLOW
*
KKGS25D3
KM            1.3 AC.
BA0.0022
PB
* PI
BF -38.7
LU  0.10  0.2500  11.100
UK   300  0.0700   0.600  100.00
RD   900  0.0650   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KKYC25D3
KM     COMBINE
HC     2
ZW C=FLOW
*
KKGS25D2
KM            2.9 AC.
BA0.0045
PB
* PI
BF -38.7
LU  0.10  0.2500   8.500
UK   300  0.0700   0.600  100.00
RD   840  0.0710   0.060            TRAP    10.0     1.0
```

```
ZW C=FLOW
*
KKYC25D2
KM     COMBINE
HC     2
ZW C=FLOW
*
KKGS25D1
KM             4.1 AC
BA0.0062
PB
* PI
BF -38.7
LU  0.10  0.2500   8.500
UK   300  0.0700   0.600  100.00
RD  1520  0.0700   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KKYC25D1
KM     COMBINE
HC     2
ZW C=FLOW
*
KKVR25D1
KM     ROUTE COMBINED GS25D1
RD   923  0.0368   0.015           CIRC     2.0     0.0
ZW C=FLOW
*
KKGS28B2
KM            6.7 AC.
BA0.0105
PB
* PI
BF -38.7
LU  0.10  0.2500   5.250
UK   300  0.0700   0.600  100.00
RD  1780  0.0625   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KKGS27B1
KM         5.5 AC.
BA0.0087
PB
* PI
BF -38.7
LU  0.10  0.2500   8.500
UK   300  0.0700   0.600  100.00
RD  1040  0.0557   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KK YC27B
KM     COMBINE
HC     3
ZW C=FLOW
*
KKGS25C2
KM            3.0 AC
BA0.0047
PB
* PI
BF -38.7
LU  0.10  0.2500   9.930
UK   300  0.0700   0.600  100.00
RD  1800  0.0566   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KKYC25C2
KM     COMBINE
HC     2
ZW C=FLOW
*
KKGS27B3
KM            3.3 AC.
BA0.0052
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   300  0.0700   0.600  100.00
RD   660  0.0720   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KKGS27B2
KM  0
BA0.0053
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   300  0.0700   0.600  100.00
RD   560  0.0640   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KKYQG27B
```

```
KM     COMBINE
HC     3
ZW C=FLOW
*
KKGS25E1
KM    GS25E
BA0.0131
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   900  0.1000   0.600  100.00
RD  1000  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYGS25E
KM  0
HC     2
ZW C=FLOW
*
KK GS30B
KM            1.1 AC
BA0.0018
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   300  0.0700   0.600  100.00
RD   800  0.0350   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KKGS28B1
KM            1.6 AC.
BA0.0025
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   300  0.0700   0.600  100.00
RD  1000  0.0437   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KKYC28B1
KM     COMBINE
HC     2
ZW C=FLOW
*
KKGS28B3
KM            .09 AC.
BA0.0015
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   300  0.0700   0.600  100.00
RD   830  0.0554   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KKYC28B3
KM     COMBINE
HC     2
ZW C=FLOW
*
KKGS28A1
KM            7.6 AC.
BA0.0120
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   300  0.0700   0.600  100.00
RD  1000  0.0690   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KKYQG28B
KM     COMBINE
HC     2
ZW C=FLOW
*
KKGS28A2
KM   GS28A
BA0.0154
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   500  0.0710   0.600      50
UK   200  0.0200   0.240      50
RD   500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYGS28A
KM  0
HC     2
```

```
ZW C=FLOW
*
KKYGS29C
KM  0
HC     2
ZW C=FLOW
*
KK GS30A
KM    GS30
BA0.0427
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   900  0.0560   0.600      89
UK    50  0.0200   0.110      11
RD  1400  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK GS31A
KM   GS31A
BA0.0843
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK  1000  0.0500   0.600      90
UK   200  0.0200   0.400      10
RD  1100  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKYGS31C
KM  0
HC     2
ZW C=FLOW
*
KKYS31CC
KM  0
HC     2
ZW C=FLOW
*
KK  GS32
KM    GS32
BA0.0320
PB
* PI
BF -38.7
LU  0.10  0.2300   2.000
UK   500  0.1000   0.600  100.00
RD  1800  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
* - - - - - -
*
*
KK MD1H3
KM   MD1H3
BA0.0040
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   300  0.1200   0.600      75
UK    50  0.0200   0.110      25
RD   400  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK MD1H2
KM   MD1H2
BA0.0027
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   300  0.1200   0.600      75
UK    50  0.0200   0.110      25
RD   300  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKYD1H2C
KM  0
HC     2
ZW C=FLOW
*
KK MD1E4
KM   MD1E4
BA0.0132
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   300  0.1000   0.600      87
UK    50  0.0200   0.110      13
RD   600  0.0500   0.060            TRAP     2.0     2.0
```

```
ZW C=FLOW
*
KKYD1H2D
KM  0
HC     2
ZW C=FLOW
*
KK MD1E3
KM   MD1E3
BA0.0039
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   300  0.1000   0.600      78
UK    50  0.0200   0.110      22
RD   500  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKYD1E3C
KM  0
HC     2
ZW C=FLOW
*
KK MD1E2
KM   MD1E2
BA0.0031
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   300  0.1000   0.600      84
UK    50  0.0200   0.110      16
RD   600  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYD1E2C
KM  0
HC     2
ZW C=FLOW
*
KKMD1E1E
KM   MD1E1-2
BA0.0042
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1200  0.1070   0.600  100.00
RD   800  0.0640   0.060            TRAP    10.0     0.0
ZW C=FLOW
*
KK YMD1E
KM  0
HC     2
ZW C=FLOW
*
KKMD1E1C
KM   MD1E1-3
BA0.0686
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1000  0.0800   0.600  100.00
RD  1858  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKMD1E1B
KM   MD1E1-2
BA0.0141
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1200  0.1070   0.600  100.00
RD   800  0.0640   0.060            TRAP    10.0     0.0
ZW C=FLOW
*
KKYM1E1B
KM  0
HC     2
ZW C=FLOW
*
KK MD1H1
KM    MD1H1-1
BA0.0073
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   400  0.0600   0.600  100.00
RD   200  0.0080   0.060            TRAP    10.0    10.0
ZW C=FLOW
```

```
*
KK MD1H4
KM    MD1H1-2
BA0.0049
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   650  0.0600   0.600  100.00
RD   100  0.0030   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKMD1I_1
KM    MD1I-1
BA0.0242
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1000  0.1000   0.600  100.00
RD   350  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYD1H1C
KM  0
HC     3
ZW C=FLOW
*
KK MD1G3
KM   MD1G3
BA0.0096
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   300  0.0800   0.600      90
UK    50  0.0200   0.110      10
RD   600  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYD1G3C
KM  0
HC     2
ZW C=FLOW
*
KKVD1G3R
KM  0
RD  1600  0.0500   0.040            TRAP    10.0    10.0
ZW C=FLOW
*
KK MD1G2
KM   MD1G2
BA0.0033
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   200  0.0800   0.600      72
UK    50  0.0200   0.110      28
RD   300  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKMD1G2B
KM   MD1G2B
BA0.0055
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   200  0.0850   0.600  100.00
RD   300  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKYM1G2B
KM  0
HC     2
ZW C=FLOW
*
KKMD1G1B
KM   MD1G1-2
BA0.0195
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1300  0.0600   0.600  100.00
RD  1568  0.1070   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYM1G1B
KM  0
HC     2
ZW C=FLOW
*
```

```
KKY26OUP
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK GS26A
KM    GS26A
BA0.0074
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   600  0.1000   0.600      85
UK    50  0.0200   0.110      15
RD   400  0.0500   0.060            TRAP     2.0      2.0
ZW C=FLOW
*
KK GS26B
KM    GS26B
BA0.0139
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   600  0.2000   0.600      89
UK    50  0.0200   0.110      11
RD   800  0.0500   0.060            TRAP     2.0      2.0     YES
ZW C=FLOW
*
KK GS26C
KM    GS26C
BA0.0126
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   600  0.2000   0.600      90
UK    50  0.0200   0.110      10
RD   800  0.0500   0.060            TRAP     2.0      2.0     YES
ZW C=FLOW
*
KK GS26D
KM    GS26D
BA0.0144
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   600  0.1000   0.600      89
UK    50  0.0200   0.110      11
RD   400  0.0500   0.060            TRAP     2.0      2.0
ZW C=FLOW
*
KKYS26DC
KM  0
HC     2
ZW C=FLOW
*
KK GS26E
KM    GS26E
BA0.0028
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   300  0.0800   0.600      75
UK    50  0.0200   0.110      25
RD   600  0.0500   0.060            TRAP     2.0      2.0     YES
ZW C=FLOW
*
KK GS26F
KM    GS26F
BA0.0074
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   400  0.1000   0.600      87
UK    50  0.0200   0.110      13
RD   400  0.0500   0.060            TRAP     2.0      2.0     YES
ZW C=FLOW
*
KKGS26N1
KM    GS26N-1
BA0.0046
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   335  0.0200   0.110  100.00
RD   500  0.0500   0.060            TRAP     2.0      2.0
```

```
ZW C=FLOW
*
KK GS26G
KM    GS26G
BA0.0231
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   600  0.1000   0.600      91
UK    50  0.0200   0.110       9
RD   400  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KKYS26NC
KM  0
HC     2
ZW C=FLOW
*
KK GS26H
KM    GS26H
BA0.0026
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   100  0.0800   0.600      75
UK    50  0.0200   0.110      25
RD   500  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KK GS15C
KM    GS15C
BA0.0106
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   600  0.1500   0.600      91
UK    50  0.0200   0.110       9
RD   400  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KK GS15D
KM    GS15D
BA0.0133
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   300  0.1350   0.600      91
UK    50  0.0200   0.110       9
RD   400  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KK GS15A
KM    GS15A
BA0.0913
PB
* PI
BF -38.7
LU  0.10  0.2370   2.000    0.10  0.2370  95.000
UK  1800  0.1200   0.600      97
UK    50  0.0200   0.110       3
RD   600  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KK GS15B
KM    GS15B
BA0.0151
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   400  0.1000   0.600      94
UK    50  0.0200   0.110       6
RD   600  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KKYS15BC
KM  0
HC     2
ZW C=FLOW
*
KKGS16A1
KM    GS16A1
BA0.0190
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   400  0.1000   0.600      96
UK    50  0.0200   0.110       4
RD   500  0.0500   0.060            TRAP     2.0     2.0     YES
```

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ZW C=FLOW
*
KKGS16A2
KM    GS16A2
BA0.0137
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   400  0.1000   0.600      91
UK    50  0.0200   0.110       9
RD   600  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KK GS16B
KM    GS16B
BA0.0260
PB
* PI
BF -38.7
LU  0.10  0.2330   2.000    0.10  0.2330  95.000
UK  1800  0.1500   0.600      93
UK    50  0.0200   0.110       7
RD   500  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KK GS16C
KM    GS16C
BA0.0141
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   400  0.1500   0.600      89
UK    50  0.0200   0.110      11
RD   400  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KK GS17C
KM    GS17C
BA0.0147
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   600  0.1200   0.600      91
UK    50  0.0200   0.110       9
RD   600  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KK  E6A3
KM    E6A3
BA0.0421
PB
* PI
BF -38.7
LU  0.10  0.1800   2.000    0.10  0.1800  95.000
UK  1800  0.2000   0.600      94
UK    50  0.0200   0.110       6
RD   800  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KK GS12B
KM    GS12B
BA0.0089
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   600  0.1200   0.600      89
UK    50  0.0200   0.110      11
RD   600  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KK GS12C
KM    GS12C
BA0.0068
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   300  0.1200   0.600      70
UK    50  0.0200   0.110      30
RD  1600  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKY12CCC
KM  0
HC     2
ZW C=FLOW
*
KK GS12F
KM    GS12F
BA0.0082
```

```
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   400  0.1000   0.600      94
UK    50  0.0200   0.110       6
RD   400  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKYS12FC
KM  0
HC     2
ZW C=FLOW
*
KK GS12H
KM    GS12H
BA0.0082
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   800  0.1000   0.600      94
UK    50  0.0200   0.110       6
RD   600  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KK GS12D
KM    GS12D
BA0.0044
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   400  0.1500   0.600      84
UK    50  0.0200   0.110      16
RD   300  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KK GS12E
KM    GS12E
BA0.0044
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   400  0.1500   0.600      90
UK    50  0.0200   0.110      10
RD   400  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KKY12ECC
KM  0
HC     2
ZW C=FLOW
*
KK GS12I
KM    GS12I
BA0.0177
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   800  0.1000   0.600      95
UK    50  0.0200   0.110       5
RD  1000  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKYS12IC
KM  0
HC     2
ZW C=FLOW
*
KKVNTOLK
KM  0
RD  1000  0.0500   0.040            TRAP     2.0     2.0
ZW C=FLOW
*
KKYGS17C
KM  0
HC     2
ZW C=FLOW
*
KKYGS16A
KM  0
HC     2
ZW C=FLOW
*
KK GS17A
KM    GS17A
BA0.0226
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
```

```
UK   800  0.1000   0.600      90
UK    50  0.0200   0.110      10
RD  1000  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKYAKCOM
KM  0
HC     3
ZW C=FLOW
*
*
KKULFDT2
KM   DETENTION AT GS17A
RS     1    FLOW      -1
SV  0.00    0.55    1.91    3.69    7.81
SQ   0.0    60.0   170.0   311.0   630.0
ZW C=FLOW
*
KK GS26N
KM   GS26N-2
BA0.0299
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1419  0.0660   0.600  100.00
RD  1800  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
*
KKUSTDET
KM GOLF LAKE/WET MEADOW AT SOUTH SIDE OF B STREET
* NEW 10-11-04
* NEW 12-04 for 30ft weir @ 6177.2 and low swq below
KO     1
RS     1    ELEV    6176
* SV     0    6.92   8.320   9.821  11.439   13.17
*  sv Revised by BAT 2/15/05 TO REFLECT NORMAL POOL ELEV AT 6176
SA     0    0.01    1.34    1.67    2.15
SE  6166  6175.9    6176    6178    6180
SQ     0    .001    0.50    64.0   217.0   421.0
SE  6166    6176    6177    6178    6179    6180
ZW C=FLOW
*
*
KKGS26OA
KM    AREA=20.2 AC
BA0.0321
PB
* PI
BF -38.7
LU  0.10  0.2500  86.000    0.10  0.2500  90.000
UK   800  0.0500   0.600      95
UK    50  0.0200   0.110       5
RD   800  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKGS26OB
KM    AREA=3.3 AC UNIT 4A
BA0.0047
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  90.000
UK   600  0.0500   0.600      95
UK    50  0.0200   0.110       5
RD   600  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKYS26OC
KM  0
HC     4
ZW C=FLOW
*
*
KKUPLAKE
KM   CONCERT PARK LAKE
KO     1
RS     1    ELEV    6149
SA  0.01    0.25    0.32    0.36
SE  6140    6148    6149    6150
*  LOW FLOW PIPE (SL RECORD) IS A DUMMY
SL  6146   0.001    0.62     0.5
SS  6148      20     2.6     1.5
ZW C=FLOW
*
KK MD1C2
KM    MD1C2
BA0.0063
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  90.000
UK   250  0.0500   0.600      90
```

```
UK    50  0.0200   0.110      10
RD   300  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKYMD1C2
KM  0
HC     2
ZW C=FLOW
*
KKGS26L3
KM    AREA=0.7 AC   UNIT 4A
BA0.0012
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  90.000
UK   500  0.0580   0.600      90
UK    50  0.0200   0.110      10
RD   500  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKYNIT4A
KM  0
HC     2
ZW C=FLOW
*
KKMD1F-1
KM    MD1F-1
BA0.0069
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   600  0.0800   0.600      90
UK    50  0.0200   0.110      10
RD  1000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  MD1F
KM    MD1F-2
BA0.0035
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   500  0.0800   0.600      90
UK    50  0.0200   0.110      10
RD  1000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD1F
KM  0
HC     2
ZW C=FLOW
*
KKMD1D1D
KM    MD1D1D
BA0.0124
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   800  0.0600   0.600  100.00
RD   400  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYD1D1D
KM  0
HC     2
ZW C=FLOW
*
KKMD1D1C
KM    MD1D1C
BA0.0074
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   500  0.0500   0.600  100.00
RD   200  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYD1D1C
KM  0
HC     2
ZW C=FLOW
*
KK  MD1E
KM    MD1E
BA0.0160
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
```

```
UK   600  0.0800   0.600      95
UK    50  0.0200   0.110       5
RD  1000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
*
KKUD1EWQ
KM  0
RS     1    FLOW      -1
SV  0.00    0.25    0.50    0.75
SQ   0.0     0.1    30.0    60.0
ZW C=FLOW
*
KKMD1D1A
KM    MD1D1A
BA0.0059
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   400  0.1200   0.600  100.00
RD   500  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKMD1D1B
KM    MD1D1B
BA0.0028
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   400  0.1200   0.600  100.00
RD   500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYD1D1B
KM  0
HC     2
ZW C=FLOW
*
KK MD1D2
KM    MD1D2
BA0.0077
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   600  0.2000   0.600  100.00
RD  1000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYD1D2D
KM  0
HC     3
ZW C=FLOW
*
KKYD1C2C
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK GS26J
KM    GS26J
BA0.0023
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   230  0.0780   0.600  100.00
RD   250  0.0770   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KK GS26K
KM    GS26K
BA0.0032
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   194  0.0920   0.600  100.00
RD   200  0.0830   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKYGS26K
KM  0
HC     2
ZW C=FLOW
*
KK GS26L
KM    GS26L REVISED AREA = 5.8 AC UNIT 4A
BA0.0091
```

```
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  90.000
UK   500  0.0580   0.600      90
UK    50  0.0200   0.110      10
RD   500  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKYGS26L
KM  0
HC     2
ZW C=FLOW
*
KKGS26L2
KM    GS26L2
BA0.0029
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  90.000
UK   250  0.0470   0.600      90
UK    50  0.0200   0.110      10
RD   250  0.0300   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KK MD1C1
KM    MD1C1
BA0.0155
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  90.000
UK   400  0.0500   0.600      85
UK    50  0.0200   0.110      15
RD  1800  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KKYD1C1C
KM  0
HC     2
ZW C=FLOW
*
*
KKUWLAKE
KM CULTURAL CENTER LAKE LOWER LAKE
* CULTURAL LAKE HAS BEEN RELOCATED AND THE THE GRADING REVISED.
* THE LAKE NOW CONSISTS OF AN UPPER LAKE AND A LOWER LAKE.
* THE UPPER LAKE IS UPLAKE. THIS IS LOWER LAKE.  UPPER LAKE IS
* DESIGNATED UPLAKE
* REVISION DATE 7/7/2006
KO     1
RS     1    ELEV    6133
SA  0.98    2.89    3.08    3.34    3.65    4.01
SE  6119    6133    6134    6136    6138    6140
SQ     0     1.8    10.5    54.1   116.9   194.2   283.6   383.6   493.2
SE  6133  6133.6    6134    6135    6136    6137    6138    6139    6140
ZW C=FLOW
*
*
KKUAINWQ
KM   AT MD1C1
RS     1    FLOW      -1
SV  0.00    0.34    0.69    1.03    1.38    1.83    2.29    2.86    3.44
SQ   0.0     0.5     1.0     8.5    30.0    60.0   100.0   150.0   600.0
ZW C=FLOW
*
KK MD1C4
KM    MD1C4
BA0.0169
PB
* PI
BF -38.7
LU  0.10  0.2240   2.000    0.10  0.2240  90.000
UK   400  0.0500   0.600      95
UK    50  0.0200   0.110       5
RD  1800  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
*
KKU1C4WQ
KM   AT MD1C4
RS     1    FLOW      -1
SV  0.00    0.23    0.51    0.92    1.24    1.60    1.95    2.30
SQ   0.0     0.3     0.5     0.8     1.0     1.5    45.0   500.0
ZW C=FLOW
*
* - - - - - -
*
*
KK   MA1
KM     MA1
BA0.2995
PB
```

```
* PI
BF -38.7
LU  0.10  0.1910   2.000
UK  1600  0.2340   0.600  100.00
RD  3500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK   MA2
KM     MA2
BA0.5483
PB
* PI
BF -38.7
LU  0.10  0.2000   2.000
UK  2200  0.2840   0.600  100.00
RD  4300  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK   MA3
KM     MA3
BA0.6259
PB
* PI
BF -38.7
LU  0.10  0.2290   2.000
UK  2300  0.2720   0.600  100.00
RD  7500  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK   MA4
KM     MA4
BA0.2870
PB
* PI
BF -38.7
LU  0.10  0.2270   2.000
UK  2000  0.3000   0.600  100.00
RD  3300  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK   MA5
KM     MA5
BA0.2025
PB
* PI
BF -38.7
LU  0.10  0.2140   2.000
UK  1500  0.1830   0.600  100.00
RD  2500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK   MA6
KM     MA6
BA0.4152
PB
* PI
BF -38.7
LU  0.10  0.2280   2.000
UK  1800  0.0970   0.600  100.00
RD  3000  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK YMA6C
KM  0
HC     2
ZW C=FLOW
*
KK   MA7
KM     MA7
BA0.2326
PB
* PI
BF -38.7
LU  0.10  0.2330   2.000
UK  3300  0.2270   0.600  100.00
RD  1500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMA7C
KM  0
HC     2
ZW C=FLOW
*
KK   MA8
KM     MA8
BA0.4308
PB
* PI
BF -38.7
LU  0.10  0.1650   2.000
UK  1250  0.3200   0.600  100.00
RD  5500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
```

```
KK YMA8C
KM  0
HC     2
ZW C=FLOW
*
KK   MA9
KM     MA9
BA0.0913
PB
* PI
BF -38.7
LU  0.10  0.2370   2.000
UK   600  0.2080   0.600  100.00
RD  1500  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK MA10A
KM    MA10A
BA0.2885
PB
* PI
BF -38.7
LU  0.10  0.2410   2.000    0.10  0.2410  15.000
UK  1600  0.0380   0.600      85
UK   200  0.0200   0.240      15
RD  2800  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK MA10B
KM    MA10B
BA0.0100
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   900  0.0900   0.600      90
UK    50  0.0200   0.110      10
RD   200  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYA10BC
KM  0
HC     2
ZW C=FLOW
*
*
KKU0DCUL
KM  0
RS     1    FLOW      -1
SV  0.00    2.50    5.00    8.50   12.50
SQ   0.0   500.0  1200.0  2300.0  3500.0
ZW C=FLOW
*
* - - - - - -
*
*
KKMB7B3A
KM    MB7B3A
BA0.0051
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   500  0.0800   0.600      95
UK    50  0.0200   0.110       5
RD   550  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKMB7B4A
KM    MB7B4A
BA0.0156
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   500  0.0900   0.600      95
UK    50  0.0200   0.110       5
RD   570  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKMB7B3B
KM    MB7B3B
BA0.0064
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   600  0.0800   0.600      95
UK    50  0.0200   0.110       5
RD   600  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKMB7B4B
KM    MB7B4B
```

```
BA0.0044
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   400  0.0700   0.600      95
UK    50  0.0200   0.110       5
RD   500  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYB7B34
KM  0
HC     3
ZW C=FLOW
*
KKMB7B4C
KM    MB7B4C
BA0.0023
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   170  0.0530   0.600      95
UK    50  0.0200   0.110       5
RD   300  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
*
KKUA10EQ
KM  0
RS     1    FLOW      -1
SV  0.00    0.05    0.10    0.15    0.20    0.25
SQ   0.0     0.0     0.0     0.0    30.0    60.0
ZW C=FLOW
*
KKYA10EC
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KKMB7B1A
KM    MB7B1A
BA0.0709
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1300  0.1920   0.600  100.00
RD  3000  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKMB7B1C
KM    MB7B1C
BA0.0041
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   400  0.0800   0.600      95
UK    50  0.0200   0.110       5
RD   200  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKMB7B1B
KM    MB7B1B
BA0.0107
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   500  0.0800   0.600      95
UK    50  0.0200   0.110       5
RD   600  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKYMB7B1
KM  0
HC     2
ZW C=FLOW
*
KKMB7B1D
KM    MB7B1D
BA0.0146
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   500  0.0700   0.600      95
UK    50  0.0200   0.110       5
RD   650  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
```

```
*
KKMB7B1E
KM    MB7B1E
BA0.0054
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   500  0.0500   0.600      95
UK    50  0.0200   0.110       5
RD   350  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
*
KKUB7B1Q
KM  0
RS     1    FLOW      -1
SV  0.00    0.10    0.20    0.30    0.40    0.50
SQ   0.0     0.1     0.1     0.7    20.0    80.0
ZW C=FLOW
*
KK MB7B2
KM    MB7B2
BA0.0216
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK  1300  0.1920   0.600      95
UK    50  0.0200   0.110       5
RD   600  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
*
KKUB7B2Q
KM  0
RS     1    FLOW      -1
SV  0.00    0.33    0.66    1.00    1.33
SQ   0.0     0.2     0.3     0.3   150.0
ZW C=FLOW
*
KKYMB7BC
KM  0
HC     2
ZW C=FLOW
*
*
KKUPONDD
KM  0
RS     1    FLOW      -1
SV  0.00    1.00    2.00    3.00    4.00    5.00    6.00    7.00    8.00
SQ   0.0    50.0   100.0   200.0   400.0   600.0  1000.0  2000.0  4000.0
ZW C=FLOW
*
* - - - - - -
*
*
KK   MB1
KM     MB1
BA0.5333
PB
* PI
BF -38.7
LU  0.10  0.1880   2.000
UK  4000  0.2750   0.600  100.00
RD  2700  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK   MB2
KM     MB2
BA1.2667
PB
* PI
BF -38.7
LU  0.10  0.1920   2.000
UK  2800  0.3390   0.600  100.00
RD  3400  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK   MB3
KM     MB3
BA0.5006
PB
* PI
BF -38.7
LU  0.10  0.2180   2.000
UK  1800  0.2780   0.600  100.00
RD  1600  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK   MB4
KM     MB4
BA0.6535
PB
```

```
* PI
BF -38.7
LU  0.10  0.2450   2.000
UK  1900  0.1840   0.600  100.00
RD  4000  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK   MB5
KM     MB5
BA0.1602
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1800  0.2780   0.600  100.00
RD  1500  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK  MB6A
KM   AREA = 7.0 AC
BA0.0073
PB
* PI
BF -38.7
LU  0.10  0.2500   6.600
UK  1335  0.1543   0.600  100.00
RD   625  0.0800   0.060           TRAP     0.1     1.0
ZW C=FLOW
*
*
KKUB6ADT
KM  0
RS     1    FLOW      -1
SV  0.00    0.15    0.30    0.45
SQ   0.0   100.0   200.0   300.0
ZW C=FLOW
*
KKYMB6AC
KM  0
HC     2
ZW C=FLOW
*
*
KKUB6CUL
KM  0
RS     1    FLOW      -1
SV  0.00    2.50    5.00    8.50   12.50
SQ   0.0   500.0  1100.0  2000.0  3000.0
ZW C=FLOW
*
KK  MB6B
KM   AREA = 3.9 AC
BA0.0061
PB
* PI
BF -38.7
LU  0.10  0.2500  11.800
UK   240  0.0708   0.600  100.00
RD   520  0.0800   0.060           TRAP     0.1     1.0
ZW C=FLOW
*
*
KKUB6BDT
KM  0
RS     1    FLOW      -1
SV  0.00    0.15    0.30    0.45
SQ   0.0   100.0   200.0   300.0
ZW C=FLOW
*
KKYMB6BC
KM  0
HC     2
ZW C=FLOW
*
KK  MB6C
KM   AREA = 3.2 AC
BA0.0039
PB
* PI
BF -38.7
LU  0.10  0.2500   7.600
UK   370  0.1081   0.600  100.00
RD   490  0.0683   0.060           TRAP     0.1     1.0
ZW C=FLOW
*
*
KKUB6CDT
KM  0
RS     1    FLOW      -1
SV  0.00    0.15    0.30    0.45
SQ   0.0   100.0   200.0   300.0
ZW C=FLOW
*
KKYMB6CC
```

```
KM  0
HC     2
ZW C=FLOW
*
KK  MB6D
KM    MB6D
BA0.0223
PB
* PI
BF -38.7
LU  0.10  0.2460   2.000    0.10  0.2460  15.000
UK   200  0.1250   0.600      65
UK   200  0.0200   0.240      35
RD  1500  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK  MB6G
KM  MB6G
BA0.0109
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   500  0.1250   0.600      30
UK   200  0.0200   0.240      70
RD   500  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK  MB6F
KM  MB6F
BA0.0062
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   500  0.1250   0.600      30
UK   200  0.0200   0.240      70
RD   500  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK MB6D1
KM  MB6D1
BA0.0036
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   500  0.1250   0.600      30
UK   200  0.0200   0.240      70
RD   500  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYMB6D1
KM  0
HC     3
ZW C=FLOW
*
KK  MB6E
KM    MB6E
BA0.0050
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   500  0.1250   0.600      30
UK   200  0.0200   0.240      70
RD   500  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK YMB6E
KM  0
HC     2
ZW C=FLOW
*
*
KKUB6EDT
KM  0
RS     1    FLOW      -1
SV  0.00    0.15    0.30    0.45
SQ   0.0   100.0   200.0   300.0
ZW C=FLOW
*
KKYMB6EC
KM  0
HC     2
ZW C=FLOW
*
KKYMB6DD
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
```

```
*
KK MB7A1
KM     MB7A1
BA0.1465
PB
* PI
BF -38.7
LU  0.10  0.2080   2.000    0.10  0.2080  95.000
UK  1300  0.1920   0.600      97
UK    50  0.0200   0.110       3
RD  2500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKMB7A2A
KM     MB7A2A
BA0.0247
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   550  0.1920   0.600      92
UK    50  0.0200   0.110       8
RD   580  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKMB7A2B
KM     MB7A2B
BA0.0059
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   300  0.1920   0.600  100.00
RD   500  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
*
KKUB7A2Q
KM  0
RS     1    FLOW      -1
SV  0.00    0.12    0.25    0.38    0.50    0.62
SQ   0.0     0.1     0.1     0.1    20.0   120.0
ZW C=FLOW
*
KK  MB7C
KM     MB7C
BA0.0236
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   200  0.1000   0.600      92
UK    50  0.0200   0.110       8
RD   500  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKMB7D1A
KM     MB7D1A
BA0.0044
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   500  0.1000   0.600      79
UK    50  0.0200   0.110      21
RD   200  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKMB7D1B
KM     MB7D1B
BA0.0025
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   300  0.1000   0.600      79
UK    50  0.0200   0.110      21
RD   400  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYB7D1C
KM  0
HC     2
ZW C=FLOW
*
KK MB7D1
KM     MB7D1
BA0.0011
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   100  0.1000   0.600  100.00
RD   300  0.0500   0.060            TRAP    10.0    10.0     YES
```

```
ZW C=FLOW
*
KK MB7D2
KM     MB7D2
BA0.0215
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   200  0.1000   0.600      95
UK    50  0.0200   0.110       5
RD   500  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKYMB7CC
KM  0
HC     2
ZW C=FLOW
*
KK  MB7E
KM     MB7E
BA0.0585
PB
* PI
BF -38.7
LU  0.10  0.2470   2.000    0.10  0.2470  95.000
UK   200  0.1000   0.600      96
UK    50  0.0200   0.110       4
RD  1500  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
*
KKUB8SWQ
KM  0
RS     1    FLOW      -1
SV  0.00    0.25    0.50    0.75    1.00
SQ   0.0     0.2     0.2     0.2   200.0
ZW C=FLOW
*
KKYMB7EC
KM  0
HC     2
ZW C=FLOW
*
KK   MB8
KM     MB8
BA0.0545
PB
* PI
BF -38.7
LU  0.10  0.2140   2.000    0.10  0.2140  15.000
UK  1000  0.1000   0.600      85
UK   200  0.0200   0.240      15
RD  2500  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
* - - - - - -
*
*
KK   MC1
KM   AREA = 258.6 AC
BA0.4041
PB
* PI
BF -38.7
LU  0.10  0.2390   2.000
UK  1530  0.4281   0.600  100.00
RD  5300  0.2394   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  MC2A
KM   AREA = 59.1 AC
BA0.0923
PB
* PI
BF -38.7
LU  0.10  0.2500   2.200
UK  1035  0.4010   0.600  100.00
RD  2590  0.3421   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMC2AC
KM  0
HC     2
ZW C=FLOW
*
KK  MC2B
KM   AREA = 0.9 AC
BA0.0014
PB
* PI
BF -38.7
LU  0.10  0.2500  10.300
UK   550  0.0764   0.600  100.00
```

```
RD   200  0.0800   0.060           TRAP     0.1     1.0
ZW C=FLOW
*
KK  MC2K
KM  MC2K
BA0.0001
PB
* PI
BF -38.7
LU  0.10  0.2500   4.700
UK  1225  0.1551   0.600  100.00
RD   565  0.0800   0.060           TRAP     0.1     1.0
ZW C=FLOW
*
KK YMC2K
KM  0
HC     2
ZW C=FLOW
*
*
KKUC2BDT
KM  0
RS     1    FLOW      -1
SV  0.00    0.15    0.30    0.45
SQ   0.0   100.0   200.0   300.0
ZW C=FLOW
*
KKYMC2BC
KM  0
HC     2
ZW C=FLOW
*
KK  MD1D
KM     MD1d AREA = 5.9 AC
BA0.0092
PB
* PI
BF -38.7
LU  0.10  0.2500   3.400
UK   800  0.2375   0.600  100.00
RD   190  0.0414   0.060           TRAP     0.1     1.0
ZW C=FLOW
*
KK  MD1B
KM     MD1b AREA = 5.9 AC
BA0.0092
PB
* PI
BF -38.7
LU  0.10  0.2500   3.600
UK   800  0.2375   0.600  100.00
RD   260  0.0414   0.060           TRAP     0.1     1.0
ZW C=FLOW
*
KK YMD1B
KM  0
HC     2
ZW C=FLOW
*
KK MC2A2
KM  MC2A2
BA0.0061
PB
* PI
BF -38.7
LU  0.10  0.2500   4.700
UK  1225  0.1551   0.600  100.00
RD   565  0.0800   0.060           TRAP     0.1     1.0
ZW C=FLOW
*
KKYMC2A2
KM  0
HC     3
ZW C=FLOW
*
KK  MD1C
KM    MD1c AREA = 2.9 AC
BA0.0045
PB
* PI
BF -38.7
LU  0.10  0.2500   7.900
UK   500  0.2178   0.600  100.00
RD   364  0.2178   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK MC2A3
KM  MC2A3
BA0.0044
PB
* PI
BF -38.7
LU  0.10  0.2500   4.700
UK  1225  0.1551   0.600  100.00
```

```
RD   565  0.0800   0.060           TRAP     0.1     1.0
ZW C=FLOW
*
KKYMC2A3
KM  0
HC     3
ZW C=FLOW
*
KK  MC2D
KM   AREA = 7.8 AC
BA0.0122
PB
* PI
BF -38.7
LU  0.10  0.2500   4.700
UK  1225  0.1551   0.600  100.00
RD   565  0.0800   0.060           TRAP     0.1     1.0
ZW C=FLOW
*
*
KKUC2DDT
KM  0
RS     1    FLOW      -1
SV  0.00    0.15    0.30    0.45
SQ   0.0   100.0   200.0   300.0
ZW C=FLOW
*
KK  MC2E
KM   AREA = 3.9 AC
BA0.0060
PB
* PI
BF -38.7
LU  0.10  0.2500   8.500
UK   895  0.1777   0.600  100.00
RD   565  0.0800   0.060           TRAP     0.1     1.0
ZW C=FLOW
*
*
KKUC2EDT
KM  0
RS     1    FLOW      -1
SV  0.00    0.15    0.30    0.45
SQ   0.0   100.0   200.0   300.0
ZW C=FLOW
*
KKYMC2EC
KM  0
HC     2
ZW C=FLOW
*
KK  MC2G
KM   AREA = 9.7 AC
BA0.0151
PB
* PI
BF -38.7
LU  0.10  0.2500  90.000
UK   395  0.2051   0.600  100.00
RD   360  0.0800   0.060           TRAP     0.1     1.0
ZW C=FLOW
*
KK YMC2G
KM  0
HC     2
ZW C=FLOW
*
KK  MC2H
KM   AREA = 2.4 AC
BA0.0038
PB
* PI
BF -38.7
LU  0.10  0.2500   9.500
UK   365  0.1096   0.600  100.00
RD   530  0.0800   0.060           TRAP     0.1     1.0
ZW C=FLOW
*
KKYMC2HC
KM  0
HC     2
ZW C=FLOW
*
KK  MC2L
KM  MC2L
BA0.0519
PB
* PI
BF -38.7
LU  0.10  0.2500  10.300
UK   550  0.0764   0.600  100.00
RD   200  0.0800   0.060           TRAP     0.1     1.0
ZW C=FLOW
*
```

```
KK YMC2L
KM  0
HC     3
ZW C=FLOW
*
KK  MC2I
KM   AREA = 0.7 AC
BA0.0011
PB
* PI
BF -38.7
LU  0.10  0.2500  24.300
UK   225  0.1289   0.600  100.00
RD   100  0.0800   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
KK  MC2J
KM   AREA = 0.6 AC
BA0.0011
PB
* PI
BF -38.7
LU  0.10  0.2500  19.200
UK   225  0.1600   0.600  100.00
RD   310  0.0800   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
KKYMC2IC
KM  0
HC     2
ZW C=FLOW
*
KK YMC2I
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK  MD4A
KM     MD4A
BA0.1163
PB
* PI
BF -38.7
LU  0.10  0.2500   2.500
UK   500  0.4140   0.600  100.00
RD  2399  0.3040   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  MD3C
KM     MD3c AREA = 6.9 AC = 0.01078 SQ MI % IMPERV = 4.6
BA0.0108
PB
* PI
BF -38.7
LU  0.10  0.2500   4.400
UK   500  0.3184   0.600  100.00
RD   737  0.3184   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD3C
KM  0
HC     2
ZW C=FLOW
*
KK  MD3B
KM     MD3b AREA = 8.5 AC = 0.01328 SQ MI % IMPERV = 3.8
BA0.0133
PB
* PI
BF -38.7
LU  0.10  0.2500   3.600
UK   500  0.3073   0.600  100.00
RD  1173  0.3073   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMD3BC
KM  0
HC     2
ZW C=FLOW
*
KK MD3A1
KM     MD3a AREA = 25.4 AC = 0.03969 SQ MI % IMPERV = 2.6
BA0.0397
PB
* PI
BF -38.7
LU  0.10  0.2500   2.500
UK   500  0.3458   0.600  100.00
RD  2530  0.3458   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
```

```
KKYMD3A1
KM  0
HC     2
ZW C=FLOW
*
KK MD1A1
KM     MD1a  AREA = 3.0 AC = 0.00469 SQ MI % IMPERV = 7.1
BA0.0047
PB
* PI
BF -38.7
LU  0.10  0.2500   6.400
UK   500  0.2420   0.600  100.00
RD   135  0.2420   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMD1A1
KM  0
HC     2
ZW C=FLOW
*
KK MC2A4
KM   AREA = 59.1 AC
BA0.0022
PB
* PI
BF -38.7
LU  0.10  0.2500   2.200
UK  1035  0.4010   0.600  100.00
RD  2590  0.3421   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMC2A4
KM  0
HC     2
ZW C=FLOW
*
KKYC2A4C
KM  0
HC     2
ZW C=FLOW
*
KK YMD8C
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK MD1B1
KM   MD1B1
BA0.0157
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   800  0.0500   0.600      51
UK    50  0.0200   0.110      49
RD  1000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK MD1B2
KM   MD1B2
BA0.0392
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   800  0.0800   0.600      94
UK    50  0.0200   0.110       6
RD  1000  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKYMD1B2
KM  0
HC     2
ZW C=FLOW
*
KK  MD1A
KM     MD1a  AREA = 3.0 AC = 0.00469 SQ MI % IMPERV = 7.1
BA0.0581
PB
* PI
BF -38.7
LU  0.10  0.1940   6.400
UK   500  0.2420   0.600  100.00
RD   135  0.2420   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD1A
KM  0
HC     2
ZW C=FLOW
```

```
*
KKYMD1C4
KM  0
HC     2
ZW C=FLOW
*
KK  MD2D
KM     MD2D
BA0.0040
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   550  0.0350   0.600      90
UK    50  0.0200   0.110      10
RD   350  0.0300   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KK YMD2D
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK  MD3D
KM     MD3d
BA0.0094
PB
* PI
BF -38.7
LU  0.10  0.2500   8.000
UK   682  0.1610   0.600  100.00
RD   200  0.2350   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKMD1E1A
KM  MD1E1A
BA0.0018
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   600  0.0800   0.600      95
UK    50  0.0200   0.110       5
RD  1000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYD1E1A
KM  0
HC     2
ZW C=FLOW
*
KK   MD6
KM     MD6
BA0.0072
PB
* PI
BF -38.7
LU  0.10  0.2500   7.500
UK   635  0.1560   0.600  100.00
RD   300  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  YMD6
KM  0
HC     2
ZW C=FLOW
*
KK   MD1
KM     MD1  AREA = 5.7 AC = 0.00891 SQ MI % IMPERV = 14.0
BA0.0088
PB
* PI
BF -38.7
LU  0.10  0.2500  13.000
UK   483  0.1451   0.600  100.00
RD   100  0.1451   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  MD2A
KM  MD2A
BA0.0026
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   250  0.0350   0.600      90
UK    50  0.0200   0.110      10
RD   300  0.0400   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KK YMD2A
```

```
KM  0
HC     2
ZW C=FLOW
*
KKYMD6CC
KM  0
HC     2
ZW C=FLOW
*
KK  MD27
KM     MD27
BA0.0048
PB
* PI
BF -38.7
LU  0.10  0.2500  11.000
UK   559  0.0500   0.600  100.00
RD   123  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD27
KM  0
HC     2
ZW C=FLOW
*
KK MD28A
KM     MD28A
BA0.0043
PB
* PI
BF -38.7
LU  0.10  0.2500  15.200
UK   559  0.0500   0.600  100.00
RD   123  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMD28A
KM  0
HC     2
ZW C=FLOW
*
KK MD28B
KM     MD28B
BA0.0092
PB
* PI
BF -38.7
LU  0.10  0.2500   4.800
UK   559  0.0500   0.600  100.00
RD   123  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  MD3A
KM     MD3a AREA = 25.4 AC = 0.03969 SQ MI % IMPERV = 2.6
BA0.0076
PB
* PI
BF -38.7
LU  0.10  0.2500   2.500
UK   500  0.3458   0.600  100.00
RD  2530  0.3458   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMD28B
KM  0
HC     3
ZW C=FLOW
*
KK YMD3A
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK  MD7B
KM     MD7B
BA0.0042
PB
* PI
BF -38.7
LU  0.10  0.2500   9.000
UK   760  0.0500   0.600  100.00
RD   160  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
*
KKUD7BDT
KM  0
RS     1    FLOW      -1
SV  0.00    0.15    0.30    0.45
SQ   0.0   100.0   200.0   300.0
ZW C=FLOW
```

```
*
KK  MD4C
KM     MD4c
BA0.0056
PB
* PI
BF -38.7
LU  0.10  0.2500   8.800
UK   626  0.0500   0.600  100.00
RD   200  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD4C
KM  0
HC     2
ZW C=FLOW
*
KK  MD4E
KM  MD4E
BA0.0016
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1500  0.2830   0.600  100.00
RD  1100  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD4E
KM  0
HC     2
ZW C=FLOW
*
KK  MD4D
KM     MD4d
BA0.0062
PB
* PI
BF -38.7
LU  0.10  0.2500   7.500
UK   895  0.1010   0.600  100.00
RD   350  0.2980   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD4D
KM  0
HC     2
ZW C=FLOW
*
KK   MD9
KM     MD9
BA0.0106
PB
* PI
BF -38.7
LU  0.10  0.2500   7.900
UK   824  0.2530   0.600  100.00
RD   572  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK   MD8
KM     MD8
BA0.0047
PB
* PI
BF -38.7
LU  0.10  0.2500   4.800
UK   519  0.1260   0.600  100.00
RD   354  0.2350   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  YMD8
KM  0
HC     3
ZW C=FLOW
*
KK  YMD9
KM  0
HC     2
ZW C=FLOW
*
KK  MD6A
KM  MD6A
BA0.1279
PB
* PI
BF -38.7
LU  0.10  0.2190   7.500
UK   635  0.1560   0.600  100.00
RD   300  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD6A
KM  0
```

```
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK  MD7D
KM     MD7d
BA0.0051
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   500  0.1060   0.600  100.00
RD   723  0.0640   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  MD7C
KM     MD7c
BA0.0061
PB
* PI
BF -38.7
LU  0.10  0.2500   3.200
UK   500  0.1060   0.600  100.00
RD   741  0.0640   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD7C
KM  0
HC     2
ZW C=FLOW
*
KK  MD7E
KM  MD7E
BA0.0094
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK  1200  0.3130   0.600      90
UK  1200  0.3000   0.240      10
RD  2000  0.0200   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD7E
KM  0
HC     2
ZW C=FLOW
*
KK  MD7F
KM  MD7F
BA0.0067
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK  1200  0.3130   0.600      90
UK  1200  0.3000   0.240      10
RD  2000  0.0200   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD7F
KM  0
HC     2
ZW C=FLOW
*
KK  MD11
KM     MD11
BA0.0056
PB
* PI
BF -38.7
LU  0.10  0.2500   4.800
UK   595  0.0500   0.600  100.00
RD   200  0.3330   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD11
KM  0
HC     2
ZW C=FLOW
*
KKYMD7FC
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK  MD2B
KM     MD2B
BA0.0056
```

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PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   690  0.0460   0.600      90
UK    50  0.0200   0.110      10
RD   130  0.0100   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KK  ME3A
KM     ME3A
BA0.0040
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   420  0.0380   0.600      90
UK    50  0.0200   0.110      10
RD   200  0.0300   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KK YME3A
KM  0
HC     2
ZW C=FLOW
*
*
KKUE3CUL
KM  0
RS     1    FLOW      -1
SV  0.00    2.50    5.00    8.50   12.50   17.50
SQ   0.0   500.0  1200.0  2300.0  3500.0  5500.0
ZW C=FLOW
*
KKYME3AC
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK  MD17
KM     MD17
BA0.0075
PB
* PI
BF -38.7
LU  0.10  0.2500   5.700
UK   830  0.1260   0.600  100.00
RD   150  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  MD18
KM    MD18
BA0.0051
PB
* PI
BF -38.7
LU  0.10  0.2500   6.000
UK   930  0.1480   0.600  100.00
RD   200  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  MD19
KM     MD19
BA0.0056
PB
* PI
BF -38.7
LU  0.10  0.2500   6.100
UK  1055  0.2100   0.600  100.00
RD   150  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD19
KM  0
HC     3
ZW C=FLOW
*
KKYMD19C
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK MD2A1
KM     MD2A
BA0.0019
PB
* PI
BF -38.7
```

```
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   250  0.0350   0.600      90
UK    50  0.0200   0.110      10
RD   300  0.0400   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KK   MD2
KM     MD2
BA0.0059
PB
* PI
BF -38.7
LU  0.10  0.2500  16.800
UK   295  0.1250   0.600  100.00
RD   200  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  YMD2
KM  0
HC     2
ZW C=FLOW
*
KK ME3A2
KM    ME3A2
BA0.0062
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   500  0.0440   0.600      90
UK    50  0.0200   0.110      10
RD   300  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KK YMD2C
KM  0
HC     2
ZW C=FLOW
*
KKYME3A2
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK  MD13
KM     MD13
BA0.4368
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   500  0.4770   0.600  100.00
RD  5450  0.3010   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKME6_19
KM  ME6_19
BA0.0236
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   330  0.0530   0.600  100.00
RD   522  0.0880   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKME6_14
KM  ME6_14
BA0.0063
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   330  0.0530   0.600  100.00
RD   522  0.0880   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME614
KM  0
HC     2
ZW C=FLOW
*
KK YMD13
KM  0
HC     2
ZW C=FLOW
*
KK  MD12
KM     MD12
BA0.0428
PB
```

```
* PI
BF -38.7
LU  0.10  0.2500   2.500
UK   500  0.1060   0.600  100.00
RD  2855  0.0640   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD12
KM  0
HC     2
ZW C=FLOW
*
KK MD12B
KM     MD12b
BA0.0024
PB
* PI
BF -38.7
LU  0.10  0.2500  24.700
UK   352  0.2560   0.600  100.00
RD   190  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK MD12C
KM     MD12c
BA0.0084
PB
* PI
BF -38.7
LU  0.10  0.2500   6.500
UK   500  0.2050   0.600  100.00
RD   498  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMD12C
KM  0
HC     2
ZW C=FLOW
*
KK MD14B
KM     MD14b
BA0.0016
PB
* PI
BF -38.7
LU  0.10  0.2500  12.600
UK   500  0.1060   0.600  100.00
RD    42  0.0640   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMD14B
KM  0
HC     2
ZW C=FLOW
*
KK MD14C
KM     MD14c
BA0.0060
PB
* PI
BF -38.7
LU  0.10  0.2500   4.300
UK   500  0.1060   0.600  100.00
RD   406  0.0640   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMD14C
KM  0
HC     3
ZW C=FLOW
*
KKME6_13
KM   1.17 AC
BA0.0022
PB
* PI
BF -38.7
LU  0.10  0.2500   2.900
UK   525  0.1750   0.600  100.00
RD   345  0.0800   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK ME8_3
KM   3.07 AC
BA0.0048
PB
* PI
BF -38.7
LU  0.10  0.2500   7.400
UK   675  0.1640   0.600  100.00
RD   100  0.1700   0.060            TRAP     0.1     2.0
ZW C=FLOW
*
KKYME8_3
```

```
KM  0
HC     2
ZW C=FLOW
*
KK YME83
KM  0
HC     2
ZW C=FLOW
*
KK MD13B
KM  MD13B
BA0.0392
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   500  0.4770   0.600  100.00
RD  5450  0.3010   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYMD13B
KM  0
HC     2
ZW C=FLOW
*
KK  MD14
KM     MD14
BA0.0060
PB
* PI
BF -38.7
LU  0.10  0.2500   9.300
UK   663  0.1650   0.600  100.00
RD   280  0.3210   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK MD14A
KM  MD14A
BA0.0009
PB
* PI
BF -38.7
LU  0.10  0.2500   9.300
UK   663  0.1650   0.600  100.00
RD   280  0.3210   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYMD14A
KM  0
HC     2
ZW C=FLOW
*
KKYD14AC
KM  0
HC     2
ZW C=FLOW
*
KK ME3_5
KM  ME3_5
BA0.0007
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   300  0.1000   0.600      65
UK   300  0.1000   0.240      35
RD  1500  0.1000   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYME3_5
KM  0
HC     2
ZW C=FLOW
*
KK  MD15
KM    MD15
BA0.0073
PB
* PI
BF -38.7
LU  0.10  0.2500   9.200
UK   870  0.1590   0.600  100.00
RD   140  0.3210   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK MD15A
KM  MD15A
BA0.0002
PB
* PI
BF -38.7
LU  0.10  0.2500   9.200
UK   870  0.1590   0.600  100.00
RD   140  0.3210   0.060           TRAP    10.0    10.0
```

```
ZW C=FLOW
*
KKYMD15A
KM  0
HC     2
ZW C=FLOW
*
KK MD16A
KM  MD16A
BA0.0036
PB
* PI
BF -38.7
LU  0.10  0.2500  10.000
UK   772  0.1250   0.600  100.00
RD   150  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMD16A
KM  0
HC     2
ZW C=FLOW
*
KK  MD16
KM     MD16
BA0.0063
PB
* PI
BF -38.7
LU  0.10  0.2500  10.000
UK   772  0.1250   0.600  100.00
RD   150  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD16
KM  0
HC     2
ZW C=FLOW
*
KKYMD16C
KM  0
HC     2
ZW C=FLOW
*
KK MD13C
KM  MD13C
BA0.0068
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   500  0.4770   0.600  100.00
RD  5450  0.3010   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMD13C
KM  0
HC     2
ZW C=FLOW
*
KK  MD20
KM     MD20
BA0.0020
PB
* PI
BF -38.7
LU  0.10  0.2500   9.000
UK   740  0.0500   0.600  100.00
RD   180  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD20
KM  0
HC     2
ZW C=FLOW
*
KKYD13CC
KM  0
HC     2
ZW C=FLOW
*
KK  ME3B
KM     ME3B
BA0.0182
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   300  0.1000   0.600      65
UK   300  0.1000   0.240      35
RD  1500  0.1000   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
* - - - - - -
```

```
*
*
KKGS31B1
KM    GS31B1
BA0.0029
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   580  0.0380   0.600      90
UK    50  0.0200   0.110      10
RD   275  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKGS31B2
KM    GS31B2
BA0.0047
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   690  0.0570   0.600      90
UK    50  0.0200   0.110      10
RD   340  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKGS31B3
KM    GS31B3
BA0.0056
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   530  0.0600   0.600      90
UK    50  0.0200   0.110      10
RD   250  0.0400   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKYGS311
KM  0
HC     3
ZW C=FLOW
*
KKGS31B4
KM    GS31B4
BA0.0012
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   250  0.0480   0.600      90
UK    50  0.0200   0.110      10
RD   150  0.0400   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKGS31B5
KM    GS31B5
BA0.0056
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   500  0.0500   0.600      90
UK    50  0.0200   0.110      10
RD   350  0.0400   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKYGS312
KM  0
HC     3
ZW C=FLOW
*
KKYS31BC
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK ME8_1
KM   0.48 AC
BA0.0007
PB
* PI
BF -38.7
LU  0.10  0.2500  26.000
UK   180  0.0660   0.600  100.00
RD    80  0.0600   0.060            TRAP     0.1     2.0
ZW C=FLOW
*
KK ME3_1
KM  ME3_1
BA0.0009
```

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PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   300  0.1000   0.600      65
UK   300  0.1000   0.240      35
RD  1500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME3_1
KM  0
HC     2
ZW C=FLOW
*
KK ME3_2
KM  ME3_2
BA0.0024
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   300  0.1000   0.600      65
UK   300  0.1000   0.240      35
RD  1500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME3_2
KM  0
HC     2
ZW C=FLOW
*
KK ME3_3
KM  ME3_3
BA0.0031
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   300  0.1000   0.600      65
UK   300  0.1000   0.240      35
RD  1500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME3_3
KM  0
HC     2
ZW C=FLOW
*
KK ME3_4
KM  ME3_4
BA0.0024
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   300  0.1000   0.600      65
UK   300  0.1000   0.240      35
RD  1500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME3_4
KM  0
HC     2
ZW C=FLOW
*
KK  MD21
KM     MD21
BA0.0033
PB
* PI
BF -38.7
LU  0.10  0.2500   7.200
UK   640  0.0500   0.600  100.00
RD   150  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD21
KM  0
HC     2
ZW C=FLOW
*
KK ME3C3
KM  ME3C3
BA0.0066
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   300  0.1000   0.600      65
UK   300  0.1000   0.240      35
RD  1500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME3C3
```

```
KM  0
HC     2
ZW C=FLOW
*
KK ME3C1
KM  ME3C1
BA0.0016
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   300  0.1000   0.600      65
UK   300  0.1000   0.240      35
RD  1500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME3C1
KM  0
HC     2
ZW C=FLOW
*
KKYME3CC
KM  0
HC     2
ZW C=FLOW
*
KK  ME4A
KM     ME4A
BA0.0939
PB
* PI
BF -38.7
LU  0.10  0.2320   2.000    0.10  0.2320  15.000
UK   500  0.1200   0.600      90
UK   300  0.1200   0.240      10
RD  2500  0.1000   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
* - - - - - -
*
*
KKME6_11
KM   0.13 AC
BA0.0002
PB
* PI
BF -38.7
LU  0.10  0.2500  49.100
UK    30  0.0200   0.110  100.00
RD    95  0.0600   0.060            TRAP     0.1    50.0
ZW C=FLOW
*
KKME6_10
KM   0.21 AC
BA0.0003
PB
* PI
BF -38.7
LU  0.10  0.2500  67.300
UK    30  0.0200   0.110  100.00
RD   235  0.0600   0.060            TRAP     0.1    50.0
ZW C=FLOW
*
KKYME610
KM  CME610
HC     2
ZW C=FLOW
*
KKME6_25
KM   7.81 AC
BA0.0094
PB
* PI
BF -38.7
LU  0.10  0.2500   7.100
UK   125  0.1600   0.600  100.00
RD   235  0.1149   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME625
KM  0
HC     2
ZW C=FLOW
*
KKME6_33
KM  ME6_33
BA0.0026
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   330  0.0530   0.600  100.00
RD   522  0.0880   0.060            TRAP    10.0    10.0
ZW C=FLOW
```

```
*
KKYME633
KM  0
HC     2
ZW C=FLOW
*
KKME6_26
KM   0.43 AC
BA0.0008
PB
* PI
BF -38.7
LU  0.10  0.2500   3.000
UK   200  0.1300   0.600  100.00
RD   205  0.1268   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYME626
KM  0
HC     2
ZW C=FLOW
*
KK ME7_1
KM   8.34 AC
BA0.0127
PB
* PI
BF -38.7
LU  0.10  0.2500   4.600
UK   470  0.2468   0.600  100.00
RD   340  0.1471   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYME7_1
KM  CME7_1
HC     2
ZW C=FLOW
*
KK ME7_2
KM   0.25 AC
BA0.0004
PB
* PI
BF -38.7
LU  0.10  0.2500  83.600
UK    30  0.0200   0.110  100.00
RD   620  0.0800   0.060           TRAP     0.1    50.0
ZW C=FLOW
*
KKYME7_2
KM  0
HC     2
ZW C=FLOW
*
KK ME7D6
KM  ME7D6
BA0.0060
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   500  0.1800   0.600      75
UK   300  0.1800   0.240      25
RD  1000  0.1000   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYME7D6
KM  0
HC     2
ZW C=FLOW
*
KKME7D14
KM  ME7D14
BA0.0037
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   150  0.1300   0.600  100.00
RD   300  0.1200   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKME7D16
KM  ME7D16
BA0.0018
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   177  0.0450   0.600  100.00
RD   430  0.1200   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKME7D15
```

```
KM  ME7D15
BA0.0031
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   175  0.0570   0.600  100.00
RD   570  0.1100   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKYM7D14
KM  0
HC     2
ZW C=FLOW
*
KKME7D24
KM  ME7D24
BA0.0022
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   144  0.0900   0.600  100.00
RD   270  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYM7D24
KM  0
HC     2
ZW C=FLOW
*
KKME4B13
KM  ME4B13
BA0.0056
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   270  0.0200   0.600  100.00
RD   515  0.0540   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYM4B13
KM  0
HC     2
ZW C=FLOW
*
KK ME7C4
KM  ME7C4
BA0.0054
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   500  0.1500   0.600       5
UK   300  0.1500   0.240      95
RD  1000  0.1000   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK ME7C5
KM  ME7C5
BA0.0061
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   500  0.1500   0.600       5
UK   300  0.1500   0.240      95
RD  1000  0.1000   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYME7C5
KM  0
HC     2
ZW C=FLOW
*
KK ME4B3
KM  ME4B3
BA0.0029
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   300  0.0500   0.600      15
UK   300  0.0500   0.240      85
RD  2000  0.1000   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYME4B3
KM  0
HC     2
ZW C=FLOW
*
*
```

```
KKUE4BDT
KM  0
RS     1    FLOW      -1
SV  0.00    0.15    0.30    0.45
SQ   0.0   100.0   200.0   300.0
ZW C=FLOW
*
KKME4B12
KM  ME4B12
BA0.0065
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   430  0.0180   0.600  100.00
RD   720  0.0700   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME4BC
KM  0
HC     2
ZW C=FLOW
*
KKYM4BCC
KM  0
HC     2
ZW C=FLOW
*
KKME4B23
KM  ME4B23
BA0.0088
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   210  0.0700   0.600  100.00
RD   400  0.0600   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKME4B22
KM  ME4B22
BA0.0074
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   220  0.1000   0.600  100.00
RD   720  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK ME3C2
KM  ME3C2
BA0.0032
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   300  0.1600   0.600      60
UK   300  0.1600   0.240      40
RD  1500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKME4B11
KM  ME4B11
BA0.0049
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   340  0.0530   0.600  100.00
RD   530  0.0750   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKME4B21
KM  ME4B21
BA0.0024
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   220  0.1000   0.600  100.00
RD   720  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKME4B10
KM  ME4B-10
BA0.0027
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   150  0.0800   0.600  100.00
RD   275  0.0700   0.060           TRAP     10.0    10.0
ZW C=FLOW
```

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*
KK  ME4B
KM     ME4B
BA0.0055
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   300  0.0500   0.600      15
UK   300  0.0500   0.240      85
RD  2000  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YME4B
KM  0
HC     2
ZW C=FLOW
*
KKYME4CC
KM  0
HC     3
ZW C=FLOW
*
KKYM4CCC
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KKMG3_3B
KM  MG3_3B
BA0.1460
PB
* PI
BF -38.7
LU  0.10  0.2500   2.900
UK   575  0.2250   0.600  100.00
RD   925  0.2260   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKMG3_3C
KM  MG3_3C
BA0.0127
PB
* PI
BF -38.7
LU  0.10  0.2500   2.900
UK   575  0.2250   0.600  100.00
RD   925  0.2260   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMG_3C
KM  0
HC     2
ZW C=FLOW
*
KKME6_12
KM   14.48 AC
BA0.0096
PB
* PI
BF -38.7
LU  0.10  0.2500   3.400
UK   600  0.2950   0.600  100.00
RD  1920  0.2495   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME_12
KM  0
HC     2
ZW C=FLOW
*
KKME6_16
KM   10.41 AC
BA0.0002
PB
* PI
BF -38.7
LU  0.10  0.2500   4.400
UK   600  0.2950   0.600  100.00
RD  1595  0.3003   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME_16
KM  0
HC     2
ZW C=FLOW
*
KKME6_18
KM   2.92 AC
BA0.0046
PB
```

```
* PI
BF -38.7
LU  0.10  0.2500  10.200
UK   150  0.2133   0.600  100.00
RD   155  0.1032   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME_18
KM  0
HC     2
ZW C=FLOW
*
KKME6_20
KM   3.75 AC
BA0.0060
PB
* PI
BF -38.7
LU  0.10  0.2500   6.300
UK   200  0.2100   0.600  100.00
RD   155  0.2330   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKME6_24
KM   0.70 AC
BA0.0026
PB
* PI
BF -38.7
LU  0.10  0.2500  18.600
UK   305  0.0910   0.600  100.00
RD   120  0.0300   0.060            TRAP     0.1    50.0
ZW C=FLOW
*
KKYME_24
KM  0
HC     3
ZW C=FLOW
*
KKME6_23
KM   4.19 AC
BA0.0065
PB
* PI
BF -38.7
LU  0.10  0.2500   8.200
UK   200  0.1700   0.600  100.00
RD   265  0.1060   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKME6_32
KM   0.39 AC
BA0.0006
PB
* PI
BF -38.7
LU  0.10  0.2500  33.900
UK    24  0.0200   0.110  100.00
RD   415  0.0800   0.060            TRAP     0.1    50.0
ZW C=FLOW
*
KKYME_32
KM  0
HC     2
ZW C=FLOW
*
KKME6_28
KM   4.93 AC
BA0.0077
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   355  0.1130   0.600  100.00
RD   590  0.1010   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK ME627
KM   1.77 AC
BA0.0027
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   120  0.1070   0.600  100.00
RD   400  0.1057   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME627
KM  0
HC     2
ZW C=FLOW
*
KKME6_29
```

```
KM   1.37 AC
BA0.0021
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   370  0.1140   0.600  100.00
RD   335  0.0930   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME_29
KM  0
HC     2
ZW C=FLOW
*
KKME6_30
KM   1.27 AC
BA0.0020
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   295  0.0880   0.600  100.00
RD   195  0.0790   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKME6A25
KM  ME6A25
BA0.0029
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   330  0.0530   0.600  100.00
RD   522  0.0880   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYM6A25
KM  0
HC     2
ZW C=FLOW
*
KK  ME7B
KM     ME7B
BA0.0270
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   400  0.0500   0.600      75
UK   300  0.0500   0.240      25
RD  1500  0.1000   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
*
KKUE7BDT
KM  0
RS     1    FLOW      -1
SV  0.00    0.15    0.30    0.45
SQ   0.0   100.0   200.0   300.0
ZW C=FLOW
*
KK  ME7A
KM     ME7A
BA0.1404
PB
* PI
BF -38.7
LU  0.10  0.2270   2.000    0.10  0.2270  15.000
UK  1300  0.1920   0.600      10
UK   300  0.1900   0.240      90
RD  3000  0.1000   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKYME7AC
KM  0
HC     2
ZW C=FLOW
*
KK YGSMC
KM  0
HC     2
ZW C=FLOW
*
KKVGSMCR
KM  0
RD  2000  0.0100   0.040            TRAP    10.0    10.0
ZW C=FLOW
*
KK   MF1
KM     MF1
BA0.3780
PB
* PI
```

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BF -38.7
LU  0.10  0.2050   2.000
UK  1500  0.0870   0.600  100.00
RD  2000  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK YMF1C
KM  0
HC     2
ZW C=FLOW
*
KKVMF1CR
KM  0
RD  2000  0.0100   0.040           TRAP    10.0    10.0
ZW C=FLOW
*
KK   MF2
KM     MF2
BA0.0582
PB
* PI
BF -38.7
LU  0.10  0.2470   2.000
UK  1000  0.0700   0.600  100.00
RD  2000  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK YMF2C
KM  0
HC     2
ZW C=FLOW
*
KKVMF2CR
KM  0
RD  3000  0.0100   0.040           TRAP    10.0    10.0
ZW C=FLOW
*
* - - - - - -
*
*
KKMD4_1A
KM     MD4
BA0.1899
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1500  0.2830   0.600  100.00
RD  1100  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKMG4_1B
KM     6.35 AC
BA0.0100
PB
* PI
BF -38.7
LU  0.10  0.2500   2.100
UK   500  0.3500   0.600  100.00
RD   491  0.4296   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKMG5_2A
KM   8.61 AC
BA0.0134
PB
* PI
BF -38.7
LU  0.10  0.2500   3.200
UK   600  0.2033   0.600  100.00
RD  1065  0.3014   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYMG52A
KM  0
HC     3
ZW C=FLOW
*
KK MG3_1
KM   1.78 AC
BA0.0028
PB
* PI
BF -38.7
LU  0.10  0.2500   5.400
UK   500  0.2800   0.600  100.00
RD  1070  0.3293   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKMG3_1A
KM   1.00 AC
BA0.0016
PB
* PI
```

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BF -38.7
LU  0.10  0.2500   5.400
UK   498  0.2800   0.600  100.00
RD   575  0.3270   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMG31A
KM  0
HC     2
ZW C=FLOW
*
KKMG3_1C
KM   1.47 AC
BA0.0023
PB
* PI
BF -38.7
LU  0.10  0.2500   5.400
UK   498  0.2811   0.600  100.00
RD   567  0.3422   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMG31C
KM  0
HC     2
ZW C=FLOW
*
KK MG3_6
KM   0.09 AC
BA0.0002
PB
* PI
BF -38.7
LU  0.10  0.2500  90.000
UK    30  0.0200   0.110  100.00
RD   360  0.0120   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
KK YMG36
KM  0
HC     2
ZW C=FLOW
*
KK MG4_2
KM   4.61 AC
BA0.0072
PB
* PI
BF -38.7
LU  0.10  0.2500   3.100
UK   500  0.2840   0.600  100.00
RD   535  0.3551   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMG42
KM  0
HC     2
ZW C=FLOW
*
KKMG4_3B
KM  MG4_3B
BA0.0002
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK  2300  0.3260   0.600      95
UK   600  0.2500   0.240       5
RD  2500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMG43B
KM  0
HC     2
ZW C=FLOW
*
KKMG4_3A
KM   0.07 AC
BA0.0001
PB
* PI
BF -38.7
LU  0.10  0.2500  90.000
UK    30  0.0200   0.110  100.00
RD   250  0.0098   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
KKYMG43A
KM  0
HC     2
ZW C=FLOW
*
KKMG5_2B
KM   0.06 AC
```

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BA0.0001
PB
* PI
BF -38.7
LU  0.10  0.2500  90.000
UK    12  0.0100   0.600  100.00
RD   400  0.0500   0.060            TRAP    10.0    50.0
ZW C=FLOW
*
KK MG4_4
KM   0.10 AC
BA0.0002
PB
* PI
BF -38.7
LU  0.10  0.2500  90.000
UK    30  0.0200   0.110  100.00
RD   350  0.0098   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
KK YMG44
KM  0
HC     2
ZW C=FLOW
*
KKMG4_5C
KM  MG4_5C
BA0.0078
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK  2300  0.3260   0.600      95
UK   600  0.2500   0.240       5
RD  2500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMG45C
KM  0
HC     4
ZW C=FLOW
*
KKMG5_1A
KM   18.98 AC
BA0.0296
PB
* PI
BF -38.7
LU  0.10  0.2500   2.800
UK   600  0.1550   0.600  100.00
RD  1820  0.2357   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKMG5_1B
KM  MG5_1B
BA0.0090
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   200  0.1000   0.600       5
UK   200  0.1000   0.240      95
RD   500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMG51B
KM  0
HC     2
ZW C=FLOW
*
KK MG5_3
KM   0.04 AC
BA0.0001
PB
* PI
BF -38.7
LU  0.10  0.2500  90.000
UK    30  0.0200   0.110  100.00
RD   300  0.0775   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
KK MG5_4
KM   0.15 AC
BA0.0003
PB
* PI
BF -38.7
LU  0.10  0.2500  90.000
UK    30  0.0200   0.110  100.00
RD   300  0.0775   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
KK YMG54
KM  0
```

```
HC     3
ZW C=FLOW
*
KK MG5_5
KM  MG5_5
BA0.0024
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   200  0.1000   0.600       5
UK   200  0.1000   0.240      95
RD   500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMG55
KM  0
HC     2
ZW C=FLOW
*
KKYMG55C
KM  0
HC     2
ZW C=FLOW
*
KKMG3_3A
KM   8.25 AC
BA0.0129
PB
* PI
BF -38.7
LU  0.10  0.2500   2.900
UK   575  0.2250   0.600  100.00
RD   925  0.2260   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK MG3_2
KM   2.58 AC
BA0.0040
PB
* PI
BF -38.7
LU  0.10  0.2500   6.100
UK   390  0.2051   0.600  100.00
RD   370  0.3000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK MG3_4
KM   014 AC
BA0.0002
PB
* PI
BF -38.7
LU  0.10  0.2500  88.800
UK    30  0.0200   0.110  100.00
RD   300  0.0691   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
KK YMG34
KM  0
HC     3
ZW C=FLOW
*
KKMG3_1B
KM   0.87 AC
BA0.0014
PB
* PI
BF -38.7
LU  0.10  0.2500   5.400
UK   500  0.2800   0.600  100.00
RD   300  0.3467   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKMG3_1D
KM   0.57 AC
BA0.0009
PB
* PI
BF -38.7
LU  0.10  0.2500   5.400
UK   504  0.2778   0.600  100.00
RD   360  0.3083   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK MG3_5
KM   0.07 AC
BA0.0001
PB
* PI
BF -38.7
LU  0.10  0.2500  90.000
UK    30  0.0200   0.110  100.00
RD   350  0.0094   0.060            TRAP     0.1     1.0
```

```
ZW C=FLOW
*
KK YMG35
KM  0
HC     3
ZW C=FLOW
*
KKMG3_5A
KM  MG3_5A
BA0.0073
PB
* PI
BF -38.7
LU  0.10  0.2500   2.900
UK   575  0.2250   0.600  100.00
RD   925  0.2260   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMG35A
KM  0
HC     3
ZW C=FLOW
*
KK ME6_1
KM   10.24 AC
BA0.0082
PB
* PI
BF -38.7
LU  0.10  0.2500   3.900
UK   310  0.1740   0.600  100.00
RD   250  0.1640   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK ME6_2
KM   1.28 AC
BA0.0099
PB
* PI
BF -38.7
LU  0.10  0.2500   6.900
UK   505  0.1940   0.600  100.00
RD   235  0.0800   0.060            TRAP     0.1    50.0
ZW C=FLOW
*
KK ME6_3
KM   0.02 AC
BA0.0003
PB
* PI
BF -38.7
LU  0.10  0.2500  86.500
UK    15  0.0200   0.600  100.00
RD   235  0.0800   0.060            TRAP     0.1    50.0
ZW C=FLOW
*
KKYM6123
KM  0
HC     3
ZW C=FLOW
*
KK ME6_5
KM   1.40 AC
BA0.0022
PB
* PI
BF -38.7
LU  0.10  0.2500  16.500
UK   160  0.1500   0.600  100.00
RD   365  0.0800   0.060            TRAP     0.1    50.0
ZW C=FLOW
*
KK YME65
KM  0
HC     2
ZW C=FLOW
*
KK ME6_7
KM   0.81 AC
BA0.0013
PB
* PI
BF -38.7
LU  0.10  0.2500  16.200
UK   190  0.1680   0.600  100.00
RD   145  0.1100   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YME67
KM  0
HC     2
ZW C=FLOW
*
KK ME6_8
```

```
KM    .44 AC
BA0.0007
PB
* PI
BF -38.7
LU  0.10  0.2500  87.800
UK    20  0.0200   0.600  100.00
RD   555  0.0560   0.060            TRAP    10.0    50.0
ZW C=FLOW
*
KK YME68
KM  0
HC     2
ZW C=FLOW
*
KK MG1_2
KM   0.67 AC
BA0.0010
PB
* PI
BF -38.7
LU  0.10  0.2500  11.100
UK   100  0.1400   0.600  100.00
RD   255  0.1686   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK MG1_3
KM   1.89 AC
BA0.0025
PB
* PI
BF -38.7
LU  0.10  0.2500   9.500
UK   300  0.0700   0.600  100.00
RD   205  0.2293   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK MG1_1
KM   1.38 AC
BA0.0026
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   185  0.1946   0.600  100.00
RD   205  0.0600   0.060            TRAP     0.1     2.0
ZW C=FLOW
*
KK MG1_4
KM   0.18 AC
BA0.0003
PB
* PI
BF -38.7
LU  0.10  0.2500  46.900
UK    30  0.0200   0.110  100.00
RD   295  0.0800   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
KKYG1234
KM  0
HC     5
ZW C=FLOW
*
KKMG3_33
KM  MG3_33
BA0.0087
PB
* PI
BF -38.7
LU  0.10  0.2500   2.900
UK   575  0.2250   0.600  100.00
RD   925  0.2260   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMG33
KM  0
HC     2
ZW C=FLOW
*
KKME6_8A
KM  ME6_8A
BA0.0006
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   330  0.0530   0.600  100.00
RD   522  0.0880   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME68A
KM  0
HC     3
```

```
ZW C=FLOW
*
KK   MG2
KM     MG2
BA0.1195
PB
* PI
BF -38.7
LU  0.10  0.2450   2.000    0.10  0.2450  15.000
UK   700  0.1430   0.600      90
UK   700  0.1400   0.240      10
RD  1500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  YMG2
KM  0
HC     3
ZW C=FLOW
*
* - - - - - -
*
*
KK ME6_6
KM   0.16 AC
BA0.0003
PB
* PI
BF -38.7
LU  0.10  0.2500  73.000
UK    30  0.0200   0.110  100.00
RD   340  0.0800   0.060            TRAP     0.1    50.0
ZW C=FLOW
*
KKME6_21
KM   2.50 AC
BA0.0039
PB
* PI
BF -38.7
LU  0.10  0.2500  12.000
UK   200  0.1250   0.600  100.00
RD   235  0.1490   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKME6_31
KM   0.44 AC
BA0.0007
PB
* PI
BF -38.7
LU  0.10  0.2500  42.900
UK    24  0.0200   0.110  100.00
RD   480  0.0800   0.060            TRAP     0.1    50.0
ZW C=FLOW
*
KKYME631
KM  0
HC     3
ZW C=FLOW
*
KKMG1B19
KM  MG1B19
BA0.0072
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   150  0.0400   0.600  100.00
RD   780  0.1300   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKMG1B20
KM  MG1B20
BA0.0039
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   240  0.0800   0.600  100.00
RD   710  0.1200   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  ME6A
KM     ME6A
BA0.0030
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   300  0.1200   0.600      50
UK   300  0.1200   0.240      50
RD  1500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
```

```
KK YME6A
KM  0
HC     3
ZW C=FLOW
*
KKMG1B26
KM  MG1B26
BA0.0038
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   250  0.0960   0.600  100.00
RD   550  0.0910   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK  MG1B
KM     MG1B
BA0.0119
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   300  0.1000   0.600      50
UK   200  0.1000   0.240      50
RD   800  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKME6A27
KM  ME6A27
BA0.0094
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   230  0.0950   0.600  100.00
RD   520  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMG1B
KM  0
HC     3
ZW C=FLOW
*
KK  MG1A
KM     MG1A
BA0.0185
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   200  0.1000   0.600      50
UK   200  0.1000   0.240      50
RD  1000  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMG1A
KM  0
HC     2
ZW C=FLOW
*
KK YMGCC
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK MG5B1
KM  MG5B1
BA0.1242
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   200  0.1000   0.600       5
UK   200  0.1000   0.240      95
RD   500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK MG5A2
KM  MG5A2
BA0.0613
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   200  0.1000   0.600       5
UK   200  0.1000   0.240      95
RD   500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMG5A2
```

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KM  0
HC     2
ZW C=FLOW
*
KK  MG6B
KM     MG6B
BA0.0479
PB
* PI
BF -38.7
LU  0.10  0.2010   2.000    0.10  0.2010  15.000
UK  1000  0.2500   0.600      85
UK   400  0.2500   0.240      15
RD  1500  0.1000   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK MG5A1
KM  MG5A1
BA0.0134
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   200  0.1000   0.600       5
UK   200  0.1000   0.240      95
RD   500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMG5A1
KM  0
HC     2
ZW C=FLOW
*
KK YMGCC
KM  0
HC     2
ZW C=FLOW
*
KK   MG7
KM     MG7
BA0.1439
PB
* PI
BF -38.7
LU  0.10  0.2070   2.000
UK   600  0.2500   0.600  100.00
RD  3500  0.0100   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK NS24A
KM  NS24A
BA0.0297
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   900  0.1000   0.600  100.00
RD  1000  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK NS24B
KM  NS24B
BA0.0120
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   300  0.1000   0.600  100.00
RD   500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS24B
KM  0
HC     2
ZW C=FLOW
*
KK NS24C
KM  NS24C
BA0.0400
PB
* PI
BF -38.7
LU  0.10  0.1820   2.000
UK   800  0.1000   0.600  100.00
RD  1000  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS24C
KM  0
HC     3
ZW C=FLOW
*
KK  NS25
KM  NS25
```

```
BA0.0370
PB
* PI
BF -38.7
LU  0.10  0.2490   2.000
UK   800  0.0500   0.600  100.00
RD  1200  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YNS25
KM  0
HC     2
ZW C=FLOW
*
KK  NS26
KM  NS26
BA0.1102
PB
* PI
BF -38.7
LU  0.10  0.1220   2.000
UK  1000  0.0500   0.600  100.00
RD  1500  0.0200   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YNS26
KM  0
HC     3
ZW C=FLOW
*
*
KKUW4END
KM  ROUTE FOR BACKWATER AT NW4
RS     1    FLOW      -1
SV  0.00    0.46    1.70    6.66    46.3     520
SQ   0.0   178.0    1833    2500    4382    8550
ZW C=FLOW
*
* - - - - - -
*
*
KK NS22A
KM  NS22A
BA0.0103
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   750  0.1000   0.600  100.00
RD  1000  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK NS22C
KM  NS22C
BA0.0063
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   300  0.1000   0.600  100.00
RD   500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS22C
KM  0
HC     2
ZW C=FLOW
*
KK NS23A
KM  NS23A
BA0.0374
PB
* PI
BF -38.7
LU  0.10  0.1900   2.000
UK   950  0.0700   0.600  100.00
RD  1100  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS23A
KM  0
HC     2
ZW C=FLOW
*
KK  NS27
KM  NS27
BA0.0574
PB
* PI
BF -38.7
LU  0.10  0.1000   2.000
UK   830  0.0300   0.600  100.00
RD  1000  0.0200   0.060            TRAP    10.0    10.0
ZW C=FLOW
```

```
*
KK YNS27
KM  0
HC     4
ZW C=FLOW
*
KK NS28B
KM  NS28B
BA0.0417
PB
* PI
BF -38.7
LU  0.10  0.1000   2.000
UK   500  0.0100   0.600  100.00
RD  1000  0.0100   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK  E85Z
KM  E85Z
BA0.0291
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   400  0.0200   0.600  100.00
RD   500  0.0500   0.060           TRAP    20.0    10.0
ZW C=FLOW
*
KKYNS28B
KM  0
HC     3
ZW C=FLOW
*
KK NS28A
KM  NS28A
BA0.0415
PB
* PI
BF -38.7
LU  0.10  0.1000   2.000
UK   500  0.0100   0.600  100.00
RD  1000  0.0100   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS28A
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK  NS22
KM  NS22
BA0.2037
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  2100  0.0800   0.600  100.00
RD  2500  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK  NS31
KM  NS31
BA0.0592
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1250  0.1000   0.600  100.00
RD  1300  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK YNS31
KM  0
HC     2
ZW C=FLOW
*
KK NS22B
KM  NS22B
BA0.0098
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   500  0.1000   0.600  100.00
RD   500  0.1000   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS22B
KM  0
HC     2
ZW C=FLOW
```

```
*
KK NS23B
KM  NS23B
BA0.1061
PB
* PI
BF -38.7
LU  0.10  0.1910   2.000
UK  1350  0.0500   0.600  100.00
RD  1500  0.0200   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS23B
KM  0
HC     2
ZW C=FLOW
*
KK NS32A
KM  NS32A
BA0.0191
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   500  0.1000   0.600  100.00
RD  1000  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK NS32B
KM  NS32B
BA0.1481
PB
* PI
BF -38.7
LU  0.10  0.1650   2.000
UK  1500  0.0800   0.600  100.00
RD  2500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS32B
KM  0
HC     3
ZW C=FLOW
*
KK   NS1
KM   BASIN 1 - 330 Ac
BA0.5174
PB
* PI
BF -38.7
LU  0.10  0.1780   2.000    0.10  0.1780   2.000
UK  3300  0.2400   0.800      57
UK  3300  0.2400   0.600      43
RD  2800  0.1800   0.060            TRAP     5.0     3.0
RD  2800  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
*
KKUR-NS1
KM   ROUTE NS-1
RS     1    FLOW      -1
SV  0.70    1.10    1.50    1.90    2.20    2.80    3.90    4.90
SQ 100.0   200.0   300.0   400.0   500.0   700.0  1100.0  1500.0
ZW C=FLOW
*
KK   NS2
KM   BASIN 2 - 267 Ac
BA0.4184
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500   2.000
UK  2800  0.2500   0.800      54
UK  2800  0.2500   0.600      46
RD  2200  0.1600   0.060            TRAP     5.0     3.0
RD  2200  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KKYCMB-2
KM   COMBINE NS-1 & 2
HC     2
ZW C=FLOW
*
*
KKUCMB-2
KM   ROUTE CMB-2
RS     1    FLOW      -1
SV  0.70    1.00    1.40    1.70    2.00    2.50    3.40    4.30
SQ 100.0   200.0   300.0   400.0   500.0   700.0  1100.0  1500.0
ZW C=FLOW
*
KK   NS3
KM   BASIN 3 - 331 Ac
BA0.5218
```

```
PB
* PI
BF -38.7
LU  0.10  0.2500  65.000    0.10  0.2500   2.000
UK  2950  0.1800   0.240       3
UK  2950  0.1800   0.600      98
RD  3000  0.2000   0.060            TRAP     5.0     3.0
RD  3000  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KKYCMB-3
KM   COMBINE NS-1 THRU 3
HC     2
ZW C=FLOW
*
*
KKUCMB-3
KM   ROUTE CMB-3
RS     1    FLOW      -1
SV  1.40    2.30    3.00    3.70    4.20    5.70    7.70    9.20
SQ 100.0   200.0   300.0   400.0   500.0   700.0  1100.0  1500.0
ZW C=FLOW
*
KK   NS4
KM   BASIN 4 - 166 Ac
BA0.2602
PB
* PI
BF -38.7
LU  0.10  0.2500  65.000    0.10  0.2500   2.000
UK  2110  0.2200   0.240      29
UK  2110  0.2200   0.600      71
RD  2500  0.1000   0.060            TRAP     5.0     3.0
RD  2500  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KKYCMB-4
KM   COMBINE NS-1 THRU 4
HC     2
ZW C=FLOW
*
*
KKUCMB-4
KM   ROUTE CMB-4
RS     1    FLOW      -1
SV  0.20    0.30    0.40    0.40    0.50    0.60    2.20    2.90
SQ 100.0   200.0   300.0   400.0   500.0   700.0  1100.0  1500.0
ZW C=FLOW
*
KK   NS5
KM   BASIN 5 - 21 Ac
BA0.0319
PB
* PI
BF -38.7
LU  0.10  0.2500  65.000    0.10  0.2500   2.000
UK  1400  0.2500   0.240      36
UK  1400  0.2500   0.600      64
RD   700  0.1400   0.060            TRAP     5.0     3.0
RD   700  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KKYCMB-5
KM   COMBINE NS-1 THRU 5
HC     2
ZW C=FLOW
*
*
KKUCMB-5
KM   ROUTE CMB-5
RS     1    FLOW      -1
SV  0.40    0.60    0.80    1.10    1.30    1.60    2.30    2.90
SQ 100.0   200.0   300.0   400.0   500.0   700.0  1100.0  1500.0
ZW C=FLOW
*
KK   NS6
KM   BASIN 6 - 178 Ac
BA0.2162
PB
* PI
BF -38.7
LU  0.10  0.2500  65.000    0.10  0.2500   2.000
UK  3100  0.2700   0.240      71
UK  3100  0.2700   0.600      29
RD  3100  0.1600   0.060            TRAP     5.0     3.0
RD  3100  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KKVR-NS6
KM   ROUTE NS-6
RD   970  0.0700   0.015            TRAP     1.0     1.0
ZW C=FLOW
*
KK   NS7
```

```
KM   BASIN 7 - 38 Ac
BA0.0602
PB
* PI
BF -38.7
LU  0.10  0.2500  65.000    0.10  0.2500   2.000
UK  1570  0.1900   0.240      69
UK  1570  0.1900   0.600      31
RD   800  0.0800   0.060           TRAP     2.0     1.0
RD   800  0.0010   0.060           TRAP     2.0     1.0
ZW C=FLOW
*
KKYCMB-7
KM   COMBINE NS-6 & 7
HC     2
ZW C=FLOW
*
KKYMB-7A
KM   COMBINE NS-1 THRU 7
HC     2
ZW C=FLOW
*
*
KKUCMB7A
KM   ROUTE CMB-7A
RS     1    FLOW      -1
SV  0.60    1.10    1.40    1.70    2.10    2.60    3.60    4.60
SQ 100.0   200.0   300.0   400.0   500.0   700.0  1100.0  1500.0
ZW C=FLOW
*
KK   NS8
KM   BASIN 8 - 673 Ac
BA1.1304
PB
* PI
BF -38.7
LU  0.10  0.2390   2.000    0.10  0.2390   2.000
UK  4200  0.2100   0.800      92
UK  4200  0.2100   0.600       9
RD  1900  0.0800   0.060           TRAP     5.0     3.0
RD  1900  0.0010   0.060           TRAP     5.0     3.0
ZW C=FLOW
*
*
KKURES-A
KM   RESERVOIR A
RS     1    FLOW      -1
SV  0.00    3.40    6.80   10.20   13.60   17.00   20.40   23.80   27.20   34.00
SQ   0.0    23.9    67.5   124.0   190.0   266.0   350.0   441.0   540.0   754.0
ZW C=FLOW
*
KKV-RESA
KM   ROUTE RES-A
RD  1400  0.1100   0.060           TRAP     5.0     3.0
ZW C=FLOW
*
KK   NS9
KM   BASIN 9 - 144 Ac
BA0.1855
PB
* PI
BF -38.7
LU  0.10  0.2490   2.000
UK  4400  0.2000   0.600  100.00
RD  1200  0.1100   0.060           TRAP     5.0     3.0
RD  1200  0.0010   0.060           TRAP     5.0     3.0
ZW C=FLOW
*
KKYCMB-9
KM   COMBINE NS-8 & 9
HC     2
ZW C=FLOW
*
KKVCMB-9
KM   ROUTE CMB-9
RD  2800  0.1100   0.060           TRAP     5.0     3.0
ZW C=FLOW
*
KK  NS10
KM   BASIN 10 - 214 Ac
BA0.3581
PB
* PI
BF -38.7
LU  0.10  0.2230   2.000
UK  3905  0.2000   0.600  100.00
RD  2200  0.0900   0.060           TRAP     5.0     3.0
RD  2200  0.0010   0.060           TRAP     5.0     3.0
ZW C=FLOW
*
KKYMB-10
KM   COMBINE NS-8 THRU 10
HC     2
ZW C=FLOW
```

```
*
KKVCMB10
KM   ROUTE CMB-10
RD  3600  0.0800   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KK  NS11
KM   BASIN 11 - 60 Ac
BA0.0389
PB
* PI
BF -38.7
LU  0.10  0.2490  65.000    0.10  0.2490   2.000
UK  1600  0.3400   0.240       6
UK  1600  0.3400   0.600      95
RD  3600  0.0800   0.060            TRAP     5.0     3.0
RD  3600  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KKYMB-11
KM   COMBINE NS-8 THRU 11
HC     2
ZW C=FLOW
*
KKYMB11A
KM   COMBINE NS-1 THRU 11
HC     2
ZW C=FLOW
*
*
KKUCM11A
KM   ROUTE CMB11A
RS     1    FLOW      -1
SV  0.20    0.30    0.50    0.60    0.70    0.90    1.20    1.60
SQ 100.0   200.0   300.0   400.0   500.0   700.0  1100.0  1500.0
ZW C=FLOW
*
KK NS11B
KM   BASIN 11 - 60 Ac
BA0.0546
PB
* PI
BF -38.7
LU  0.10  0.2500  65.000    0.10  0.2500   2.000
UK  1600  0.3400   0.240       6
UK  1600  0.3400   0.600      95
RD  3600  0.0800   0.060            TRAP     5.0     3.0
RD  3600  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KKYNS11B
KM  0
HC     2
ZW C=FLOW
*
KK  NS12
KM   BASIN 12 - 40 Ac
BA0.0619
PB
* PI
BF -38.7
LU  0.10  0.2500  65.000    0.10  0.2500   2.000
UK   400  0.1000   0.240      71
UK   400  0.1000   0.800      30
RD  1500  0.0700   0.060            TRAP     5.0     3.0
RD  1500  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KKYMB-12
KM   COMBINE NS-1 THRU 12
HC     2
ZW C=FLOW
*
KK  NS13
KM   BASIN 13 - 15 Ac
BA0.1459
PB
* PI
BF -38.7
LU  0.10  0.2500  65.000    0.10  0.2500  98.000
UK   500  0.1600   0.240      86
UK   500  0.1600   0.110      14
RD   900  0.1300   0.060            TRAP     5.0     3.0
RD   900  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KKV-NS13
KM   ROUTE NS-13
RD  1400  0.0800   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KK  NS14
KM   BASIN 14 - 47 Ac
BA0.0434
```

```
PB
* PI
BF -38.7
LU  0.10  0.2500  65.000    0.10  0.2500  98.000
UK   775  0.3500   0.240      90
UK   775  0.3500   0.110      10
RD   800  0.0600   0.060            TRAP     5.0     3.0
RD   800  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KKYMB-14
KM   COMBINE NS-13 & 14
HC     2
ZW C=FLOW
*
KK NS14B
KM  NS14B
BA0.0204
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   500  0.1000   0.600  100.00
RD   500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMB14A
KM   COMBINE NS-1 THRU 14
HC     3
ZW C=FLOW
*
KK NS20B
KM  NS20B
BA0.0322
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   640  0.1000   0.600  100.00
RD  1000  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  NS15
KM  NS15
BA0.0860
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1000  0.0800   0.600  100.00
RD  1500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YNS15
KM  0
HC     2
ZW C=FLOW
*
KKYNS15C
KM  0
HC     2
ZW C=FLOW
*
KK  NS16
KM  NS16
BA0.1019
PB
* PI
BF -38.7
LU  0.10  0.2460   2.000
UK  1600  0.1000   0.600  100.00
RD  2100  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  NS17
KM  NS17
BA0.0811
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1500  0.0800   0.600  100.00
RD  1200  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YNS17
KM  0
HC     2
ZW C=FLOW
*
KK  NS18
KM  NS18
BA0.1877
PB
```

```
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  3200  0.1000   0.600  100.00
RD  3000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  NS19
KM  NS19
BA0.0434
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1600  0.0500   0.600  100.00
RD  1000  0.0400   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YNS19
KM  0
HC     2
ZW C=FLOW
*
KKYNS19C
KM  0
HC     2
ZW C=FLOW
*
KK  NS20
KM  NS20
BA0.0548
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   600  0.0800   0.600  100.00
RD  1200  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YNS20
KM  0
HC     2
ZW C=FLOW
*
KKYNS20C
KM  0
HC     2
ZW C=FLOW
*
KK  NS21
KM  NS21
BA0.1390
PB
* PI
BF -38.7
LU  0.10  0.2480   2.000
UK  1450  0.0500   0.600  100.00
RD  2500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YNS21
KM  0
HC     2
ZW C=FLOW
*
KK NS30D
KM  NS30D
BA0.0577
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   900  0.0800   0.600  100.00
RD  1400  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK NS30A
KM  NS30A
BA0.0266
PB
* PI
BF -38.7
LU  0.10  0.2440   2.000
UK   800  0.0800   0.600  100.00
RD  1600  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS30A
KM  0
HC     2
ZW C=FLOW
*
KKYS30CC
KM  0
```

```
HC     2
ZW C=FLOW
*
KK NS30B
KM  NS30B
BA0.1400
PB
* PI
BF -38.7
LU  0.10  0.2360   2.000
UK  1600  0.1000   0.600  100.00
RD  2000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS30B
KM  0
HC     2
ZW C=FLOW
*
KK NS30E
KM  NS30E
BA0.0022
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   200  0.1000   0.600  100.00
RD   500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS30E
KM  0
HC     2
ZW C=FLOW
*
KK NS30F
KM  NS30F
BA0.0023
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   200  0.1000   0.600  100.00
RD   500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS30F
KM  0
HC     2
ZW C=FLOW
*
KK NS30C
KM  NS30C
BA0.1237
PB
* PI
BF -38.7
LU  0.10  0.1510   2.000
UK  1600  0.0800   0.600  100.00
RD  2000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS30C
KM  0
HC     2
ZW C=FLOW
*
KKY30CCC
KM  0
HC     2
ZW C=FLOW
*
KK NS33B
KM  NS33B
BA0.0301
PB
* PI
BF -38.7
LU  0.10  0.1000   2.000
UK  1000  0.0500   0.600  100.00
RD  1000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS33B
KM  0
HC     2
ZW C=FLOW
*
KKYNSALL
KM  0
HC     2
ZW C=FLOW
*
*
```

```
KKUW5END
KM  ROUTE FOR BACKWATER AT NW5
RS     1    FLOW      -1
SV  0.00    0.75    54.4   131.2     377    1086
SQ   0.0   267.0    2853    3500    6287    9653
ZW C=FLOW
*
* - - - - - -
*
*
KK  NS34
KM  NS34
BA0.0437
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   900  0.0800   0.600  100.00
RD   900  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  NS35
KM  NS35
BA0.1517
PB
* PI
BF -38.7
LU  0.10  0.1850   2.000
UK  1900  0.0500   0.600  100.00
RD  2500  0.0400   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YNS35
KM  0
HC     2
ZW C=FLOW
*
KK XMAR1
KM XMAR1
BA0.2922
PB
* PI
BF -38.7
LU  0.10  0.2440   2.000
UK  1900  0.1000   0.600  100.00
RD  2000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK XMAR2
KM XMAR2
BA0.4066
PB
* PI
BF -38.7
LU  0.10  0.2410   2.000
UK  2200  0.1000   0.600  100.00
RD  3100  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK XMAR3
KM XMAR3
BA0.6221
PB
* PI
BF -38.7
LU  0.10  0.2480   2.000
UK  3500  0.1000   0.600  100.00
RD  3400  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK XMAR4
KM XMAR4
BA0.2489
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  2300  0.1000   0.600  100.00
RD  1100  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK XMAR5
KM XMAR5
BA0.3335
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1700  0.1000   0.600  100.00
RD  2600  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMAR5
KM  0
```

```
HC     2
ZW C=FLOW
*
KK XMAR6
KM XMAR6
BA0.1147
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1500  0.1000   0.600  100.00
RD  1650  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK XMAR7
KM XMAR7
BA0.3439
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  2800  0.1000   0.600  100.00
RD  1400  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMAR7
KM  0
HC     2
ZW C=FLOW
*
KK XMAR8
KM XMAR8
BA0.2218
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  2200  0.1000   0.600  100.00
RD  3500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMAR8
KM  0
HC     2
ZW C=FLOW
*
KK XMAR9
KM XMAR9
BA0.2500
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  2100  0.1000   0.600  100.00
RD  3400  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKXMAR10
KM XMAR10
BA0.2272
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  2300  0.1000   0.600  100.00
RD  2400  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKXMAR11
KM XMAR11
BA0.1037
PB
* PI
BF -38.7
LU  0.10  0.1850   2.000
UK  1100  0.1000   0.600  100.00
RD  1500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMAR11
KM  0
HC     2
ZW C=FLOW
*
KKXMAR12
KM XMAR12
BA0.1361
PB
* PI
BF -38.7
LU  0.10  0.2060   2.000
UK  1250  0.1000   0.600  100.00
RD  2200  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
```

```
*
KKXMAR13
KM XMAR13
BA0.2679
PB
* PI
BF -38.7
LU  0.10  0.2490   2.000
UK  1800  0.1000   0.600  100.00
RD  4000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMAR13
KM  0
HC     2
ZW C=FLOW
*
KKYMARC1
KM  0
HC     2
ZW C=FLOW
*
KKXMAR14
KM XMAR14
BA0.0483
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   500  0.1000   0.600  100.00
RD   500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKXMAR15
KM XMAR15
BA0.0140
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   500  0.1000   0.600  100.00
RD   500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMAR15
KM  0
HC     3
ZW C=FLOW
*
KKXMAR17
KM XMAR17
BA0.2288
PB
* PI
BF -38.7
LU  0.10  0.2200   2.000
UK  1300  0.1000   0.600  100.00
RD  2700  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMAR17
KM  0
HC     2
ZW C=FLOW
*
KKMAR19A
KM  MAR19A
BA0.0295
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1000  0.1000   0.600  100.00
RD  1000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKMAR19B
KM  MAR19B
BA0.0074
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   500  0.1000   0.600  100.00
RD  1000  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKXMAR18
KM XMAR18
BA0.1517
PB
* PI
BF -38.7
LU  0.10  0.2480   2.000
```

```
UK  1600  0.1000   0.600  100.00
RD  2500  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYMAR18
KM  0
HC     3
ZW C=FLOW
*
KKXMAR20
KM XMAR20
BA0.2009
PB
* PI
BF -38.7
LU  0.10  0.2440   2.000
UK  1700  0.1000   0.600  100.00
RD  2700  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKMAR21A
KM  MAR21A
BA0.0602
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   500  0.1000   0.600  100.00
RD   500  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKMAR21B
KM  MAR21B
BA0.0241
PB
* PI
BF -38.7
LU  0.10  0.2450   2.000
UK   500  0.1000   0.600  100.00
RD  1000  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK YR21B
KM  0
HC     2
ZW C=FLOW
*
* SA Note: Use New Overflow analysis instead
* DIVERT At Upstream Highway Crossing, where water can't cross under roadway
KK N11DV
DTN11DIV
DI     0     190     200     800    1600    5000
DQ     0       1       5     604    1403    4802
ZW C=FLOW
*
KKMAR22B
KM  MAR22B
BA0.0266
PB
* PI
BF -38.7
LU  0.10  0.2300   2.000
UK   500  0.1000   0.600  100.00
RD  1000  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKMAR22A
KM  MAR22A
BA0.0165
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   500  0.1000   0.600  100.00
RD   500  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK YR22A
KM  0
HC     2
ZW C=FLOW
*
KKXMAR23
KM XMAR23
BA0.0439
PB
* PI
BF -38.7
LU  0.10  0.1380   2.000
UK   500  0.0500   0.600  100.00
RD  2000  0.0200   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKYMAR23
```

```
KM  0
HC     2
ZW C=FLOW
*
*
KK UWEND
KM  ROUTE FOR BACKWATER AT W1
RS     1    FLOW      -1
SV  0.00   10.00    49.2   292.0   859.7  867.00
SQ   0.0    18.0   239.0   244.0   250.0  1034.0
ZW C=FLOW
*
KKXMAR24
KM XMAR24
BA0.0055
PB
* PI
BF -38.7
LU  0.10  0.1000   2.000
UK   200  0.0200   0.600  100.00
RD   500  0.0100   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKXMAR25
KM XMAR25
BA0.0147
PB
* PI
BF -38.7
LU  0.10  0.1260   2.000
UK  1000  0.0200   0.600  100.00
RD  1000  0.0100   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYMAR25
KM  0
HC     3
ZW C=FLOW
*
KK NS33A
KM  NS33A
BA0.0118
PB
* PI
BF -38.7
LU  0.10  0.1970   2.000
UK  1000  0.0200   0.600  100.00
RD  1000  0.0200   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS33A
KM  0
HC     2
ZW C=FLOW
*
*
KK  UHWY
KM  ROUTE FOR BACKWATER AT HWY
RS     1    FLOW      -1
SV  0.00    0.13    0.60   32.40   61.60  114.60  266.00  330.00
SQ   0.0   200.0   491.0  3074.0  4293.0  5718.0  8410.0  9000.0
ZW C=FLOW
*
* ----------END---------------
KKN11DIV
DRN11DIV
ZW C=FLOW
*
KK  E30A
KM  Drains Away
BA0.0064
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500   8.000
UK   600  0.0380   0.600  100.00
RD  1900  0.0140   0.060           TRAP    15.0    10.0
ZW C=FLOW
*
ZZ
```

A-2. HEC-1 Pre-Project PDP Input FROZEN EVENT

```
ID DRY CREEK WATERSHED, PLACER COUNTY, CA
ID WATERSHED UPDATE MODELS - DRAFT ULT BUILDOUT
ID DRAFT MODEL FOR HYD ROUTING - DCTOOLBOX SOURCE
ID CESI/RBF 8/29/2011
ID
IT     5 13FEB08       0     300
IO     5               0
IN     5       0       0
*DIAGRAM
*
*
KK    E2
KM    Large Offsite Shed  155.8ac
BA0.2434
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2110  92.310
UK  1500  0.0830   0.600  100.00
RD  4000  0.0300   0.060            TRAP     2.0    25.0
ZW C=FLOW
*
KK   E15
KM   Other Large Upstream offsite shed 111.1 ac
BA0.1736
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.1470  90.060
UK  1000  0.0580   0.600  100.00
RD  2500  0.0300   0.060            TRAP     2.0    10.0     YES
ZW C=FLOW
*
KK   E10
KM    Large Undeveloped upstream watershed. (139.2)
BA0.0311
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.1790  90.960
UK  2000  0.0750   0.600  100.00
RD  3200  0.0700   0.060   .0500    TRAP    20.0    40.0
RD  3300  0.0010   0.040   .1500    TRAP    20.0    20.0
ZW C=FLOW
*
KK YE10C
KM    Upstream of Project
HC     2
ZW C=FLOW
*
KK VE12R
KM    ROUTE TO BOTTOM OF E20
RD  1500  0.0170   0.040            TRAP    15.0     5.0
ZW C=FLOW
*
KK  E20A
KM    12.0 AC
BA0.0106
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2430  88.200
UK  1200  0.0580   0.600  100.00
RD   700  0.0170   0.060            TRAP    15.0     5.0
ZW C=FLOW
*
KK YE20A
KM  0
HC     2
ZW C=FLOW
*
KK  E14A
KM    Small Roadway Shed 4 ac
BA0.0063
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.1000  89.670
UK   500  0.0300   0.600  100.00
RD   500  0.0300   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  E18A
KM    Small Hopkins Roadway Drain 3.6ac
BA0.0057
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2070  88.740
UK   450  0.0300   0.600  100.00
RD   500  0.0300   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK  E16A
```

```
KM    Small Hopkins Roadway Drain 0.4ac
BA0.0006
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2130  90.000
UK    50  0.0200   0.600  100.00
RD   100  0.0300   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYE16AC
KM  0
HC     2
ZW C=FLOW
*
KK  E20B
KM    10.9 AC
BA0.0182
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2000  88.530
UK   800  0.0700   0.600  100.00
RD   200  0.0170   0.060            TRAP    15.0     5.0
ZW C=FLOW
*
KK YE20B
KM  0
HC     2
ZW C=FLOW
*
KKVE16AR
KM    ROUTE TO BOTTOM OF E20
RD  2000  0.0170   0.040            TRAP    15.0     5.0
ZW C=FLOW
*
KK  E20C
KM    4.8 AC
BA0.0075
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  88.470    0.10  0.2500  90.000
UK   500  0.0500   0.600      90
UK    18  0.0200   0.110      10
RD   200  0.0170   0.060   .0500    TRAP    15.0     5.0
RD   500  0.0010   0.040            TRAP    15.0     5.0
ZW C=FLOW
*
KK YE20C
KM  0
HC     3
ZW C=FLOW
*
KK  E20D
KM    10.6 AC
BA0.0166
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  87.720    0.10  0.2500  90.000
UK   500  0.0500   0.600      89
UK    18  0.0200   0.110      11
RD   200  0.0170   0.060   .0500    TRAP    15.0     5.0
RD   600  0.0010   0.040            TRAP    15.0     5.0
ZW C=FLOW
*
KK  E20E
KM    8.4 AC Mostly diverted area added to this shed
BA0.0132
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  88.560    0.10  0.2500  90.000
UK   900  0.0200   0.600      90
UK    18  0.0200   0.110      10
RD   200  0.0170   0.060   .0500    TRAP    15.0     5.0
RD   600  0.0010   0.040            TRAP    15.0     5.0
ZW C=FLOW
*
KK YE20D
KM  0
HC     3
ZW C=FLOW
*
KK   E30
KM    MAIN SHED ABOVE TWIN CULVERTS IN S. MILL RD.  40.8AC
BA0.0638
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  87.030
UK   600  0.0380   0.600  100.00
RD  1900  0.0140   0.060            TRAP    15.0    10.0     YES
```

```
ZW C=FLOW
*
KK   E19
KM    HILLSIDE ABOVE SM RD.     4.2AC
BA0.0065
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  88.530    0.10  0.2500  90.000
UK   400  0.0180   0.600      89
UK    18  0.0200   0.110      11
RD   570  0.0140   0.060            TRAP     2.0    25.0
RD   550  0.0010   0.012            CIRC     1.0     0.0      NO
ZW C=FLOW
*
KK VE19R
KM    ROUTE TO BOTTOM OF E20
RD   600  0.0400   0.040            TRAP    10.0    40.0
ZW C=FLOW
*
KK   E21
KM    HILLSIDE ABOVE ROAD           5.7AC
BA0.0084
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  88.230    0.10  0.2500  90.000
UK   600  0.0170   0.600      74
UK    18  0.0200   0.110      26
RD   800  0.0150   0.060            TRAP     2.0    25.0
RD   800  0.0010   0.015            TRAP     2.0    25.0      NO
ZW C=FLOW
*
KK  YE21
KM  0
HC     2
ZW C=FLOW
*
KK   E22
KM  "  HILLSIDE ABOVE 15"" CULVERT   2.9AC                                              "
BA0.0045
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  88.050
UK   350  0.0270   0.600  100.00
RD   250  0.0300   0.060            TRAP     2.0    10.0      NO
ZW C=FLOW
*
KK YE22C
KM    COMBINE E21 AND E22
HC     2
ZW C=FLOW
*
KK VE22R
KM    ROUTE TO BOTTOM OF E30
RD   700  0.0140   0.040            TRAP    15.0    10.0
ZW C=FLOW
*
KK   E23
KM    PORTION OF S.MILL RD.     0.5AC
BA0.0008
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.000
UK    18  0.0200   0.110  100.00
RD   500  0.0240   0.060            TRAP     2.0    25.0      NO
ZW C=FLOW
*
KK  YE23
KM  0
HC     2
ZW C=FLOW
*
KK VE23R
KM    ROUTE TO BOTTOM OF E30
RD   400  0.0140   0.040            TRAP    15.0    10.0
ZW C=FLOW
*
KK YE30C
KM     COMBINE AT BOTTOM OF E30
HC     2
ZW C=FLOW
*
*
KKUE30CR
KM  0
RS     1    FLOW      -1
SV  0.00    0.54    0.84    1.03    1.34    1.56    1.82    2.09    7.48
SQ   0.0    73.0   104.0   125.0   153.0   173.0   195.0   217.0   700.0
ZW C=FLOW
*
KK   E40
```

```
KM    LARGE SHED DOWNSTREAM OF S. MILL RD.    85.5Ac
BA0.1147
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.1800  86.580
UK  1600  0.0340   0.600  100.00
RD   600  0.0400   0.060   .0100    TRAP    10.0    40.0
RD  3000  0.0010   0.040            TRAP    40.0    20.0     YES
ZW C=FLOW
*
KK  E40B
KM    LARGE SHED DOWNSTREAM OF S. MILL RD.    85.5Ac
BA0.0190
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2480  86.520
UK   600  0.0100   0.600  100.00
RD   600  0.0400   0.060   .0100    TRAP    10.0    40.0
RD  1000  0.0010   0.040            TRAP    40.0    20.0
ZW C=FLOW
*
KKYE40BC
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK  E14C
KM    OFF-SITE SHED WEST OF S. MILL RD.    3.6AC
BA0.0059
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.330
UK   600  0.0800   0.600  100.00
RD   500  0.0070   0.060   .0030    TRAP     2.0    25.0
RD   500  0.0010   0.040            TRAP     2.0    10.0      NO
ZW C=FLOW
*
KK VE60R
KM    ROUTE TO MAIN CHANNEL OF E64
RD  1100  0.0700   0.060            TRAP    40.0    40.0
ZW C=FLOW
*
KK  E64A
KM    EAST OF S. MILL RD.      16.1AC
BA0.0248
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.1590  89.730    0.10  0.1590  90.000
UK  1000  0.0500   0.600      94
UK    18  0.0200   0.110       6
RD  1000  0.0700   0.060   .0140    TRAP    40.0    40.0
RD   500  0.0010   0.040            TRAP    20.0    10.0
ZW C=FLOW
*
KK YE64A
KM  0
HC     2
ZW C=FLOW
*
KK  E64B
KM    EAST OF S. MILL RD.      12.1AC
BA0.0190
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.1750  88.680    0.10  0.1750  90.000
UK   800  0.0700   0.600      97
UK    18  0.0200   0.110       3
RD  1000  0.0700   0.060   .0140    TRAP    40.0    40.0
RD   500  0.0010   0.040            TRAP    20.0    10.0
ZW C=FLOW
*
KK YE64B
KM  0
HC     2
ZW C=FLOW
*
KK VE64R
KM    ROUTE TO MAIN CHANNEL OF E75
RD  1000  0.0350   0.040            TRAP    40.0    10.0
ZW C=FLOW
*
* - - - - - -
*
*
KK   E70
KM    OFF-SITE- LAHONTAN UNITS 7&8 AND LAHONTAN II    78.6AC
```

```
BA0.1255
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.1710  88.560    0.10  0.1710  90.000
UK  1200  0.0410   0.600      95
UK    18  0.0200   0.110       5
RD   450  0.0140   0.060   .0100    TRAP     2.0    25.0
RD  1800  0.0010   0.040            TRAP    20.0    10.0      NO
ZW C=FLOW
*
KK   E71
KM    OFF-SITE PORTION OF LAHONTAN II    17.8Ac
BA0.0279
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2270  89.040
UK  1400  0.0500   0.600  100.00
RD   700  0.0300   0.060   .0070    TRAP     2.0    25.0
RD   400  0.0010   0.040   .0150    TRAP     2.0     5.0
ZW C=FLOW
*
KK   E72
KM    OFF-SITE PORTION OF LAHONTAN II   12.1Ac
BA0.0178
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.1980  88.710
UK  1700  0.0370   0.600  100.00
RD   850  0.0530   0.060   .0100    TRAP    20.0    20.0
RD   700  0.0010   0.040            TRAP    10.0    20.0      NO
ZW C=FLOW
*
KKYE7012
KM  0
HC     2
ZW C=FLOW
*
KK VE72R
KM    ROUTE TO MAIN CHANNEL OF E75
RD   750  0.0300   0.040            TRAP    40.0    10.0
ZW C=FLOW
*
KKY72&64
KM    ROUTE TO MAIN CHANNEL OF E75
HC     2
ZW C=FLOW
*
KK   E75
KM    MOSTLY OFF-SITE AND DOWNSTREAM SHED  57.9Ac
BA0.0905
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.1910  86.430
UK  1200  0.0580   0.600  100.00
RD   600  0.0500   0.060   .0050    TRAP    20.0    20.0
RD  1400  0.0010   0.040            TRAP    10.0    50.0     YES
ZW C=FLOW
*
KK  YE75
KM  0
HC     2
ZW C=FLOW
*
*
KKUE75CR
KM  0
RS     1    FLOW      -1
SV  0.00    0.33    0.45    0.52    0.61    0.67    0.73    0.79    0.87    2.95
SQ   0.0    24.0    35.0    42.0    51.0    58.0    66.0    73.0    83.0   400.0
ZW C=FLOW
*
* - - - - - -
*
*
KK  E14B
KM    OFF-SITE SHED WEST OF S. MILL RD.
BA0.0397
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.1920  90.180
UK   800  0.0800   0.600  100.00
RD   800  0.0300   0.060   .0200    TRAP    40.0    40.0
RD   400  0.0010   0.040            TRAP     2.0     6.0      NO
ZW C=FLOW
*
KK VE50R
KM    ROUTE TO MAIN CHANNEL OF E55
RD   850  0.0700   0.060            TRAP    40.0    40.0
ZW C=FLOW
```

```
*
KK  E55A
KM    EAST OF S. MILL RD.   16.7AC
BA0.0261
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.1360  89.010
UK   500  0.0400   0.600  100.00
RD   400  0.0700   0.060   .0070    TRAP    40.0    40.0
RD   500  0.0010   0.040            TRAP    10.0     5.0
ZW C=FLOW
*
KK YE55A
KM  0
HC     2
ZW C=FLOW
*
*
KKUE55AR
KM  0
RS     1    FLOW      -1
SV  0.00    0.08    0.10    0.12    0.14    0.15    0.16    0.17    5.30
SQ   0.0    18.0    25.0    30.0    36.0    41.0    45.0    49.0   580.0
ZW C=FLOW
*
KK  E58D
KM    EAST OF S. MILL RD.   23.7AC
BA0.0229
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  87.330
UK   800  0.0400   0.600  100.00
RD   400  0.0700   0.060   .0070    TRAP    40.0    40.0
RD  1400  0.0010   0.040            TRAP    10.0     5.0
ZW C=FLOW
*
KK YE58D
KM  0
HC     2
ZW C=FLOW
*
KK  E55B
KM    EAST OF S. MILL RD.   3.2AC
BA0.0050
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.1920  88.530
UK   200  0.0500   0.600  100.00
RD   400  0.0700   0.060   .0070    TRAP    40.0    40.0
RD   500  0.0010   0.040            TRAP    10.0     5.0
ZW C=FLOW
*
KK  E55C
KM    EAST OF S. MILL RD.   7.7AC
BA0.0120
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2470  87.780
UK   200  0.0500   0.600  100.00
RD   400  0.0700   0.060   .0070    TRAP    40.0    40.0
RD   500  0.0010   0.040            TRAP    10.0     5.0
ZW C=FLOW
*
KK YE55C
KM  0
HC     2
ZW C=FLOW
*
*
KKU55CCR
KM  0
RS     1    FLOW      -1
SV  0.00    0.55    0.76    0.91    1.13    1.28    1.62    2.09    2.89
SQ   0.0    20.0    28.0    34.0    42.0    47.0    53.0    59.0    80.0
ZW C=FLOW
*
KK  E55E
KM    EAST OF S. MILL RD.   3.6AC
BA0.0056
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  88.530
UK   300  0.0200   0.600  100.00
RD   400  0.0700   0.060   .0070    TRAP    40.0    40.0
RD   500  0.0010   0.040            TRAP    10.0     5.0
ZW C=FLOW
*
KK YE55E
KM  0
```

```
HC     2
ZW C=FLOW
*
KK  E55F
KM    EAST OF S. MILL RD.   1.8AC
BA0.0028
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  88.470
UK   250  0.0300   0.600  100.00
RD   200  0.0700   0.060   .0070    TRAP    40.0    40.0
RD   300  0.0010   0.040            TRAP    10.0     5.0
ZW C=FLOW
*
KK  E55G
KM    EAST OF S. MILL RD.   1AC
BA0.0015
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  88.200
UK   150  0.0200   0.600  100.00
RD   200  0.0700   0.060   .0070    TRAP    40.0    40.0
RD   300  0.0010   0.040            TRAP    10.0     5.0
ZW C=FLOW
*
KKYE55GC
KM  0
HC     2
ZW C=FLOW
*
KK YE55G
KM  0
HC     2
ZW C=FLOW
*
*
KKUE55CR
KM  0
RS     1    FLOW      -1
SV  0.00    0.55    0.76    0.91    1.13    1.28    1.62    2.09    2.89
SQ   0.0    20.0    28.0    34.0    42.0    47.0    53.0    59.0    80.0
ZW C=FLOW
*
KK  E58C
KM    EAST OF S. MILL RD.   5.6AC
BA0.0088
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  86.910
UK   250  0.0600   0.600  100.00
RD   200  0.0700   0.060   .0070    TRAP    40.0    40.0
RD   500  0.0010   0.040            TRAP    10.0     5.0
ZW C=FLOW
*
KK YE58C
KM  0
HC     2
ZW C=FLOW
*
KK  E55H
KM    EAST OF S. MILL RD.                            44.1AC
BA0.0057
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  88.080
UK   400  0.0200   0.600  100.00
RD   400  0.0700   0.060   .0300    TRAP    40.0    40.0
RD  1000  0.0010   0.040            TRAP    10.0     5.0
ZW C=FLOW
*
KK YE55H
KM  0
HC     2
ZW C=FLOW
*
KK  E58A
KM    EAST OF S. MILL RD.   5.3AC
BA0.0083
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  87.630
UK   300  0.0400   0.600  100.00
RD   200  0.0700   0.060   .0070    TRAP    40.0    40.0
RD   500  0.0010   0.040            TRAP    10.0     5.0
ZW C=FLOW
*
KK YE58A
KM  0
HC     2
```

```
ZW C=FLOW
*
KK  E58E
KM    EAST OF S. MILL RD.   3.7AC
BA0.0370
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2250  86.550
UK   300  0.0200   0.600  100.00
RD   200  0.0700   0.060   .0070    TRAP    40.0    40.0
RD   500  0.0010   0.040            TRAP    10.0     5.0
ZW C=FLOW
*
KK YE58E
KM  0
HC     2
ZW C=FLOW
*
KK   E80
KM    LAST DOWNSTREAM SHED
BA0.0452
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.1310  86.070
UK  1300  0.0400   0.600  100.00
RD  1000  0.0250   0.060   .0200    TRAP    20.0    20.0
RD  1100  0.0010   0.040            TRAP    10.0    50.0     YES
ZW C=FLOW
*
KKYE5875
KM  0
HC     3
ZW C=FLOW
*
KK YE80C
KM    COMBINE WITH E40 FOR TOTAL AT LAST DOWNSTREAM POINT
HC     2
ZW C=FLOW
*
KK  E40C
KM    LARGE SHED DOWNSTREAM OF S. MILL RD.    85.5Ac
BA0.0344
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.1660  86.130
UK  1200  0.0100   0.600  100.00
RD   600  0.0400   0.060   .0100    TRAP    10.0    40.0
RD  1000  0.0010   0.040            TRAP    40.0    20.0
ZW C=FLOW
*
KK  E40E
KM    LARGE SHED DOWNSTREAM OF S. MILL RD.    85.5Ac
BA0.0058
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  86.220
UK   600  0.0100   0.600  100.00
RD   600  0.0400   0.060   .0100    TRAP    10.0    40.0
RD  1000  0.0010   0.040            TRAP    40.0    20.0
ZW C=FLOW
*
KK  E40D
KM    LARGE SHED DOWNSTREAM OF S. MILL RD.    85.5Ac
BA0.0074
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.1940  85.980
UK   600  0.0100   0.600  100.00
RD   600  0.0400   0.060   .0100    TRAP    10.0    40.0
RD  1000  0.0010   0.040            TRAP    40.0    20.0
ZW C=FLOW
*
KK YE40D
KM  0
HC     3
ZW C=FLOW
*
KKYE40DC
KM  0
HC     2
ZW C=FLOW
*
KK   E85
KM    OFFSITE DOWNSTREAM SHED     313.9
BA0.4599
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.1750  85.770
```

```
UK  2500  0.0625   0.600  100.00
RD  2000  0.0250   0.060   .1000    TRAP    20.0    20.0
RD  5000  0.0010   0.040            TRAP    10.0    50.0
ZW C=FLOW
*
KK  YE85
KM  0
HC     2
ZW C=FLOW
*
KK  E85B
KM  E85B
BA0.0312
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2300  86.100
UK   400  0.0200   0.600  100.00
RD   500  0.0500   0.060            TRAP    20.0    10.0
ZW C=FLOW
*
KK YE85B
KM  0
HC     2
ZW C=FLOW
*
*
KKUW3END
KM  ROUTE FOR BACKWATER AT NW3
RS     1    FLOW      -1
SV  0.00    0.01    0.03    20.6     247     250
SQ   0.0    40.0   243.0     508     637   800.0
ZW C=FLOW
*
KK  E85C
KM  E85C
BA0.0079
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2380  85.920
UK   400  0.0200   0.600  100.00
RD   500  0.0500   0.060            TRAP    20.0    10.0
ZW C=FLOW
*
KKYE85CC
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK  E5A1
KM    E5A1 Drop Inlet
BA0.0730
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2040  94.840    0.10  0.2040  95.000
UK  1350  0.1330   0.600      98
UK   200  0.0200   0.110       3
RD  2000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK   E5B
KM    E5B
BA0.0139
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2450  93.480    0.10  0.2450  95.000
UK   600  0.0800   0.600      91
UK   200  0.0200   0.110       9
RD  2000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  YE5B
KM  0
HC     2
ZW C=FLOW
*
KK   E5C
KM    E5C
BA0.0051
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.600    0.10  0.2500  95.000
UK   600  0.0700   0.600      92
UK   200  0.0200   0.110       8
RD   500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
```

```
KK  YE5C
KM  0
HC     2
ZW C=FLOW
*
*
KKUE5ADT
KM  0
RS     1    FLOW      -1
SV  0.00    0.10    0.20    0.30    0.40    1.70    2.40
SQ   0.0     0.0     0.1     2.0    50.0    80.0   200.0
ZW C=FLOW
*
KK   E5D
KM    E5D
BA0.0850
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.790
UK  1500  0.0500   0.600  100.00
RD  1500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YE5DC
KM  0
HC     2
ZW C=FLOW
*
KK  E6A1
KM    E6A1
BA0.0570
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.190
UK  1000  0.0680   0.600  100.00
RD  2700  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK  E6A2
KM    E6A2
BA0.0149
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.170
UK   600  0.0680   0.600  100.00
RD   800  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYE6A1C
KM  0
HC     2
ZW C=FLOW
*
KK   E6C
KM    E6C
BA0.0939
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2460  90.420
UK  1600  0.0900   0.600  100.00
RD  1400  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YE6CC
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK GS10D
KM    GS10D
BA0.0124
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.570    0.10  0.2500  95.000
UK   900  0.0700   0.600      79
UK   100  0.0200   0.110      21
RD   200  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK GS10C
KM    GS10C
BA0.0169
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.380    0.10  0.2500  95.000
```

```
UK   300  0.0600   0.600      91
UK   100  0.0200   0.110       9
RD   400  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYS10CC
KM  0
HC     2
ZW C=FLOW
*
KK GS10B
KM    GS10B
BA0.0044
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.260    0.10  0.2500  95.000
UK   600  0.0800   0.600      86
UK   100  0.0200   0.110      14
RD   400  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKGS10A1
KM    GS10A1
BA0.0290
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.090    0.10  0.2500  95.000
UK   600  0.0800   0.600      96
UK   100  0.0200   0.110       4
RD   500  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK GS10F
KM    GS10F
BA0.0248
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.630    0.10  0.2500  95.000
UK   600  0.0800   0.600      92
UK   100  0.0200   0.110       8
RD   900  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKY10FCC
KM  0
HC     2
ZW C=FLOW
*
KK GS10E
KM    GS10E
BA0.0153
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.520    0.10  0.2500  95.000
UK   300  0.0800   0.600      78
UK   100  0.0200   0.110      22
RD   600  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYS10AC
KM   COMBINATION AT MEADOWS ROUTING AREA
HC     2
ZW C=FLOW
*
KKGS10A2
KM   GS10A2
BA0.0278
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.900    0.10  0.2500  95.000
UK  1400  0.0800   0.600      96
UK   100  0.0200   0.110       4
RD  1400  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYGDTCC
KM  0
HC     2
ZW C=FLOW
*
*
KKUGS10R
KM   MEADOWS WQ AND DETENTION RESERVOIR AT GS10E
RS     1    FLOW      -1
SV 11.60   13.00   15.95
SQ  61.0   100.0   330.0
ZW C=FLOW
*
*
```

```
KKUS10ER
KM   Channel Attenuation downstream of GS10R
RS     1    FLOW      -1
SV  0.00    0.05    0.27    0.50    0.72    0.95    1.15
SQ   0.0     0.0     5.0    15.0    27.0    37.0    62.0
ZW C=FLOW
*
KK GS10J
KM    GS10J
BA0.0099
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.440    0.10  0.2500  95.000
UK   300  0.0800   0.600      92
UK   200  0.0200   0.110       8
RD   500  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKYS10JC
KM  0
HC     2
ZW C=FLOW
*
KK GS10G
KM    GS10G
BA0.0081
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.080    0.10  0.2500  95.000
UK   300  0.0800   0.600      90
UK   200  0.0200   0.110      10
RD   500  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
*
KKUS10JR
KM   Channel Attenuation From GS10J to GS10I
RS     1    FLOW      -1
SV  0.00    0.05    0.10    0.12    0.19    0.22    1.35
SQ   0.0     0.0     5.0    15.0    27.0    37.0   400.0
ZW C=FLOW
*
KK GS10H
KM    GS10H
BA0.0066
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.040    0.10  0.2500  95.000
UK   300  0.0800   0.600      81
UK   200  0.0200   0.110      19
RD   400  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KK GS10I
KM    GS10I
BA0.0071
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.760    0.10  0.2500  95.000
UK   300  0.0600   0.600      78
UK   200  0.0200   0.110      22
RD   400  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KK   E8A
KM    E8A
BA0.0049
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.970    0.10  0.2500  95.000
UK   200  0.1200   0.600      73
UK   100  0.0200   0.110      27
RD   300  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
*
KKUE8ASQ
KM  0
RS     1    FLOW      -1
SV  0.00    0.03    0.05    0.08    0.10    0.20    1.00
SQ   0.0     0.0     0.0     0.0     3.5    80.0   200.0
ZW C=FLOW
*
KK   E8B
KM    E8B
BA0.0122
PB
* PI
BF    -1  -0.001    1.50
```

```
LU  0.10  0.2500  91.290    0.10  0.2500  95.000
UK   400  0.0800   0.600      95
UK   100  0.0200   0.110       5
RD  1400  0.1000   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK   E8C
KM    E8C
BA0.0244
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.630
UK   800  0.0800   0.600  100.00
RD  1400  0.1000   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK YE8CC
KM  0
HC     2
ZW C=FLOW
*
KKYGS10C
KM  0
HC     2
ZW C=FLOW
*
KKYS10IC
KM  0
HC     2
ZW C=FLOW
*
*
KKUS10IR
KM   Storage Upstream of Siller Ranch Road -  Channel Routing Meadow to Schaffer m
RS     1    FLOW      -1
SV  0.00    0.05    0.12    0.19    0.26    0.33    1.55
SQ   0.0     0.0     5.0    15.0    27.0    37.0   400.0
ZW C=FLOW
*
*
KK UGS9R
KM  0
RS     1    FLOW      -1
SV  0.00    0.09    0.17    0.24    0.41    0.59    0.83    0.94    4.03
SQ   0.0    33.0    55.0    76.0   114.0   145.0   177.0   206.0   644.0
ZW C=FLOW
*
KK    E9
KM    E9
BA0.0213
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.040
UK   600  0.0800   0.600  100.00
RD  1000  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
*
KKUGS11R
KM  0
RS     1    FLOW      -1
SV  0.00    0.25    0.42    0.58    0.95    1.37    2.24    2.77    6.95
SQ   0.0    33.0    55.0    76.0   114.0   145.0   177.0   206.0   644.0
ZW C=FLOW
*
KK GS11B
KM    GS11B
BA0.0031
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.680
UK   700  0.1000   0.600  100.00
RD   300  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK GS11A
KM    GS11A
BA0.0354
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2370  89.970
UK   700  0.1000   0.600  100.00
RD  1100  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKYGS11A
KM  0
HC     2
ZW C=FLOW
*
```

```
*
KKUS11RR
KM  0
RS     1    FLOW      -1
SV  0.00    1.25    1.51    1.75    2.27    2.78    3.53    4.26    4.67
SQ   0.0    33.0    55.0    76.0   114.0   145.0   177.0   206.0   244.0
ZW C=FLOW
*
KK GS13C
KM   GS13C
BA0.0066
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.830
UK   300  0.0700   0.600  100.00
RD   300  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK GS13B
KM   GS13B
BA0.0168
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.340
UK   300  0.0700   0.600  100.00
RD  1100  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK GS18A
KM   GS18A
BA0.0020
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.080
UK   800  0.0940   0.600  100.00
RD   300  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  GS18
KM    GS18
BA0.0248
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.410
UK   800  0.0940   0.600  100.00
RD  1600  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKYGS18C
KM  0
HC     2
ZW C=FLOW
*
KK GS13A
KM   GS13A
BA0.0196
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.1810  89.760
UK   600  0.0670   0.600  100.00
RD  1100  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYGS13A
KM  0
HC     2
ZW C=FLOW
*
KK YGS13
KM  0
HC     2
ZW C=FLOW
*
KK  GS19
KM    GS19
BA0.0617
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.1920  89.790
UK   700  0.0860   0.600  100.00
RD  1000  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK  GS20
KM    GS20
BA0.0178
PB
* PI
```

```
BF    -1  -0.001    1.50
LU  0.10  0.1680  89.460
UK   600  0.1000   0.600  100.00
RD   600  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYGS20C
KM  0
HC     2
ZW C=FLOW
*
*
KKUOOSED
KM   GOOSENECK LAKE RESERVOIR _ CURRENT ROUTING/DISCHARGE RATING
RS     1    FLOW      -1
SV  0.00   43.30   90.10  144.10  173.90  205.40  238.90  274.10
SQ   0.0     2.0    84.8   360.0   670.8  1273.0  3585.0  8880.0
ZW C=FLOW
*
* - - - - - -
*
*
KKGS21B1
KM            4.2 AC.
BA0.0065
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.660
UK   300  0.0700   0.600  100.00
RD   800  0.1000   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KKVR21B1
KM   ROUTE GS21B1
RD   540  0.0704   0.015           CIRC     2.0     0.0
ZW C=FLOW
*
KKGS21B2
KM            3.2 AC.
BA0.0050
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.330
UK   300  0.0700   0.600  100.00
RD   900  0.0800   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KKYQG21B
KM     COMBINE
HC     2
ZW C=FLOW
*
KK GS21A
KM   GS21A
BA0.0412
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.830    0.10  0.2500  90.830
UK  1000  0.0700   0.600      80
UK   200  0.0200   0.240      20
RD  2500  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK  GS22
KM    GS22
BA0.0741
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2490  90.000
UK   700  0.0570   0.600  100.00
RD  1000  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKYGS21A
KM     COMBINE
HC     2
ZW C=FLOW
*
*
KKUGS22R
KM  0
RS     1    FLOW      -1
SV  0.00    0.67    0.84    0.97    1.28    1.45    1.87    2.23    5.29
SQ   0.0    65.0    85.0   102.0   144.0   184.0   232.0   291.0   575.0
ZW C=FLOW
*
KK  GS23
KM    GS23
BA0.0596
PB
```

```
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  89.490
UK  2000  0.0400   0.600  100.00
RD  1100  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK  GS24
KM    GS24
BA0.0352
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.020
UK   500  0.1000   0.600  100.00
RD   900  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYGS24C
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KKGS25B3
KM           1.2 AC.
BA0.0019
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.330
UK   300  0.0700   0.600  100.00
RD   310  0.0500   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KKGS25B4
KM            1.8 AC.
BA0.0029
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.250
UK   300  0.0700   0.600  100.00
RD   440  0.1200   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KKYC25B4
KM     COMBINE
HC     2
ZW C=FLOW
*
KKGS25C4
KM            4.4 AC.
BA0.0069
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.210
UK   300  0.0700   0.600  100.00
RD   550  0.1000   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KKGS25C5
KM            1.7 AC.
BA0.0026
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.190
UK   300  0.0700   0.600  100.00
RD   450  0.1100   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KKYC25C5
KM     COMBINE
HC     2
ZW C=FLOW
*
KKGS25C6
KM            1.6 AC.
BA0.0023
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.060
UK   300  0.0700   0.600  100.00
RD   240  0.1080   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KKYC25C6
KM     COMBINE
HC     3
```

```
ZW C=FLOW
*
KKGS25C9
KM           3.0 AC.
BA0.0047
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.850
UK   300  0.0700   0.600  100.00
RD   550  0.0509   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KKGS21A2
KM           1.3 AC.
BA0.0020
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.040
UK   300  0.0700   0.600  100.00
RD   750  0.0825   0.060            CIRC     2.0     0.0
ZW C=FLOW
*
KKGS25C1
KM           .4 AC.
BA0.0006
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.870
UK   300  0.0700   0.600  100.00
RD   290  0.0621   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KKYC25C1
KM   COMBINE
HC     2
ZW C=FLOW
*
KKVR25C1
KM     ROUTR COMBINED GS25C1
RD   312  0.0401   0.015          CIRC       2.0     0.0
ZW C=FLOW
*
KKYC25C9
KM     COMBINE
HC     3
ZW C=FLOW
*
KKGS25C3
KM           3.9 AC.
BA0.0060
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.990
UK   300  0.0700   0.600  100.00
RD  1045  0.0670   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KKGS25C7
KM           3.8 AC.
BA0.0060
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.830
UK   300  0.0700   0.600  100.00
RD   620  0.0452   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KKYC25C7
KM     COMBINE
HC     3
ZW C=FLOW
*
KK GS27C
KM           2.8 AC.
BA0.0044
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.610
UK   300  0.0700   0.600  100.00
RD   220  0.0636   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KK GS23B
KM  0
BA0.0061
PB
* PI
BF    -1  -0.001    1.50
```

```
LU  0.10  0.2500  90.640
UK   300  0.0700   0.600  100.00
RD   470  0.0638   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KKYWQ25C
KM     COMBINE
HC     3
ZW C=FLOW
*
KK GS25E
KM    GS25E
BA0.0340
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.240
UK   900  0.1000   0.600  100.00
RD  1000  0.1000   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKY25ECC
KM  0
HC     2
ZW C=FLOW
*
KKGS25A2
KM            1.9 AC.
BA0.0029
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.690
UK   300  0.0700   0.600  100.00
RD   700  0.0500   0.060            TRAP     2.0     3.0
ZW C=FLOW
*
KKGS25A1
KM            .4 AC.
BA0.0007
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.740
UK   300  0.0700   0.600  100.00
RD  1400  0.0660   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KKGS25A3
KM            1.2 AC.
BA0.0018
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.700
UK   300  0.0700   0.600  100.00
RD  1010  0.0620   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KKYC25A3
KM     COMBINE
HC     3
ZW C=FLOW
*
KKVR25A3
KM       ROUTE COMBINED GS25A3
RD   561  0.0238   0.015            CIRC     2.0     0.0
ZW C=FLOW
*
KKGS25D3
KM            1.3 AC.
BA0.0022
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.690
UK   300  0.0700   0.600  100.00
RD   900  0.0650   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KKYC25D3
KM     COMBINE
HC     2
ZW C=FLOW
*
KKGS25D2
KM            2.9 AC.
BA0.0045
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.570
UK   300  0.0700   0.600  100.00
RD   840  0.0710   0.060            TRAP    10.0     1.0
```

```
ZW C=FLOW
*
KKYC25D2
KM     COMBINE
HC     2
ZW C=FLOW
*
KKGS25D1
KM            4.1 AC
BA0.0062
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.400
UK   300  0.0700   0.600  100.00
RD  1520  0.0700   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KKYC25D1
KM     COMBINE
HC     2
ZW C=FLOW
*
KKVR25D1
KM     ROUTE COMBINED GS25D1
RD   923  0.0368   0.015           CIRC     2.0     0.0
ZW C=FLOW
*
KKGS28B2
KM           6.7 AC.
BA0.0105
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.230
UK   300  0.0700   0.600  100.00
RD  1780  0.0625   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KKGS27B1
KM         5.5 AC.
BA0.0087
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.170
UK   300  0.0700   0.600  100.00
RD  1040  0.0557   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KK YC27B
KM     COMBINE
HC     3
ZW C=FLOW
*
KKGS25C2
KM           3.0 AC
BA0.0047
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.980
UK   300  0.0700   0.600  100.00
RD  1800  0.0566   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KKYC25C2
KM     COMBINE
HC     2
ZW C=FLOW
*
KKGS27B3
KM           3.3 AC.
BA0.0052
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.660
UK   300  0.0700   0.600  100.00
RD   660  0.0720   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KKGS27B2
KM  0
BA0.0053
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.620
UK   300  0.0700   0.600  100.00
RD   560  0.0640   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KKYQG27B
```

```
KM     COMBINE
HC     3
ZW C=FLOW
*
KKGS25E1
KM    GS25E
BA0.0131
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.120
UK   900  0.1000   0.600  100.00
RD  1000  0.1000   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYGS25E
KM  0
HC     2
ZW C=FLOW
*
KK GS30B
KM            1.1 AC
BA0.0018
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.270
UK   300  0.0700   0.600  100.00
RD   800  0.0350   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KKGS28B1
KM            1.6 AC.
BA0.0025
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.170
UK   300  0.0700   0.600  100.00
RD  1000  0.0437   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KKYC28B1
KM     COMBINE
HC     2
ZW C=FLOW
*
KKGS28B3
KM            .09 AC.
BA0.0015
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.990
UK   300  0.0700   0.600  100.00
RD   830  0.0554   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KKYC28B3
KM     COMBINE
HC     2
ZW C=FLOW
*
KKGS28A1
KM            7.6 AC.
BA0.0120
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.790
UK   300  0.0700   0.600  100.00
RD  1000  0.0690   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KKYQG28B
KM     COMBINE
HC     2
ZW C=FLOW
*
KKGS28A2
KM   GS28A
BA0.0154
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.540    0.10  0.2500  90.540
UK   500  0.0710   0.600      50
UK   200  0.0200   0.240      50
RD   500  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYGS28A
KM  0
HC     2
```

```
ZW C=FLOW
*
KKYGS29C
KM  0
HC     2
ZW C=FLOW
*
KK GS30A
KM    GS30
BA0.0427
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.040    0.10  0.2500  95.000
UK   900  0.0560   0.600      89
UK    50  0.0200   0.110      11
RD  1400  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK GS31A
KM   GS31A
BA0.0843
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  89.700    0.10  0.2500  89.700
UK  1000  0.0500   0.600      90
UK   200  0.0200   0.400      10
RD  1100  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKYGS31C
KM  0
HC     2
ZW C=FLOW
*
KKYS31CC
KM  0
HC     2
ZW C=FLOW
*
KK  GS32
KM    GS32
BA0.0320
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2300  87.720
UK   500  0.1000   0.600  100.00
RD  1800  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
* - - - - - -
*
*
KK MD1H3
KM   MD1H3
BA0.0040
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  95.100    0.10  0.2500  95.100
UK   300  0.1200   0.600      75
UK    50  0.0200   0.110      25
RD   400  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK MD1H2
KM   MD1H2
BA0.0027
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  94.640    0.10  0.2500  95.000
UK   300  0.1200   0.600      75
UK    50  0.0200   0.110      25
RD   300  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKYD1H2C
KM  0
HC     2
ZW C=FLOW
*
KK MD1E4
KM   MD1E4
BA0.0132
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  94.420    0.10  0.2500  95.000
UK   300  0.1000   0.600      87
UK    50  0.0200   0.110      13
RD   600  0.0500   0.060            TRAP     2.0     2.0
```

```
ZW C=FLOW
*
KKYD1H2D
KM  0
HC     2
ZW C=FLOW
*
KK MD1E3
KM   MD1E3
BA0.0039
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.790    0.10  0.2500  95.000
UK   300  0.1000   0.600      78
UK    50  0.0200   0.110      22
RD   500  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKYD1E3C
KM  0
HC     2
ZW C=FLOW
*
KK MD1E2
KM   MD1E2
BA0.0031
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.150    0.10  0.2500  95.000
UK   300  0.1000   0.600      84
UK    50  0.0200   0.110      16
RD   600  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYD1E2C
KM  0
HC     2
ZW C=FLOW
*
KKMD1E1E
KM   MD1E1-2
BA0.0042
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.570
UK  1200  0.1070   0.600  100.00
RD   800  0.0640   0.060            TRAP    10.0     0.0
ZW C=FLOW
*
KK YMD1E
KM  0
HC     2
ZW C=FLOW
*
KKMD1E1C
KM   MD1E1-3
BA0.0686
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.380
UK  1000  0.0800   0.600  100.00
RD  1858  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKMD1E1B
KM   MD1E1-2
BA0.0141
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.620
UK  1200  0.1070   0.600  100.00
RD   800  0.0640   0.060            TRAP    10.0     0.0
ZW C=FLOW
*
KKYM1E1B
KM  0
HC     2
ZW C=FLOW
*
KK MD1H1
KM    MD1H1-1
BA0.0073
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  94.150
UK   400  0.0600   0.600  100.00
RD   200  0.0080   0.060            TRAP    10.0    10.0
ZW C=FLOW
```

```
*
KK MD1H4
KM    MD1H1-2
BA0.0049
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  94.030
UK   650  0.0600   0.600  100.00
RD   100  0.0030   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKMD1I_1
KM    MD1I-1
BA0.0242
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  94.690
UK  1000  0.1000   0.600  100.00
RD   350  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYD1H1C
KM  0
HC     3
ZW C=FLOW
*
KK MD1G3
KM   MD1G3
BA0.0096
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.710    0.10  0.2500  95.000
UK   300  0.0800   0.600      90
UK    50  0.0200   0.110      10
RD   600  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYD1G3C
KM  0
HC     2
ZW C=FLOW
*
KKVD1G3R
KM  0
RD  1600  0.0500   0.040           TRAP    10.0    10.0
ZW C=FLOW
*
KK MD1G2
KM   MD1G2
BA0.0033
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.570    0.10  0.2500  95.000
UK   200  0.0800   0.600      72
UK    50  0.0200   0.110      28
RD   300  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKMD1G2B
KM   MD1G2B
BA0.0055
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.400
UK   200  0.0850   0.600  100.00
RD   300  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKYM1G2B
KM  0
HC     2
ZW C=FLOW
*
KKMD1G1B
KM   MD1G1-2
BA0.0195
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.300
UK  1300  0.0600   0.600  100.00
RD  1568  0.1070   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYM1G1B
KM  0
HC     2
ZW C=FLOW
*
```

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KKY26OUP
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK GS26A
KM    GS26A
BA0.0074
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  95.350    0.10  0.2500  95.350
UK   600  0.1000   0.600      85
UK    50  0.0200   0.110      15
RD   400  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KK GS26B
KM    GS26B
BA0.0139
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  94.220    0.10  0.2500  95.000
UK   600  0.2000   0.600      89
UK    50  0.0200   0.110      11
RD   800  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KK GS26C
KM    GS26C
BA0.0126
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.110    0.10  0.2500  95.000
UK   600  0.2000   0.600      90
UK    50  0.0200   0.110      10
RD   800  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KK GS26D
KM    GS26D
BA0.0144
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.430    0.10  0.2500  95.000
UK   600  0.1000   0.600      89
UK    50  0.0200   0.110      11
RD   400  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKYS26DC
KM  0
HC     2
ZW C=FLOW
*
KK GS26E
KM    GS26E
BA0.0028
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.560    0.10  0.2500  95.000
UK   300  0.0800   0.600      75
UK    50  0.0200   0.110      25
RD   600  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KK GS26F
KM    GS26F
BA0.0074
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.560    0.10  0.2500  95.000
UK   400  0.1000   0.600      87
UK    50  0.0200   0.110      13
RD   400  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KKGS26N1
KM    GS26N-1
BA0.0046
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.260
UK   335  0.0200   0.110  100.00
RD   500  0.0500   0.060            TRAP     2.0     2.0
```

```
ZW C=FLOW
*
KK GS26G
KM    GS26G
BA0.0231
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.520    0.10  0.2500  95.000
UK   600  0.1000   0.600      91
UK    50  0.0200   0.110       9
RD   400  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KKYS26NC
KM  0
HC     2
ZW C=FLOW
*
KK GS26H
KM    GS26H
BA0.0026
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.140    0.10  0.2500  95.000
UK   100  0.0800   0.600      75
UK    50  0.0200   0.110      25
RD   500  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KK GS15C
KM    GS15C
BA0.0106
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  95.220    0.10  0.2500  95.220
UK   600  0.1500   0.600      91
UK    50  0.0200   0.110       9
RD   400  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KK GS15D
KM    GS15D
BA0.0133
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.620    0.10  0.2500  95.000
UK   300  0.1350   0.600      91
UK    50  0.0200   0.110       9
RD   400  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KK GS15A
KM    GS15A
BA0.0913
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2370  95.820    0.10  0.2370  95.820
UK  1800  0.1200   0.600      97
UK    50  0.0200   0.110       3
RD   600  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KK GS15B
KM    GS15B
BA0.0151
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.510    0.10  0.2500  95.000
UK   400  0.1000   0.600      94
UK    50  0.0200   0.110       6
RD   600  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KKYS15BC
KM  0
HC     2
ZW C=FLOW
*
KKGS16A1
KM    GS16A1
BA0.0190
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.870    0.10  0.2500  95.000
UK   400  0.1000   0.600      96
UK    50  0.0200   0.110       4
RD   500  0.0500   0.060            TRAP     2.0     2.0     YES
```

```
ZW C=FLOW
*
KKGS16A2
KM    GS16A2
BA0.0137
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.430    0.10  0.2500  95.000
UK   400  0.1000   0.600      91
UK    50  0.0200   0.110       9
RD   600  0.0500   0.060           TRAP     2.0     2.0     YES
ZW C=FLOW
*
KK GS16B
KM    GS16B
BA0.0260
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2330  95.710    0.10  0.2330  95.710
UK  1800  0.1500   0.600      93
UK    50  0.0200   0.110       7
RD   500  0.0500   0.060           TRAP     2.0     2.0
ZW C=FLOW
*
KK GS16C
KM    GS16C
BA0.0141
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.740    0.10  0.2500  95.000
UK   400  0.1500   0.600      89
UK    50  0.0200   0.110      11
RD   400  0.0500   0.060           TRAP     2.0     2.0     YES
ZW C=FLOW
*
KK GS17C
KM    GS17C
BA0.0147
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.770    0.10  0.2500  95.000
UK   600  0.1200   0.600      91
UK    50  0.0200   0.110       9
RD   600  0.0500   0.060           TRAP     2.0     2.0     YES
ZW C=FLOW
*
KK  E6A3
KM    E6A3
BA0.0421
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.1800  95.190    0.10  0.1800  95.190
UK  1800  0.2000   0.600      94
UK    50  0.0200   0.110       6
RD   800  0.0500   0.060           TRAP     2.0     2.0
ZW C=FLOW
*
KK GS12B
KM    GS12B
BA0.0089
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.270    0.10  0.2500  95.000
UK   600  0.1200   0.600      89
UK    50  0.0200   0.110      11
RD   600  0.0500   0.060           TRAP     2.0     2.0     YES
ZW C=FLOW
*
KK GS12C
KM    GS12C
BA0.0068
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.820    0.10  0.2500  95.000
UK   300  0.1200   0.600      70
UK    50  0.0200   0.110      30
RD  1600  0.0500   0.060           TRAP     2.0     2.0
ZW C=FLOW
*
KKY12CCC
KM  0
HC     2
ZW C=FLOW
*
KK GS12F
KM    GS12F
BA0.0082
```

```
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.910    0.10  0.2500  95.000
UK   400  0.1000   0.600      94
UK    50  0.0200   0.110       6
RD   400  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKYS12FC
KM  0
HC     2
ZW C=FLOW
*
KK GS12H
KM    GS12H
BA0.0082
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.010    0.10  0.2500  95.000
UK   800  0.1000   0.600      94
UK    50  0.0200   0.110       6
RD   600  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KK GS12D
KM    GS12D
BA0.0044
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  94.450    0.10  0.2500  95.000
UK   400  0.1500   0.600      84
UK    50  0.0200   0.110      16
RD   300  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KK GS12E
KM    GS12E
BA0.0044
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.650    0.10  0.2500  95.000
UK   400  0.1500   0.600      90
UK    50  0.0200   0.110      10
RD   400  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KKY12ECC
KM  0
HC     2
ZW C=FLOW
*
KK GS12I
KM    GS12I
BA0.0177
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.630    0.10  0.2500  95.000
UK   800  0.1000   0.600      95
UK    50  0.0200   0.110       5
RD  1000  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKYS12IC
KM  0
HC     2
ZW C=FLOW
*
KKVNTOLK
KM  0
RD  1000  0.0500   0.040            TRAP     2.0     2.0
ZW C=FLOW
*
KKYGS17C
KM  0
HC     2
ZW C=FLOW
*
KKYGS16A
KM  0
HC     2
ZW C=FLOW
*
KK GS17A
KM    GS17A
BA0.0226
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.060    0.10  0.2500  95.000
```

```
UK   800  0.1000   0.600      90
UK    50  0.0200   0.110      10
RD  1000  0.0500   0.060           TRAP     2.0     2.0
ZW C=FLOW
*
KKYAKCOM
KM  0
HC     3
ZW C=FLOW
*
*
KKULFDT2
KM   DETENTION AT GS17A
RS     1    FLOW      -1
SV  0.00    0.55    1.91    3.69    7.81
SQ   0.0    60.0   170.0   311.0   630.0
ZW C=FLOW
*
KK GS26N
KM   GS26N-2
BA0.0299
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.950
UK  1419  0.0660   0.600  100.00
RD  1800  0.0500   0.060           TRAP     2.0     2.0     YES
ZW C=FLOW
*
*
KKUSTDET
KM GOLF LAKE/WET MEADOW AT SOUTH SIDE OF B STREET
* NEW 10-11-04
* NEW 12-04 for 30ft weir @ 6177.2 and low swq below
KO     1
RS     1    ELEV    6176
* SV     0    6.92   8.320   9.821  11.439   13.17
*  sv Revised by BAT 2/15/05 TO REFLECT NORMAL POOL ELEV AT 6176
SA     0    0.01    1.34    1.67    2.15
SE  6166  6175.9    6176    6178    6180
SQ     0    .001    0.50    64.0   217.0   421.0
SE  6166    6176    6177    6178    6179    6180
ZW C=FLOW
*
KKGS26OA
KM    AREA=20.2 AC
BA0.0321
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.550    0.10  0.2500  91.550
UK   800  0.0500   0.600      95
UK    50  0.0200   0.110       5
RD   800  0.0500   0.060           TRAP     2.0     2.0
ZW C=FLOW
*
KKGS26OB
KM    AREA=3.3 AC UNIT 4A
BA0.0047
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.650    0.10  0.2500  91.650
UK   600  0.0500   0.600      95
UK    50  0.0200   0.110       5
RD   600  0.0500   0.060           TRAP     2.0     2.0
ZW C=FLOW
*
KKYS26OC
KM  0
HC     4
ZW C=FLOW
*
*
KKUPLAKE
KM   CONCERT PARK LAKE
KO     1
RS     1    ELEV    6149
SA  0.01    0.25    0.32    0.36
SE  6140    6148    6149    6150
*  LOW FLOW PIPE (SL RECORD) IS A DUMMY
SL  6146   0.001    0.62     0.5
SS  6148      20     2.6     1.5
ZW C=FLOW
*
KK MD1C2
KM    MD1C2
BA0.0063
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.300    0.10  0.2500  91.300
UK   250  0.0500   0.600      90
UK    50  0.0200   0.110      10
```

```
RD   300  0.0500   0.060           TRAP     2.0     2.0
ZW C=FLOW
*
KKYMD1C2
KM  0
HC     2
ZW C=FLOW
*
KKGS26L3
KM    AREA=0.7 AC   UNIT 4A
BA0.0012
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.320    0.10  0.2500  91.320
UK   500  0.0580   0.600      90
UK    50  0.0200   0.110      10
RD   500  0.0500   0.060           TRAP     2.0     2.0
ZW C=FLOW
*
KKYNIT4A
KM  0
HC     2
ZW C=FLOW
*
KKMD1F-1
KM    MD1F-1
BA0.0069
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.680    0.10  0.2500  95.000
UK   600  0.0800   0.600      90
UK    50  0.0200   0.110      10
RD  1000  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK  MD1F
KM    MD1F-2
BA0.0035
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.530    0.10  0.2500  95.000
UK   500  0.0800   0.600      90
UK    50  0.0200   0.110      10
RD  1000  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD1F
KM  0
HC     2
ZW C=FLOW
*
KKMD1D1D
KM    MD1D1D
BA0.0124
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.750
UK   800  0.0600   0.600  100.00
RD   400  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYD1D1D
KM  0
HC     2
ZW C=FLOW
*
KKMD1D1C
KM    MD1D1C
BA0.0074
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.540
UK   500  0.0500   0.600  100.00
RD   200  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYD1D1C
KM  0
HC     2
ZW C=FLOW
*
KK  MD1E
KM    MD1E
BA0.0160
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.050    0.10  0.2500  95.000
UK   600  0.0800   0.600      95
```

```
UK    50  0.0200   0.110       5
RD  1000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
*
KKUD1EWQ
KM  0
RS     1    FLOW      -1
SV  0.00    0.25    0.50    0.75
SQ   0.0     0.1    30.0    60.0
ZW C=FLOW
*
KKMD1D1A
KM    MD1D1A
BA0.0059
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.250
UK   400  0.1200   0.600  100.00
RD   500  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKMD1D1B
KM    MD1D1B
BA0.0028
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.320
UK   400  0.1200   0.600  100.00
RD   500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYD1D1B
KM  0
HC     2
ZW C=FLOW
*
KK MD1D2
KM    MD1D2
BA0.0077
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.970
UK   600  0.2000   0.600  100.00
RD  1000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYD1D2D
KM  0
HC     3
ZW C=FLOW
*
KKYD1C2C
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK GS26J
KM    GS26J
BA0.0023
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.640
UK   230  0.0780   0.600  100.00
RD   250  0.0770   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KK GS26K
KM    GS26K
BA0.0032
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.660
UK   194  0.0920   0.600  100.00
RD   200  0.0830   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKYGS26K
KM  0
HC     2
ZW C=FLOW
*
KK GS26L
KM    GS26L REVISED AREA = 5.8 AC UNIT 4A
BA0.0091
PB
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* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.490    0.10  0.2500  91.490
UK   500  0.0580   0.600      90
UK    50  0.0200   0.110      10
RD   500  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKYGS26L
KM  0
HC     2
ZW C=FLOW
*
KKGS26L2
KM    GS26L2
BA0.0029
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.100    0.10  0.2500  91.100
UK   250  0.0470   0.600      90
UK    50  0.0200   0.110      10
RD   250  0.0300   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KK MD1C1
KM    MD1C1
BA0.0155
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.000    0.10  0.2500  91.000
UK   400  0.0500   0.600      85
UK    50  0.0200   0.110      15
RD  1800  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KKYD1C1C
KM  0
HC     2
ZW C=FLOW
*
*
KKUWLAKE
KM CULTURAL CENTER LAKE LOWER LAKE
* CULTURAL LAKE HAS BEEN RELOCATED AND THE THE GRADING REVISED.
* THE LAKE NOW CONSISTS OF AN UPPER LAKE AND A LOWER LAKE.
* THE UPPER LAKE IS UPLAKE. THIS IS LOWER LAKE.  UPPER LAKE IS
* DESIGNATED UPLAKE
* REVISION DATE 7/7/2006
KO     1
RS     1    ELEV    6133
SA  0.98    2.89    3.08    3.34    3.65    4.01
SE  6119    6133    6134    6136    6138    6140
SQ     0     1.8    10.5    54.1   116.9   194.2   283.6   383.6   493.2
SE  6133  6133.6    6134    6135    6136    6137    6138    6139    6140
ZW C=FLOW
*
*
KKUAINWQ
KM   AT MD1C1
RS     1    FLOW      -1
SV  0.00    0.34    0.69    1.03    1.38    1.83    2.29    2.86    3.44
SQ   0.0     0.5     1.0     8.5    30.0    60.0   100.0   150.0   600.0
ZW C=FLOW
*
KK MD1C4
KM    MD1C4
BA0.0169
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2240  90.670    0.10  0.2240  90.670
UK   400  0.0500   0.600      95
UK    50  0.0200   0.110       5
RD  1800  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
*
KKU1C4WQ
KM   AT MD1C4
RS     1    FLOW      -1
SV  0.00    0.23    0.51    0.92    1.24    1.60    1.95    2.30
SQ   0.0     0.3     0.5     0.8     1.0     1.5    45.0   500.0
ZW C=FLOW
*
* - - - - - -
*
*
KK   MA1
KM     MA1
BA0.2995
PB
* PI
```

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BF    -1  -0.001    1.50
LU  0.10  0.1910 100.000
UK  1600  0.2340   0.600  100.00
RD  3500  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK   MA2
KM     MA2
BA0.5483
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2000 100.000
UK  2200  0.2840   0.600  100.00
RD  4300  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK   MA3
KM     MA3
BA0.6259
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2290 100.000
UK  2300  0.2720   0.600  100.00
RD  7500  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK   MA4
KM     MA4
BA0.2870
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2270  94.530
UK  2000  0.3000   0.600  100.00
RD  3300  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK   MA5
KM     MA5
BA0.2025
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2140  94.090
UK  1500  0.1830   0.600  100.00
RD  2500  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK   MA6
KM     MA6
BA0.4152
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2280  92.830
UK  1800  0.0970   0.600  100.00
RD  3000  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK YMA6C
KM  0
HC     2
ZW C=FLOW
*
KK   MA7
KM     MA7
BA0.2326
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2330  93.460
UK  3300  0.2270   0.600  100.00
RD  1500  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK YMA7C
KM  0
HC     2
ZW C=FLOW
*
KK   MA8
KM     MA8
BA0.4308
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.1650  98.600
UK  1250  0.3200   0.600  100.00
RD  5500  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK YMA8C
```

```
KM  0
HC     2
ZW C=FLOW
*
KK   MA9
KM     MA9
BA0.0913
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2370  91.810
UK   600  0.2080   0.600  100.00
RD  1500  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK MA10A
KM    MA10A
BA0.2885
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2410  92.870    0.10  0.2410  92.870
UK  1600  0.0380   0.600      85
UK   200  0.0200   0.240      15
RD  2800  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK MA10B
KM    MA10B
BA0.0100
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.700    0.10  0.2500  95.000
UK   900  0.0900   0.600      90
UK    50  0.0200   0.110      10
RD   200  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYA10BC
KM  0
HC     2
ZW C=FLOW
*
*
KKU0DCUL
KM  0
RS     1    FLOW      -1
SV  0.00    2.50    5.00    8.50   12.50
SQ   0.0   500.0  1200.0  2300.0  3500.0
ZW C=FLOW
*
* - - - - - -
*
*
KKMB7B3A
KM    MB7B3A
BA0.0051
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.020    0.10  0.2500  95.000
UK   500  0.0800   0.600      95
UK    50  0.0200   0.110       5
RD   550  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKMB7B4A
KM    MB7B4A
BA0.0156
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.520    0.10  0.2500  95.000
UK   500  0.0900   0.600      95
UK    50  0.0200   0.110       5
RD   570  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKMB7B3B
KM    MB7B3B
BA0.0064
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.020    0.10  0.2500  95.000
UK   600  0.0800   0.600      95
UK    50  0.0200   0.110       5
RD   600  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKMB7B4B
KM    MB7B4B
BA0.0044
```

```
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.570    0.10  0.2500  95.000
UK   400  0.0700   0.600      95
UK    50  0.0200   0.110       5
RD   500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYB7B34
KM  0
HC     3
ZW C=FLOW
*
KKMB7B4C
KM    MB7B4C
BA0.0023
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.160    0.10  0.2500  95.000
UK   170  0.0530   0.600      95
UK    50  0.0200   0.110       5
RD   300  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
*
KKUA10EQ
KM  0
RS     1    FLOW      -1
SV  0.00    0.05    0.10    0.15    0.20    0.25
SQ   0.0     0.0     0.0     0.0    30.0    60.0
ZW C=FLOW
*
KKYA10EC
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KKMB7B1A
KM    MB7B1A
BA0.0709
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  94.000
UK  1300  0.1920   0.600  100.00
RD  3000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKMB7B1C
KM    MB7B1C
BA0.0041
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.690    0.10  0.2500  95.000
UK   400  0.0800   0.600      95
UK    50  0.0200   0.110       5
RD   200  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKMB7B1B
KM    MB7B1B
BA0.0107
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.410    0.10  0.2500  95.000
UK   500  0.0800   0.600      95
UK    50  0.0200   0.110       5
RD   600  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKYMB7B1
KM  0
HC     2
ZW C=FLOW
*
KKMB7B1D
KM    MB7B1D
BA0.0146
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.500    0.10  0.2500  95.000
UK   500  0.0700   0.600      95
UK    50  0.0200   0.110       5
RD   650  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
```

```
KKMB7B1E
KM    MB7B1E
BA0.0054
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.170    0.10  0.2500  95.000
UK   500  0.0500   0.600      95
UK    50  0.0200   0.110       5
RD   350  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
*
KKUB7B1Q
KM  0
RS     1    FLOW      -1
SV  0.00    0.10    0.20    0.30    0.40    0.50
SQ   0.0     0.1     0.1     0.7    20.0    80.0
ZW C=FLOW
*
KK MB7B2
KM    MB7B2
BA0.0216
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.880    0.10  0.2500  95.000
UK  1300  0.1920   0.600      95
UK    50  0.0200   0.110       5
RD   600  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
*
KKUB7B2Q
KM  0
RS     1    FLOW      -1
SV  0.00    0.33    0.66    1.00    1.33
SQ   0.0     0.2     0.3     0.3   150.0
ZW C=FLOW
*
KKYMB7BC
KM  0
HC     2
ZW C=FLOW
*
*
KKUPONDD
KM  0
RS     1    FLOW      -1
SV  0.00    1.00    2.00    3.00    4.00    5.00    6.00    7.00    8.00
SQ   0.0    50.0   100.0   200.0   400.0   600.0  1000.0  2000.0  4000.0
ZW C=FLOW
*
* - - - - - -
*
*
KK   MB1
KM     MB1
BA0.5333
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.1880 100.000
UK  4000  0.2750   0.600  100.00
RD  2700  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK   MB2
KM     MB2
BA1.2667
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.1920  97.620
UK  2800  0.3390   0.600  100.00
RD  3400  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK   MB3
KM     MB3
BA0.5006
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2180  96.320
UK  1800  0.2780   0.600  100.00
RD  1600  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK   MB4
KM     MB4
BA0.6535
PB
* PI
```

```
BF    -1  -0.001    1.50
LU  0.10  0.2450  94.850
UK  1900  0.1840   0.600  100.00
RD  4000  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK   MB5
KM     MB5
BA0.1602
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.220
UK  1800  0.2780   0.600  100.00
RD  1500  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK  MB6A
KM   AREA = 7.0 AC
BA0.0073
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.990
UK  1335  0.1543   0.600  100.00
RD   625  0.0800   0.060           TRAP     0.1     1.0
ZW C=FLOW
*
*
KKUB6ADT
KM  0
RS     1    FLOW      -1
SV  0.00    0.15    0.30    0.45
SQ   0.0   100.0   200.0   300.0
ZW C=FLOW
*
KKYMB6AC
KM  0
HC     2
ZW C=FLOW
*
*
KKUB6CUL
KM  0
RS     1    FLOW      -1
SV  0.00    2.50    5.00    8.50   12.50
SQ   0.0   500.0  1100.0  2000.0  3000.0
ZW C=FLOW
*
KK  MB6B
KM   AREA = 3.9 AC
BA0.0061
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.900
UK   240  0.0708   0.600  100.00
RD   520  0.0800   0.060           TRAP     0.1     1.0
ZW C=FLOW
*
*
KKUB6BDT
KM  0
RS     1    FLOW      -1
SV  0.00    0.15    0.30    0.45
SQ   0.0   100.0   200.0   300.0
ZW C=FLOW
*
KKYMB6BC
KM  0
HC     2
ZW C=FLOW
*
KK  MB6C
KM   AREA = 3.2 AC
BA0.0039
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.600
UK   370  0.1081   0.600  100.00
RD   490  0.0683   0.060           TRAP     0.1     1.0
ZW C=FLOW
*
*
KKUB6CDT
KM  0
RS     1    FLOW      -1
SV  0.00    0.15    0.30    0.45
SQ   0.0   100.0   200.0   300.0
ZW C=FLOW
*
KKYMB6CC
KM  0
```

```
HC     2
ZW C=FLOW
*
KK  MB6D
KM    MB6D
BA0.0223
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2460  91.510    0.10  0.2460  91.510
UK   200  0.1250   0.600      65
UK   200  0.0200   0.240      35
RD  1500  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK  MB6G
KM  MB6G
BA0.0109
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.440    0.10  0.2500  92.440
UK   500  0.1250   0.600      30
UK   200  0.0200   0.240      70
RD   500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  MB6F
KM  MB6F
BA0.0062
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.260    0.10  0.2500  92.260
UK   500  0.1250   0.600      30
UK   200  0.0200   0.240      70
RD   500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK MB6D1
KM  MB6D1
BA0.0036
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.000    0.10  0.2500  92.000
UK   500  0.1250   0.600      30
UK   200  0.0200   0.240      70
RD   500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMB6D1
KM  0
HC     3
ZW C=FLOW
*
KK  MB6E
KM    MB6E
BA0.0050
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.270    0.10  0.2500  92.270
UK   500  0.1250   0.600      30
UK   200  0.0200   0.240      70
RD   500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMB6E
KM  0
HC     2
ZW C=FLOW
*
*
KKUB6EDT
KM  0
RS     1    FLOW      -1
SV  0.00    0.15    0.30    0.45
SQ   0.0   100.0   200.0   300.0
ZW C=FLOW
*
KKYMB6EC
KM  0
HC     2
ZW C=FLOW
*
KKYMB6DD
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
```

```
KK MB7A1
KM     MB7A1
BA0.1465
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2080  94.570    0.10  0.2080  95.000
UK  1300  0.1920   0.600      97
UK    50  0.0200   0.110       3
RD  2500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKMB7A2A
KM     MB7A2A
BA0.0247
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.970    0.10  0.2500  95.000
UK   550  0.1920   0.600      92
UK    50  0.0200   0.110       8
RD   580  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKMB7A2B
KM     MB7A2B
BA0.0059
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.730
UK   300  0.1920   0.600  100.00
RD   500  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
*
KKUB7A2Q
KM  0
RS     1    FLOW      -1
SV  0.00    0.12    0.25    0.38    0.50    0.62
SQ   0.0     0.1     0.1     0.1    20.0   120.0
ZW C=FLOW
*
KK  MB7C
KM     MB7C
BA0.0236
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.450    0.10  0.2500  95.000
UK   200  0.1000   0.600      92
UK    50  0.0200   0.110       8
RD   500  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKMB7D1A
KM     MB7D1A
BA0.0044
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.210    0.10  0.2500  95.000
UK   500  0.1000   0.600      79
UK    50  0.0200   0.110      21
RD   200  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKMB7D1B
KM     MB7D1B
BA0.0025
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.310    0.10  0.2500  95.000
UK   300  0.1000   0.600      79
UK    50  0.0200   0.110      21
RD   400  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYB7D1C
KM  0
HC     2
ZW C=FLOW
*
KK MB7D1
KM     MB7D1
BA0.0011
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.810
UK   100  0.1000   0.600  100.00
RD   300  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
```

```
*
KK MB7D2
KM     MB7D2
BA0.0215
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.620    0.10  0.2500  95.000
UK   200  0.1000   0.600      95
UK    50  0.0200   0.110       5
RD   500  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKYMB7CC
KM  0
HC     2
ZW C=FLOW
*
KK  MB7E
KM     MB7E
BA0.0585
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2470  91.300    0.10  0.2470  95.000
UK   200  0.1000   0.600      96
UK    50  0.0200   0.110       4
RD  1500  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
*
KKUB8SWQ
KM  0
RS     1    FLOW      -1
SV  0.00    0.25    0.50    0.75    1.00
SQ   0.0     0.2     0.2     0.2   200.0
ZW C=FLOW
*
KKYMB7EC
KM  0
HC     2
ZW C=FLOW
*
KK   MB8
KM     MB8
BA0.0545
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2140  90.930    0.10  0.2140  90.930
UK  1000  0.1000   0.600      85
UK   200  0.0200   0.240      15
RD  2500  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
* - - - - - -
*
*
KK   MC1
KM   AREA = 258.6 AC
BA0.4041
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2390  99.080
UK  1530  0.4281   0.600  100.00
RD  5300  0.2394   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  MC2A
KM   AREA = 59.1 AC
BA0.0923
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  95.850
UK  1035  0.4010   0.600  100.00
RD  2590  0.3421   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMC2AC
KM  0
HC     2
ZW C=FLOW
*
KK  MC2B
KM   AREA = 0.9 AC
BA0.0014
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.880
UK   550  0.0764   0.600  100.00
RD   200  0.0800   0.060            TRAP     0.1     1.0
```

```
ZW C=FLOW
*
KK  MC2K
KM  MC2K
BA0.0001
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.700
UK  1225  0.1551   0.600  100.00
RD   565  0.0800   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
KK YMC2K
KM  0
HC     2
ZW C=FLOW
*
*
KKUC2BDT
KM  0
RS     1    FLOW      -1
SV  0.00    0.15    0.30    0.45
SQ   0.0   100.0   200.0   300.0
ZW C=FLOW
*
KKYMC2BC
KM  0
HC     2
ZW C=FLOW
*
KK  MD1D
KM     MD1d AREA = 5.9 AC
BA0.0092
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.580
UK   800  0.2375   0.600  100.00
RD   190  0.0414   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
KK  MD1B
KM     MD1b AREA = 5.9 AC
BA0.0092
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.040
UK   800  0.2375   0.600  100.00
RD   260  0.0414   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
KK YMD1B
KM  0
HC     2
ZW C=FLOW
*
KK MC2A2
KM  MC2A2
BA0.0061
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.570
UK  1225  0.1551   0.600  100.00
RD   565  0.0800   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
KKYMC2A2
KM  0
HC     3
ZW C=FLOW
*
KK  MD1C
KM    MD1c AREA = 2.9 AC
BA0.0045
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.740
UK   500  0.2178   0.600  100.00
RD   364  0.2178   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK MC2A3
KM  MC2A3
BA0.0044
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.740
UK  1225  0.1551   0.600  100.00
RD   565  0.0800   0.060            TRAP     0.1     1.0
```

```
ZW C=FLOW
*
KKYMC2A3
KM  0
HC     3
ZW C=FLOW
*
KK  MC2D
KM   AREA = 7.8 AC
BA0.0122
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.930
UK  1225  0.1551   0.600  100.00
RD   565  0.0800   0.060           TRAP     0.1     1.0
ZW C=FLOW
*
*
KKUC2DDT
KM  0
RS     1    FLOW      -1
SV  0.00    0.15    0.30    0.45
SQ   0.0   100.0   200.0   300.0
ZW C=FLOW
*
KK  MC2E
KM   AREA = 3.9 AC
BA0.0060
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.360
UK   895  0.1777   0.600  100.00
RD   565  0.0800   0.060           TRAP     0.1     1.0
ZW C=FLOW
*
*
KKUC2EDT
KM  0
RS     1    FLOW      -1
SV  0.00    0.15    0.30    0.45
SQ   0.0   100.0   200.0   300.0
ZW C=FLOW
*
KKYMC2EC
KM  0
HC     2
ZW C=FLOW
*
KK  MC2G
KM   AREA = 9.7 AC
BA0.0151
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.890
UK   395  0.2051   0.600  100.00
RD   360  0.0800   0.060           TRAP     0.1     1.0
ZW C=FLOW
*
KK YMC2G
KM  0
HC     2
ZW C=FLOW
*
KK  MC2H
KM   AREA = 2.4 AC
BA0.0038
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.200
UK   365  0.1096   0.600  100.00
RD   530  0.0800   0.060           TRAP     0.1     1.0
ZW C=FLOW
*
KKYMC2HC
KM  0
HC     2
ZW C=FLOW
*
KK  MC2L
KM  MC2L
BA0.0519
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.850
UK   550  0.0764   0.600  100.00
RD   200  0.0800   0.060           TRAP     0.1     1.0
ZW C=FLOW
*
KK YMC2L
```

```
KM  0
HC     3
ZW C=FLOW
*
KK  MC2I
KM   AREA = 0.7 AC
BA0.0011
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.950
UK   225  0.1289   0.600  100.00
RD   100  0.0800   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
KK  MC2J
KM   AREA = 0.6 AC
BA0.0011
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.630
UK   225  0.1600   0.600  100.00
RD   310  0.0800   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
KKYMC2IC
KM  0
HC     2
ZW C=FLOW
*
KK YMC2I
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK  MD4A
KM     MD4A
BA0.1163
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  99.440
UK   500  0.4140   0.600  100.00
RD  2399  0.3040   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  MD3C
KM     MD3c AREA = 6.9 AC = 0.01078 SQ MI % IMPERV = 4.6
BA0.0108
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  94.360
UK   500  0.3184   0.600  100.00
RD   737  0.3184   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD3C
KM  0
HC     2
ZW C=FLOW
*
KK  MD3B
KM     MD3b AREA = 8.5 AC = 0.01328 SQ MI % IMPERV = 3.8
BA0.0133
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  95.210
UK   500  0.3073   0.600  100.00
RD  1173  0.3073   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMD3BC
KM  0
HC     2
ZW C=FLOW
*
KK MD3A1
KM     MD3a AREA = 25.4 AC = 0.03969 SQ MI % IMPERV = 2.6
BA0.0397
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  97.120
UK   500  0.3458   0.600  100.00
RD  2530  0.3458   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMD3A1
```

```
KM  0
HC     2
ZW C=FLOW
*
KK MD1A1
KM     MD1a  AREA = 3.0 AC = 0.00469 SQ MI % IMPERV = 7.1
BA0.0047
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.940
UK   500  0.2420   0.600  100.00
RD   135  0.2420   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYMD1A1
KM  0
HC     2
ZW C=FLOW
*
KK MC2A4
KM   AREA = 59.1 AC
BA0.0022
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.660
UK  1035  0.4010   0.600  100.00
RD  2590  0.3421   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYMC2A4
KM  0
HC     2
ZW C=FLOW
*
KKYC2A4C
KM  0
HC     2
ZW C=FLOW
*
KK YMD8C
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK MD1B1
KM   MD1B1
BA0.0157
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.840    0.10  0.2500  95.000
UK   800  0.0500   0.600      51
UK    50  0.0200   0.110      49
RD  1000  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK MD1B2
KM   MD1B2
BA0.0392
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.370    0.10  0.2500  95.000
UK   800  0.0800   0.600      94
UK    50  0.0200   0.110       6
RD  1000  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKYMD1B2
KM  0
HC     2
ZW C=FLOW
*
KK  MD1A
KM     MD1a  AREA = 3.0 AC = 0.00469 SQ MI % IMPERV = 7.1
BA0.0581
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.1940  90.540
UK   500  0.2420   0.600  100.00
RD   135  0.2420   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD1A
KM  0
HC     2
ZW C=FLOW
*
```

```
KKYMD1C4
KM  0
HC     2
ZW C=FLOW
*
KK  MD2D
KM     MD2D
BA0.0040
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.740    0.10  0.2500  95.000
UK   550  0.0350   0.600      90
UK    50  0.0200   0.110      10
RD   350  0.0300   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KK YMD2D
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK  MD3D
KM     MD3d
BA0.0094
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.370
UK   682  0.1610   0.600  100.00
RD   200  0.2350   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKMD1E1A
KM  MD1E1A
BA0.0018
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.180    0.10  0.2500  95.000
UK   600  0.0800   0.600      95
UK    50  0.0200   0.110       5
RD  1000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYD1E1A
KM  0
HC     2
ZW C=FLOW
*
KK   MD6
KM     MD6
BA0.0072
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.450
UK   635  0.1560   0.600  100.00
RD   300  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  YMD6
KM  0
HC     2
ZW C=FLOW
*
KK   MD1
KM     MD1  AREA = 5.7 AC = 0.00891 SQ MI % IMPERV = 14.0
BA0.0088
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.180
UK   483  0.1451   0.600  100.00
RD   100  0.1451   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  MD2A
KM  MD2A
BA0.0026
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.460    0.10  0.2500  95.000
UK   250  0.0350   0.600      90
UK    50  0.0200   0.110      10
RD   300  0.0400   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KK YMD2A
KM  0
```

```
HC     2
ZW C=FLOW
*
KKYMD6CC
KM  0
HC     2
ZW C=FLOW
*
KK  MD27
KM     MD27
BA0.0048
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.090
UK   559  0.0500   0.600  100.00
RD   123  0.3210   0.060          TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD27
KM  0
HC     2
ZW C=FLOW
*
KK MD28A
KM     MD28A
BA0.0043
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.990
UK   559  0.0500   0.600  100.00
RD   123  0.3210   0.060          TRAP    10.0    10.0
ZW C=FLOW
*
KKYMD28A
KM  0
HC     2
ZW C=FLOW
*
KK MD28B
KM     MD28B
BA0.0092
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.870
UK   559  0.0500   0.600  100.00
RD   123  0.3210   0.060          TRAP    10.0    10.0
ZW C=FLOW
*
KK  MD3A
KM     MD3a AREA = 25.4 AC = 0.03969 SQ MI % IMPERV = 2.6
BA0.0076
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.590
UK   500  0.3458   0.600  100.00
RD  2530  0.3458   0.060          TRAP    10.0    10.0
ZW C=FLOW
*
KKYMD28B
KM  0
HC     3
ZW C=FLOW
*
KK YMD3A
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK  MD7B
KM     MD7B
BA0.0042
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.510
UK   760  0.0500   0.600  100.00
RD   160  0.3210   0.060          TRAP    10.0    10.0
ZW C=FLOW
*
*
KKUD7BDT
KM  0
RS     1    FLOW      -1
SV  0.00    0.15    0.30    0.45
SQ   0.0   100.0   200.0   300.0
ZW C=FLOW
*
```

```
KK  MD4C
KM     MD4c
BA0.0056
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.400
UK   626  0.0500   0.600  100.00
RD   200  0.3210   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD4C
KM  0
HC     2
ZW C=FLOW
*
KK  MD4E
KM  MD4E
BA0.0016
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.530
UK  1500  0.2830   0.600  100.00
RD  1100  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD4E
KM  0
HC     2
ZW C=FLOW
*
KK  MD4D
KM     MD4d
BA0.0062
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.460
UK   895  0.1010   0.600  100.00
RD   350  0.2980   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD4D
KM  0
HC     2
ZW C=FLOW
*
KK   MD9
KM     MD9
BA0.0106
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.600
UK   824  0.2530   0.600  100.00
RD   572  0.3210   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK   MD8
KM     MD8
BA0.0047
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.390
UK   519  0.1260   0.600  100.00
RD   354  0.2350   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK  YMD8
KM  0
HC     3
ZW C=FLOW
*
KK  YMD9
KM  0
HC     2
ZW C=FLOW
*
KK  MD6A
KM  MD6A
BA0.1279
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2190  90.180
UK   635  0.1560   0.600  100.00
RD   300  0.3210   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD6A
KM  0
HC     2
```

```
ZW C=FLOW
*
* - - - - - -
*
*
KK  MD7D
KM     MD7d
BA0.0051
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  96.520
UK   500  0.1060   0.600  100.00
RD   723  0.0640   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  MD7C
KM     MD7c
BA0.0061
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  94.500
UK   500  0.1060   0.600  100.00
RD   741  0.0640   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD7C
KM  0
HC     2
ZW C=FLOW
*
KK  MD7E
KM  MD7E
BA0.0094
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.730    0.10  0.2500  92.730
UK  1200  0.3130   0.600      90
UK  1200  0.3000   0.240      10
RD  2000  0.0200   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD7E
KM  0
HC     2
ZW C=FLOW
*
KK  MD7F
KM  MD7F
BA0.0067
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.940    0.10  0.2500  91.940
UK  1200  0.3130   0.600      90
UK  1200  0.3000   0.240      10
RD  2000  0.0200   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD7F
KM  0
HC     2
ZW C=FLOW
*
KK  MD11
KM     MD11
BA0.0056
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.640
UK   595  0.0500   0.600  100.00
RD   200  0.3330   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD11
KM  0
HC     2
ZW C=FLOW
*
KKYMD7FC
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK  MD2B
KM     MD2B
BA0.0056
PB
```

```
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.710    0.10  0.2500  95.000
UK   690  0.0460   0.600      90
UK    50  0.0200   0.110      10
RD   130  0.0100   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KK  ME3A
KM     ME3A
BA0.0040
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.510    0.10  0.2500  95.000
UK   420  0.0380   0.600      90
UK    50  0.0200   0.110      10
RD   200  0.0300   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KK YME3A
KM  0
HC     2
ZW C=FLOW
*
*
KKUE3CUL
KM  0
RS     1    FLOW      -1
SV  0.00    2.50    5.00    8.50   12.50   17.50
SQ   0.0   500.0  1200.0  2300.0  3500.0  5500.0
ZW C=FLOW
*
KKYME3AC
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK  MD17
KM     MD17
BA0.0075
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.740
UK   830  0.1260   0.600  100.00
RD   150  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  MD18
KM    MD18
BA0.0051
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.370
UK   930  0.1480   0.600  100.00
RD   200  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  MD19
KM     MD19
BA0.0056
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.180
UK  1055  0.2100   0.600  100.00
RD   150  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD19
KM  0
HC     3
ZW C=FLOW
*
KKYMD19C
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK MD2A1
KM     MD2A
BA0.0019
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.890    0.10  0.2500  95.000
```

```
UK   250  0.0350   0.600      90
UK    50  0.0200   0.110      10
RD   300  0.0400   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KK   MD2
KM     MD2
BA0.0059
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.740
UK   295  0.1250   0.600  100.00
RD   200  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  YMD2
KM  0
HC     2
ZW C=FLOW
*
KK ME3A2
KM    ME3A2
BA0.0062
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.490    0.10  0.2500  95.000
UK   500  0.0440   0.600      90
UK    50  0.0200   0.110      10
RD   300  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KK YMD2C
KM  0
HC     2
ZW C=FLOW
*
KKYME3A2
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK  MD13
KM     MD13
BA0.4368
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  99.870
UK   500  0.4770   0.600  100.00
RD  5450  0.3010   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKME6_19
KM  ME6_19
BA0.0236
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  96.490
UK   330  0.0530   0.600  100.00
RD   522  0.0880   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKME6_14
KM  ME6_14
BA0.0063
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  95.220
UK   330  0.0530   0.600  100.00
RD   522  0.0880   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME614
KM  0
HC     2
ZW C=FLOW
*
KK YMD13
KM  0
HC     2
ZW C=FLOW
*
KK  MD12
KM     MD12
BA0.0428
PB
* PI
```

```
BF    -1  -0.001    1.50
LU  0.10  0.2500  98.130
UK   500  0.1060   0.600  100.00
RD  2855  0.0640   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD12
KM  0
HC     2
ZW C=FLOW
*
KK MD12B
KM     MD12b
BA0.0024
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.360
UK   352  0.2560   0.600  100.00
RD   190  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK MD12C
KM     MD12c
BA0.0084
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  94.080
UK   500  0.2050   0.600  100.00
RD   498  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMD12C
KM  0
HC     2
ZW C=FLOW
*
KK MD14B
KM     MD14b
BA0.0016
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.540
UK   500  0.1060   0.600  100.00
RD    42  0.0640   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMD14B
KM  0
HC     2
ZW C=FLOW
*
KK MD14C
KM     MD14c
BA0.0060
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.840
UK   500  0.1060   0.600  100.00
RD   406  0.0640   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMD14C
KM  0
HC     3
ZW C=FLOW
*
KKME6_13
KM   1.17 AC
BA0.0022
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.930
UK   525  0.1750   0.600  100.00
RD   345  0.0800   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK ME8_3
KM   3.07 AC
BA0.0048
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.550
UK   675  0.1640   0.600  100.00
RD   100  0.1700   0.060            TRAP     0.1     2.0
ZW C=FLOW
*
KKYME8_3
KM  0
```

```
HC     2
ZW C=FLOW
*
KK YME83
KM  0
HC     2
ZW C=FLOW
*
KK MD13B
KM  MD13B
BA0.0392
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.400
UK   500  0.4770   0.600  100.00
RD  5450  0.3010   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMD13B
KM  0
HC     2
ZW C=FLOW
*
KK  MD14
KM     MD14
BA0.0060
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.360
UK   663  0.1650   0.600  100.00
RD   280  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK MD14A
KM  MD14A
BA0.0009
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.300
UK   663  0.1650   0.600  100.00
RD   280  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMD14A
KM  0
HC     2
ZW C=FLOW
*
KKYD14AC
KM  0
HC     2
ZW C=FLOW
*
KK ME3_5
KM  ME3_5
BA0.0007
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.240    0.10  0.2500  92.240
UK   300  0.1000   0.600      65
UK   300  0.1000   0.240      35
RD  1500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME3_5
KM  0
HC     2
ZW C=FLOW
*
KK  MD15
KM    MD15
BA0.0073
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.660
UK   870  0.1590   0.600  100.00
RD   140  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK MD15A
KM  MD15A
BA0.0002
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.290
UK   870  0.1590   0.600  100.00
RD   140  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
```

```
*
KKYMD15A
KM  0
HC     2
ZW C=FLOW
*
KK MD16A
KM  MD16A
BA0.0036
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.190
UK   772  0.1250   0.600  100.00
RD   150  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMD16A
KM  0
HC     2
ZW C=FLOW
*
KK  MD16
KM     MD16
BA0.0063
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.450
UK   772  0.1250   0.600  100.00
RD   150  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD16
KM  0
HC     2
ZW C=FLOW
*
KKYMD16C
KM  0
HC     2
ZW C=FLOW
*
KK MD13C
KM  MD13C
BA0.0068
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.950
UK   500  0.4770   0.600  100.00
RD  5450  0.3010   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMD13C
KM  0
HC     2
ZW C=FLOW
*
KK  MD20
KM     MD20
BA0.0020
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.070
UK   740  0.0500   0.600  100.00
RD   180  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD20
KM  0
HC     2
ZW C=FLOW
*
KKYD13CC
KM  0
HC     2
ZW C=FLOW
*
KK  ME3B
KM     ME3B
BA0.0182
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  89.910    0.10  0.2500  89.910
UK   300  0.1000   0.600      65
UK   300  0.1000   0.240      35
RD  1500  0.1000   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
* - - - - - -
*
```

```
*
KKGS31B1
KM    GS31B1
BA0.0029
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.870    0.10  0.2500  95.000
UK   580  0.0380   0.600      90
UK    50  0.0200   0.110      10
RD   275  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKGS31B2
KM    GS31B2
BA0.0047
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.790    0.10  0.2500  95.000
UK   690  0.0570   0.600      90
UK    50  0.0200   0.110      10
RD   340  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKGS31B3
KM    GS31B3
BA0.0056
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.680    0.10  0.2500  95.000
UK   530  0.0600   0.600      90
UK    50  0.0200   0.110      10
RD   250  0.0400   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKYGS311
KM  0
HC     3
ZW C=FLOW
*
KKGS31B4
KM    GS31B4
BA0.0012
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.540    0.10  0.2500  95.000
UK   250  0.0480   0.600      90
UK    50  0.0200   0.110      10
RD   150  0.0400   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKGS31B5
KM    GS31B5
BA0.0056
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.520    0.10  0.2500  95.000
UK   500  0.0500   0.600      90
UK    50  0.0200   0.110      10
RD   350  0.0400   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKYGS312
KM  0
HC     3
ZW C=FLOW
*
KKYS31BC
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK ME8_1
KM   0.48 AC
BA0.0007
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.390
UK   180  0.0660   0.600  100.00
RD    80  0.0600   0.060            TRAP     0.1     2.0
ZW C=FLOW
*
KK ME3_1
KM  ME3_1
BA0.0009
PB
```

```
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.360    0.10  0.2500  93.360
UK   300  0.1000   0.600      65
UK   300  0.1000   0.240      35
RD  1500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME3_1
KM  0
HC     2
ZW C=FLOW
*
KK ME3_2
KM  ME3_2
BA0.0024
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.350    0.10  0.2500  93.350
UK   300  0.1000   0.600      65
UK   300  0.1000   0.240      35
RD  1500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME3_2
KM  0
HC     2
ZW C=FLOW
*
KK ME3_3
KM  ME3_3
BA0.0031
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.010    0.10  0.2500  93.010
UK   300  0.1000   0.600      65
UK   300  0.1000   0.240      35
RD  1500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME3_3
KM  0
HC     2
ZW C=FLOW
*
KK ME3_4
KM  ME3_4
BA0.0024
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.670    0.10  0.2500  92.670
UK   300  0.1000   0.600      65
UK   300  0.1000   0.240      35
RD  1500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME3_4
KM  0
HC     2
ZW C=FLOW
*
KK  MD21
KM     MD21
BA0.0033
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.860
UK   640  0.0500   0.600  100.00
RD   150  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD21
KM  0
HC     2
ZW C=FLOW
*
KK ME3C3
KM  ME3C3
BA0.0066
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.960    0.10  0.2500  90.960
UK   300  0.1000   0.600      65
UK   300  0.1000   0.240      35
RD  1500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME3C3
KM  0
```

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HC     2
ZW C=FLOW
*
KK ME3C1
KM  ME3C1
BA0.0016
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.020    0.10  0.2500  91.020
UK   300  0.1000   0.600      65
UK   300  0.1000   0.240      35
RD  1500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME3C1
KM  0
HC     2
ZW C=FLOW
*
KKYME3CC
KM  0
HC     2
ZW C=FLOW
*
KK  ME4A
KM     ME4A
BA0.0939
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2320  89.130    0.10  0.2320  89.130
UK   500  0.1200   0.600      90
UK   300  0.1200   0.240      10
RD  2500  0.1000   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
* - - - - - -
*
*
KKME6_11
KM   0.13 AC
BA0.0002
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.280
UK    30  0.0200   0.110  100.00
RD    95  0.0600   0.060            TRAP     0.1    50.0
ZW C=FLOW
*
KKME6_10
KM   0.21 AC
BA0.0003
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.260
UK    30  0.0200   0.110  100.00
RD   235  0.0600   0.060            TRAP     0.1    50.0
ZW C=FLOW
*
KKYME610
KM  CME610
HC     2
ZW C=FLOW
*
KKME6_25
KM   7.81 AC
BA0.0094
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.750
UK   125  0.1600   0.600  100.00
RD   235  0.1149   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME625
KM  0
HC     2
ZW C=FLOW
*
KKME6_33
KM  ME6_33
BA0.0026
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.580
UK   330  0.0530   0.600  100.00
RD   522  0.0880   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
```

```
KKYME633
KM  0
HC     2
ZW C=FLOW
*
KKME6_26
KM   0.43 AC
BA0.0008
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.140
UK   200  0.1300   0.600  100.00
RD   205  0.1268   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME626
KM  0
HC     2
ZW C=FLOW
*
KK ME7_1
KM   8.34 AC
BA0.0127
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.230
UK   470  0.2468   0.600  100.00
RD   340  0.1471   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME7_1
KM  CME7_1
HC     2
ZW C=FLOW
*
KK ME7_2
KM   0.25 AC
BA0.0004
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.680
UK    30  0.0200   0.110  100.00
RD   620  0.0800   0.060            TRAP     0.1    50.0
ZW C=FLOW
*
KKYME7_2
KM  0
HC     2
ZW C=FLOW
*
KK ME7D6
KM  ME7D6
BA0.0060
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.130    0.10  0.2500  92.130
UK   500  0.1800   0.600      75
UK   300  0.1800   0.240      25
RD  1000  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME7D6
KM  0
HC     2
ZW C=FLOW
*
KKME7D14
KM  ME7D14
BA0.0037
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.380
UK   150  0.1300   0.600  100.00
RD   300  0.1200   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKME7D16
KM  ME7D16
BA0.0018
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.480
UK   177  0.0450   0.600  100.00
RD   430  0.1200   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKME7D15
KM  ME7D15
```

```
BA0.0031
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.450
UK   175  0.0570   0.600  100.00
RD   570  0.1100   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKYM7D14
KM  0
HC     2
ZW C=FLOW
*
KKME7D24
KM  ME7D24
BA0.0022
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.150
UK   144  0.0900   0.600  100.00
RD   270  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYM7D24
KM  0
HC     2
ZW C=FLOW
*
KKME4B13
KM  ME4B13
BA0.0056
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.030
UK   270  0.0200   0.600  100.00
RD   515  0.0540   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYM4B13
KM  0
HC     2
ZW C=FLOW
*
KK ME7C4
KM  ME7C4
BA0.0054
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.820    0.10  0.2500  91.820
UK   500  0.1500   0.600       5
UK   300  0.1500   0.240      95
RD  1000  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK ME7C5
KM  ME7C5
BA0.0061
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.020    0.10  0.2500  92.020
UK   500  0.1500   0.600       5
UK   300  0.1500   0.240      95
RD  1000  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME7C5
KM  0
HC     2
ZW C=FLOW
*
KK ME4B3
KM  ME4B3
BA0.0029
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.340    0.10  0.2500  91.340
UK   300  0.0500   0.600      15
UK   300  0.0500   0.240      85
RD  2000  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME4B3
KM  0
HC     2
ZW C=FLOW
*
*
KKUE4BDT
```

```
KM  0
RS     1    FLOW      -1
SV  0.00    0.15    0.30    0.45
SQ   0.0   100.0   200.0   300.0
ZW C=FLOW
*
KKME4B12
KM  ME4B12
BA0.0065
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.960
UK   430  0.0180   0.600  100.00
RD   720  0.0700   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME4BC
KM  0
HC     2
ZW C=FLOW
*
KKYM4BCC
KM  0
HC     2
ZW C=FLOW
*
KKME4B23
KM  ME4B23
BA0.0088
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.610
UK   210  0.0700   0.600  100.00
RD   400  0.0600   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKME4B22
KM  ME4B22
BA0.0074
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.530
UK   220  0.1000   0.600  100.00
RD   720  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK ME3C2
KM  ME3C2
BA0.0032
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.130    0.10  0.2500  91.130
UK   300  0.1600   0.600      60
UK   300  0.1600   0.240      40
RD  1500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKME4B11
KM  ME4B11
BA0.0049
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.660
UK   340  0.0530   0.600  100.00
RD   530  0.0750   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKME4B21
KM  ME4B21
BA0.0024
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.440
UK   220  0.1000   0.600  100.00
RD   720  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKME4B10
KM  ME4B-10
BA0.0027
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.680
UK   150  0.0800   0.600  100.00
RD   275  0.0700   0.060           TRAP     10.0    10.0
ZW C=FLOW
*
```

```
KK  ME4B
KM     ME4B
BA0.0055
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.370    0.10  0.2500  90.370
UK   300  0.0500   0.600      15
UK   300  0.0500   0.240      85
RD  2000  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YME4B
KM  0
HC     2
ZW C=FLOW
*
KKYME4CC
KM  0
HC     3
ZW C=FLOW
*
KKYM4CCC
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KKMG3_3B
KM  MG3_3B
BA0.1460
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  99.280
UK   575  0.2250   0.600  100.00
RD   925  0.2260   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKMG3_3C
KM  MG3_3C
BA0.0127
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  95.890
UK   575  0.2250   0.600  100.00
RD   925  0.2260   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMG_3C
KM  0
HC     2
ZW C=FLOW
*
KKME6_12
KM   14.48 AC
BA0.0096
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  95.830
UK   600  0.2950   0.600  100.00
RD  1920  0.2495   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME_12
KM  0
HC     2
ZW C=FLOW
*
KKME6_16
KM   10.41 AC
BA0.0002
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.700
UK   600  0.2950   0.600  100.00
RD  1595  0.3003   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME_16
KM  0
HC     2
ZW C=FLOW
*
KKME6_18
KM   2.92 AC
BA0.0046
PB
* PI
```

```
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.430
UK   150  0.2133   0.600  100.00
RD   155  0.1032   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME_18
KM  0
HC     2
ZW C=FLOW
*
KKME6_20
KM   3.75 AC
BA0.0060
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.390
UK   200  0.2100   0.600  100.00
RD   155  0.2330   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKME6_24
KM   0.70 AC
BA0.0026
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.870
UK   305  0.0910   0.600  100.00
RD   120  0.0300   0.060            TRAP     0.1    50.0
ZW C=FLOW
*
KKYME_24
KM  0
HC     3
ZW C=FLOW
*
KKME6_23
KM   4.19 AC
BA0.0065
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.220
UK   200  0.1700   0.600  100.00
RD   265  0.1060   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKME6_32
KM   0.39 AC
BA0.0006
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.940
UK    24  0.0200   0.110  100.00
RD   415  0.0800   0.060            TRAP     0.1    50.0
ZW C=FLOW
*
KKYME_32
KM  0
HC     2
ZW C=FLOW
*
KKME6_28
KM   4.93 AC
BA0.0077
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.630
UK   355  0.1130   0.600  100.00
RD   590  0.1010   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK ME627
KM   1.77 AC
BA0.0027
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.570
UK   120  0.1070   0.600  100.00
RD   400  0.1057   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME627
KM  0
HC     2
ZW C=FLOW
*
KKME6_29
KM   1.37 AC
```

```
BA0.0021
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.270
UK   370  0.1140   0.600  100.00
RD   335  0.0930   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME_29
KM  0
HC     2
ZW C=FLOW
*
KKME6_30
KM   1.27 AC
BA0.0020
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.980
UK   295  0.0880   0.600  100.00
RD   195  0.0790   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKME6A25
KM  ME6A25
BA0.0029
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.960
UK   330  0.0530   0.600  100.00
RD   522  0.0880   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYM6A25
KM  0
HC     2
ZW C=FLOW
*
KK  ME7B
KM     ME7B
BA0.0270
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.690    0.10  0.2500  90.690
UK   400  0.0500   0.600      75
UK   300  0.0500   0.240      25
RD  1500  0.1000   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
*
KKUE7BDT
KM  0
RS     1    FLOW      -1
SV  0.00    0.15    0.30    0.45
SQ   0.0   100.0   200.0   300.0
ZW C=FLOW
*
KK  ME7A
KM     ME7A
BA0.1404
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2270  87.810    0.10  0.2270  87.810
UK  1300  0.1920   0.600      10
UK   300  0.1900   0.240      90
RD  3000  0.1000   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKYME7AC
KM  0
HC     2
ZW C=FLOW
*
KK YGSMC
KM  0
HC     2
ZW C=FLOW
*
KKVGSMCR
KM  0
RD  2000  0.0100   0.040            TRAP    10.0    10.0
ZW C=FLOW
*
KK   MF1
KM     MF1
BA0.3780
PB
* PI
BF    -1  -0.001    1.50
```

```
LU  0.10  0.2050  88.710
UK  1500  0.0870   0.600  100.00
RD  2000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMF1C
KM  0
HC     2
ZW C=FLOW
*
KKVMF1CR
KM  0
RD  2000  0.0100   0.040            TRAP    10.0    10.0
ZW C=FLOW
*
KK   MF2
KM     MF2
BA0.0582
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2470  87.090
UK  1000  0.0700   0.600  100.00
RD  2000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMF2C
KM  0
HC     2
ZW C=FLOW
*
KKVMF2CR
KM  0
RD  3000  0.0100   0.040            TRAP    10.0    10.0
ZW C=FLOW
*
* - - - - - -
*
*
KKMD4_1A
KM     MD4
BA0.1899
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  98.760
UK  1500  0.2830   0.600  100.00
RD  1100  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKMG4_1B
KM     6.35 AC
BA0.0100
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  94.660
UK   500  0.3500   0.600  100.00
RD   491  0.4296   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKMG5_2A
KM   8.61 AC
BA0.0134
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  95.360
UK   600  0.2033   0.600  100.00
RD  1065  0.3014   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMG52A
KM  0
HC     3
ZW C=FLOW
*
KK MG3_1
KM   1.78 AC
BA0.0028
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  94.860
UK   500  0.2800   0.600  100.00
RD  1070  0.3293   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKMG3_1A
KM   1.00 AC
BA0.0016
PB
* PI
BF    -1  -0.001    1.50
```

```
LU  0.10  0.2500  93.450
UK   498  0.2800   0.600  100.00
RD   575  0.3270   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYMG31A
KM  0
HC     2
ZW C=FLOW
*
KKMG3_1C
KM   1.47 AC
BA0.0023
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  95.300
UK   498  0.2811   0.600  100.00
RD   567  0.3422   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYMG31C
KM  0
HC     2
ZW C=FLOW
*
KK MG3_6
KM   0.09 AC
BA0.0002
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.010
UK    30  0.0200   0.110  100.00
RD   360  0.0120   0.060           TRAP     0.1     1.0
ZW C=FLOW
*
KK YMG36
KM  0
HC     2
ZW C=FLOW
*
KK MG4_2
KM   4.61 AC
BA0.0072
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  94.510
UK   500  0.2840   0.600  100.00
RD   535  0.3551   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK YMG42
KM  0
HC     2
ZW C=FLOW
*
KKMG4_3B
KM  MG4_3B
BA0.0002
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.000    0.10  0.2500  93.000
UK  2300  0.3260   0.600      95
UK   600  0.2500   0.240       5
RD  2500  0.1000   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYMG43B
KM  0
HC     2
ZW C=FLOW
*
KKMG4_3A
KM   0.07 AC
BA0.0001
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.030
UK    30  0.0200   0.110  100.00
RD   250  0.0098   0.060           TRAP     0.1     1.0
ZW C=FLOW
*
KKYMG43A
KM  0
HC     2
ZW C=FLOW
*
KKMG5_2B
KM   0.06 AC
BA0.0001
```

```
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.300
UK    12  0.0100   0.600  100.00
RD   400  0.0500   0.060           TRAP    10.0    50.0
ZW C=FLOW
*
KK MG4_4
KM   0.10 AC
BA0.0002
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.220
UK    30  0.0200   0.110  100.00
RD   350  0.0098   0.060           TRAP     0.1     1.0
ZW C=FLOW
*
KK YMG44
KM  0
HC     2
ZW C=FLOW
*
KKMG4_5C
KM  MG4_5C
BA0.0078
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.580    0.10  0.2500  92.580
UK  2300  0.3260   0.600      95
UK   600  0.2500   0.240       5
RD  2500  0.1000   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYMG45C
KM  0
HC     4
ZW C=FLOW
*
KKMG5_1A
KM   18.98 AC
BA0.0296
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  96.080
UK   600  0.1550   0.600  100.00
RD  1820  0.2357   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKMG5_1B
KM  MG5_1B
BA0.0090
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  94.550    0.10  0.2500  94.550
UK   200  0.1000   0.600       5
UK   200  0.1000   0.240      95
RD   500  0.1000   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYMG51B
KM  0
HC     2
ZW C=FLOW
*
KK MG5_3
KM   0.04 AC
BA0.0001
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.010
UK    30  0.0200   0.110  100.00
RD   300  0.0775   0.060           TRAP     0.1     1.0
ZW C=FLOW
*
KK MG5_4
KM   0.15 AC
BA0.0003
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.810
UK    30  0.0200   0.110  100.00
RD   300  0.0775   0.060           TRAP     0.1     1.0
ZW C=FLOW
*
KK YMG54
KM  0
HC     3
```

```
ZW C=FLOW
*
KK MG5_5
KM  MG5_5
BA0.0024
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.840    0.10  0.2500  92.840
UK   200  0.1000   0.600       5
UK   200  0.1000   0.240      95
RD   500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMG55
KM  0
HC     2
ZW C=FLOW
*
KKYMG55C
KM  0
HC     2
ZW C=FLOW
*
KKMG3_3A
KM   8.25 AC
BA0.0129
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  95.330
UK   575  0.2250   0.600  100.00
RD   925  0.2260   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK MG3_2
KM   2.58 AC
BA0.0040
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.980
UK   390  0.2051   0.600  100.00
RD   370  0.3000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK MG3_4
KM   014 AC
BA0.0002
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.970
UK    30  0.0200   0.110  100.00
RD   300  0.0691   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
KK YMG34
KM  0
HC     3
ZW C=FLOW
*
KKMG3_1B
KM   0.87 AC
BA0.0014
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  94.250
UK   500  0.2800   0.600  100.00
RD   300  0.3467   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKMG3_1D
KM   0.57 AC
BA0.0009
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.700
UK   504  0.2778   0.600  100.00
RD   360  0.3083   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK MG3_5
KM   0.07 AC
BA0.0001
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.910
UK    30  0.0200   0.110  100.00
RD   350  0.0094   0.060            TRAP     0.1     1.0
ZW C=FLOW
```

```
*
KK YMG35
KM  0
HC     3
ZW C=FLOW
*
KKMG3_5A
KM  MG3_5A
BA0.0073
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.610
UK   575  0.2250   0.600  100.00
RD   925  0.2260   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMG35A
KM  0
HC     3
ZW C=FLOW
*
KK ME6_1
KM   10.24 AC
BA0.0082
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.610
UK   310  0.1740   0.600  100.00
RD   250  0.1640   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK ME6_2
KM   1.28 AC
BA0.0099
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.650
UK   505  0.1940   0.600  100.00
RD   235  0.0800   0.060            TRAP     0.1    50.0
ZW C=FLOW
*
KK ME6_3
KM   0.02 AC
BA0.0003
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.860
UK    15  0.0200   0.600  100.00
RD   235  0.0800   0.060            TRAP     0.1    50.0
ZW C=FLOW
*
KKYM6123
KM  0
HC     3
ZW C=FLOW
*
KK ME6_5
KM   1.40 AC
BA0.0022
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.760
UK   160  0.1500   0.600  100.00
RD   365  0.0800   0.060            TRAP     0.1    50.0
ZW C=FLOW
*
KK YME65
KM  0
HC     2
ZW C=FLOW
*
KK ME6_7
KM   0.81 AC
BA0.0013
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.640
UK   190  0.1680   0.600  100.00
RD   145  0.1100   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YME67
KM  0
HC     2
ZW C=FLOW
*
KK ME6_8
KM    .44 AC
```

```
BA0.0007
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.310
UK    20  0.0200   0.600  100.00
RD   555  0.0560   0.060            TRAP    10.0    50.0
ZW C=FLOW
*
KK YME68
KM  0
HC     2
ZW C=FLOW
*
KK MG1_2
KM   0.67 AC
BA0.0010
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.850
UK   100  0.1400   0.600  100.00
RD   255  0.1686   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK MG1_3
KM   1.89 AC
BA0.0025
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.150
UK   300  0.0700   0.600  100.00
RD   205  0.2293   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK MG1_1
KM   1.38 AC
BA0.0026
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.360
UK   185  0.1946   0.600  100.00
RD   205  0.0600   0.060            TRAP     0.1     2.0
ZW C=FLOW
*
KK MG1_4
KM   0.18 AC
BA0.0003
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.720
UK    30  0.0200   0.110  100.00
RD   295  0.0800   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
KKYG1234
KM  0
HC     5
ZW C=FLOW
*
KKMG3_33
KM  MG3_33
BA0.0087
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.100
UK   575  0.2250   0.600  100.00
RD   925  0.2260   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMG33
KM  0
HC     2
ZW C=FLOW
*
KKME6_8A
KM  ME6_8A
BA0.0006
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.680
UK   330  0.0530   0.600  100.00
RD   522  0.0880   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME68A
KM  0
HC     3
ZW C=FLOW
```

```
*
KK   MG2
KM     MG2
BA0.1195
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2450  89.250    0.10  0.2450  89.250
UK   700  0.1430   0.600      90
UK   700  0.1400   0.240      10
RD  1500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  YMG2
KM  0
HC     3
ZW C=FLOW
*
* - - - - - -
*
*
KK ME6_6
KM   0.16 AC
BA0.0003
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.630
UK    30  0.0200   0.110  100.00
RD   340  0.0800   0.060            TRAP     0.1    50.0
ZW C=FLOW
*
KKME6_21
KM   2.50 AC
BA0.0039
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.490
UK   200  0.1250   0.600  100.00
RD   235  0.1490   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKME6_31
KM   0.44 AC
BA0.0007
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.190
UK    24  0.0200   0.110  100.00
RD   480  0.0800   0.060            TRAP     0.1    50.0
ZW C=FLOW
*
KKYME631
KM  0
HC     3
ZW C=FLOW
*
KKMG1B19
KM  MG1B19
BA0.0072
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.770
UK   150  0.0400   0.600  100.00
RD   780  0.1300   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKMG1B20
KM  MG1B20
BA0.0039
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.640
UK   240  0.0800   0.600  100.00
RD   710  0.1200   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  ME6A
KM     ME6A
BA0.0030
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.640    0.10  0.2500  91.640
UK   300  0.1200   0.600      50
UK   300  0.1200   0.240      50
RD  1500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YME6A
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KM  0
HC     3
ZW C=FLOW
*
KKMG1B26
KM  MG1B26
BA0.0038
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.990
UK   250  0.0960   0.600  100.00
RD   550  0.0910   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK  MG1B
KM     MG1B
BA0.0119
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.940    0.10  0.2500  90.940
UK   300  0.1000   0.600      50
UK   200  0.1000   0.240      50
RD   800  0.1000   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKME6A27
KM  ME6A27
BA0.0094
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.550
UK   230  0.0950   0.600  100.00
RD   520  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK YMG1B
KM  0
HC     3
ZW C=FLOW
*
KK  MG1A
KM     MG1A
BA0.0185
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.220    0.10  0.2500  90.220
UK   200  0.1000   0.600      50
UK   200  0.1000   0.240      50
RD  1000  0.1000   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK YMG1A
KM  0
HC     2
ZW C=FLOW
*
KK YMGCC
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK MG5B1
KM  MG5B1
BA0.1242
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  94.560    0.10  0.2500  94.560
UK   200  0.1000   0.600       5
UK   200  0.1000   0.240      95
RD   500  0.1000   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK MG5A2
KM  MG5A2
BA0.0613
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.400    0.10  0.2500  92.400
UK   200  0.1000   0.600       5
UK   200  0.1000   0.240      95
RD   500  0.1000   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYMG5A2
KM  0
```

```
HC     2
ZW C=FLOW
*
KK  MG6B
KM     MG6B
BA0.0479
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2010  90.560    0.10  0.2010  90.560
UK  1000  0.2500   0.600      85
UK   400  0.2500   0.240      15
RD  1500  0.1000   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK MG5A1
KM  MG5A1
BA0.0134
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.690    0.10  0.2500  90.690
UK   200  0.1000   0.600       5
UK   200  0.1000   0.240      95
RD   500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMG5A1
KM  0
HC     2
ZW C=FLOW
*
KK YMGCC
KM  0
HC     2
ZW C=FLOW
*
KK   MG7
KM     MG7
BA0.1439
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2070  86.820
UK   600  0.2500   0.600  100.00
RD  3500  0.0100   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK NS24A
KM  NS24A
BA0.0297
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.450
UK   900  0.1000   0.600  100.00
RD  1000  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK NS24B
KM  NS24B
BA0.0120
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  87.960
UK   300  0.1000   0.600  100.00
RD   500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS24B
KM  0
HC     2
ZW C=FLOW
*
KK NS24C
KM  NS24C
BA0.0400
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.1820  85.860
UK   800  0.1000   0.600  100.00
RD  1000  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS24C
KM  0
HC     3
ZW C=FLOW
*
KK  NS25
KM  NS25
BA0.0370
```

```
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2490  87.120
UK   800  0.0500   0.600  100.00
RD  1200  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YNS25
KM  0
HC     2
ZW C=FLOW
*
KK  NS26
KM  NS26
BA0.1102
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.1220  85.260
UK  1000  0.0500   0.600  100.00
RD  1500  0.0200   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YNS26
KM  0
HC     3
ZW C=FLOW
*
*
KKUW4END
KM  ROUTE FOR BACKWATER AT NW4
RS     1    FLOW      -1
SV  0.00    0.46    1.70    6.66    46.3     520
SQ   0.0   178.0    1833    2500    4382    8550
ZW C=FLOW
*
* - - - - - -
*
*
KK NS22A
KM  NS22A
BA0.0103
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.780
UK   750  0.1000   0.600  100.00
RD  1000  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK NS22C
KM  NS22C
BA0.0063
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  88.980
UK   300  0.1000   0.600  100.00
RD   500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS22C
KM  0
HC     2
ZW C=FLOW
*
KK NS23A
KM  NS23A
BA0.0374
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.1900  86.340
UK   950  0.0700   0.600  100.00
RD  1100  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS23A
KM  0
HC     2
ZW C=FLOW
*
KK  NS27
KM  NS27
BA0.0574
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.1000  85.020
UK   830  0.0300   0.600  100.00
RD  1000  0.0200   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
```

```
KK YNS27
KM  0
HC     4
ZW C=FLOW
*
KK NS28B
KM  NS28B
BA0.0417
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.1000  84.540
UK   500  0.0100   0.600  100.00
RD  1000  0.0100   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  E85Z
KM  E85Z
BA0.0291
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  87.000
UK   400  0.0200   0.600  100.00
RD   500  0.0500   0.060            TRAP    20.0    10.0
ZW C=FLOW
*
KKYNS28B
KM  0
HC     3
ZW C=FLOW
*
KK NS28A
KM  NS28A
BA0.0415
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.1000  85.230
UK   500  0.0100   0.600  100.00
RD  1000  0.0100   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS28A
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK  NS22
KM  NS22
BA0.2037
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.040
UK  2100  0.0800   0.600  100.00
RD  2500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  NS31
KM  NS31
BA0.0592
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.140
UK  1250  0.1000   0.600  100.00
RD  1300  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YNS31
KM  0
HC     2
ZW C=FLOW
*
KK NS22B
KM  NS22B
BA0.0098
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.140
UK   500  0.1000   0.600  100.00
RD   500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS22B
KM  0
HC     2
ZW C=FLOW
*
```

```
KK NS23B
KM  NS23B
BA0.1061
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.1910  85.980
UK  1350  0.0500   0.600  100.00
RD  1500  0.0200   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS23B
KM  0
HC     2
ZW C=FLOW
*
KK NS32A
KM  NS32A
BA0.0191
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.680
UK   500  0.1000   0.600  100.00
RD  1000  0.1000   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK NS32B
KM  NS32B
BA0.1481
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.1650  85.650
UK  1500  0.0800   0.600  100.00
RD  2500  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS32B
KM  0
HC     3
ZW C=FLOW
*
KK   NS1
KM   BASIN 1 - 330 Ac
BA0.5174
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.1780 100.000    0.10  0.1780 100.000
UK  3300  0.2400   0.800      57
UK  3300  0.2400   0.600      43
RD  2800  0.1800   0.060           TRAP     5.0     3.0
RD  2800  0.0010   0.060           TRAP     5.0     3.0
ZW C=FLOW
*
*
KKUR-NS1
KM   ROUTE NS-1
RS     1    FLOW      -1
SV  0.70    1.10    1.50    1.90    2.20    2.80    3.90    4.90
SQ 100.0   200.0   300.0   400.0   500.0   700.0  1100.0  1500.0
ZW C=FLOW
*
KK   NS2
KM   BASIN 2 - 267 Ac
BA0.4184
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500 100.000    0.10  0.2500 100.000
UK  2800  0.2500   0.800      54
UK  2800  0.2500   0.600      46
RD  2200  0.1600   0.060           TRAP     5.0     3.0
RD  2200  0.0010   0.060           TRAP     5.0     3.0
ZW C=FLOW
*
KKYCMB-2
KM   COMBINE NS-1 & 2
HC     2
ZW C=FLOW
*
*
KKUCMB-2
KM   ROUTE CMB-2
RS     1    FLOW      -1
SV  0.70    1.00    1.40    1.70    2.00    2.50    3.40    4.30
SQ 100.0   200.0   300.0   400.0   500.0   700.0  1100.0  1500.0
ZW C=FLOW
*
KK   NS3
KM   BASIN 3 - 331 Ac
BA0.5218
PB
```

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* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500 100.000    0.10  0.2500 100.000
UK  2950  0.1800   0.240       3
UK  2950  0.1800   0.600      98
RD  3000  0.2000   0.060            TRAP     5.0     3.0
RD  3000  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KKYCMB-3
KM   COMBINE NS-1 THRU 3
HC     2
ZW C=FLOW
*
*
KKUCMB-3
KM   ROUTE CMB-3
RS     1    FLOW      -1
SV  1.40    2.30    3.00    3.70    4.20    5.70    7.70    9.20
SQ 100.0   200.0   300.0   400.0   500.0   700.0  1100.0  1500.0
ZW C=FLOW
*
KK   NS4
KM   BASIN 4 - 166 Ac
BA0.2602
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  97.270    0.10  0.2500  97.270
UK  2110  0.2200   0.240      29
UK  2110  0.2200   0.600      71
RD  2500  0.1000   0.060            TRAP     5.0     3.0
RD  2500  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KKYCMB-4
KM   COMBINE NS-1 THRU 4
HC     2
ZW C=FLOW
*
*
KKUCMB-4
KM   ROUTE CMB-4
RS     1    FLOW      -1
SV  0.20    0.30    0.40    0.40    0.50    0.60    2.20    2.90
SQ 100.0   200.0   300.0   400.0   500.0   700.0  1100.0  1500.0
ZW C=FLOW
*
KK   NS5
KM   BASIN 5 - 21 Ac
BA0.0319
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  95.200    0.10  0.2500  95.200
UK  1400  0.2500   0.240      36
UK  1400  0.2500   0.600      64
RD   700  0.1400   0.060            TRAP     5.0     3.0
RD   700  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KKYCMB-5
KM   COMBINE NS-1 THRU 5
HC     2
ZW C=FLOW
*
*
KKUCMB-5
KM   ROUTE CMB-5
RS     1    FLOW      -1
SV  0.40    0.60    0.80    1.10    1.30    1.60    2.30    2.90
SQ 100.0   200.0   300.0   400.0   500.0   700.0  1100.0  1500.0
ZW C=FLOW
*
KK   NS6
KM   BASIN 6 - 178 Ac
BA0.2162
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  96.850    0.10  0.2500  96.850
UK  3100  0.2700   0.240      71
UK  3100  0.2700   0.600      29
RD  3100  0.1600   0.060            TRAP     5.0     3.0
RD  3100  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KKVR-NS6
KM   ROUTE NS-6
RD   970  0.0700   0.015            TRAP     1.0     1.0
ZW C=FLOW
*
KK   NS7
KM   BASIN 7 - 38 Ac
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```
BA0.0602
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.620    0.10  0.2500  93.620
UK  1570  0.1900   0.240      69
UK  1570  0.1900   0.600      31
RD   800  0.0800   0.060            TRAP     2.0     1.0
RD   800  0.0010   0.060            TRAP     2.0     1.0
ZW C=FLOW
*
KKYCMB-7
KM   COMBINE NS-6 & 7
HC     2
ZW C=FLOW
*
KKYMB-7A
KM   COMBINE NS-1 THRU 7
HC     2
ZW C=FLOW
*
*
KKUCMB7A
KM   ROUTE CMB-7A
RS     1    FLOW      -1
SV  0.60    1.10    1.40    1.70    2.10    2.60    3.60    4.60
SQ 100.0   200.0   300.0   400.0   500.0   700.0  1100.0  1500.0
ZW C=FLOW
*
KK   NS8
KM   BASIN 8 - 673 Ac
BA1.1304
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2390 100.000    0.10  0.2390 100.000
UK  4200  0.2100   0.800      92
UK  4200  0.2100   0.600       9
RD  1900  0.0800   0.060            TRAP     5.0     3.0
RD  1900  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
*
KKURES-A
KM   RESERVOIR A
RS     1    FLOW      -1
SV  0.00    3.40    6.80   10.20   13.60   17.00   20.40   23.80   27.20   34.00
SQ   0.0    23.9    67.5   124.0   190.0   266.0   350.0   441.0   540.0   754.0
ZW C=FLOW
*
KKV-RESA
KM   ROUTE RES-A
RD  1400  0.1100   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KK   NS9
KM   BASIN 9 - 144 Ac
BA0.1855
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2490  98.370
UK  4400  0.2000   0.600  100.00
RD  1200  0.1100   0.060            TRAP     5.0     3.0
RD  1200  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KKYCMB-9
KM   COMBINE NS-8 & 9
HC     2
ZW C=FLOW
*
KKVCMB-9
KM   ROUTE CMB-9
RD  2800  0.1100   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KK  NS10
KM   BASIN 10 - 214 Ac
BA0.3581
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2230  96.570
UK  3905  0.2000   0.600  100.00
RD  2200  0.0900   0.060            TRAP     5.0     3.0
RD  2200  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KKYMB-10
KM   COMBINE NS-8 THRU 10
HC     2
ZW C=FLOW
*
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KKVCMB10
KM   ROUTE CMB-10
RD  3600  0.0800   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KK  NS11
KM   BASIN 11 - 60 Ac
BA0.0389
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2490  95.590    0.10  0.2490  95.590
UK  1600  0.3400   0.240       6
UK  1600  0.3400   0.600      95
RD  3600  0.0800   0.060            TRAP     5.0     3.0
RD  3600  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KKYMB-11
KM   COMBINE NS-8 THRU 11
HC     2
ZW C=FLOW
*
KKYMB11A
KM   COMBINE NS-1 THRU 11
HC     2
ZW C=FLOW
*
*
KKUCM11A
KM   ROUTE CMB11A
RS     1    FLOW      -1
SV  0.20    0.30    0.50    0.60    0.70    0.90    1.20    1.60
SQ 100.0   200.0   300.0   400.0   500.0   700.0  1100.0  1500.0
ZW C=FLOW
*
KK NS11B
KM   BASIN 11 - 60 Ac
BA0.0546
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.700    0.10  0.2500  92.700
UK  1600  0.3400   0.240       6
UK  1600  0.3400   0.600      95
RD  3600  0.0800   0.060            TRAP     5.0     3.0
RD  3600  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KKYNS11B
KM  0
HC     2
ZW C=FLOW
*
KK  NS12
KM   BASIN 12 - 40 Ac
BA0.0619
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.100    0.10  0.2500  92.100
UK   400  0.1000   0.240      71
UK   400  0.1000   0.800      30
RD  1500  0.0700   0.060            TRAP     5.0     3.0
RD  1500  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KKYMB-12
KM   COMBINE NS-1 THRU 12
HC     2
ZW C=FLOW
*
KK  NS13
KM   BASIN 13 - 15 Ac
BA0.1459
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  94.520    0.10  0.2500  98.000
UK   500  0.1600   0.240      86
UK   500  0.1600   0.110      14
RD   900  0.1300   0.060            TRAP     5.0     3.0
RD   900  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KKV-NS13
KM   ROUTE NS-13
RD  1400  0.0800   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KK  NS14
KM   BASIN 14 - 47 Ac
BA0.0434
PB
```

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* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.610    0.10  0.2500  98.000
UK   775  0.3500   0.240      90
UK   775  0.3500   0.110      10
RD   800  0.0600   0.060            TRAP     5.0     3.0
RD   800  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KKYMB-14
KM   COMBINE NS-13 & 14
HC     2
ZW C=FLOW
*
KK NS14B
KM  NS14B
BA0.0204
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.760
UK   500  0.1000   0.600  100.00
RD   500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMB14A
KM   COMBINE NS-1 THRU 14
HC     3
ZW C=FLOW
*
KK NS20B
KM  NS20B
BA0.0322
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  93.580
UK   640  0.1000   0.600  100.00
RD  1000  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  NS15
KM  NS15
BA0.0860
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.030
UK  1000  0.0800   0.600  100.00
RD  1500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YNS15
KM  0
HC     2
ZW C=FLOW
*
KKYNS15C
KM  0
HC     2
ZW C=FLOW
*
KK  NS16
KM  NS16
BA0.1019
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2460  95.640
UK  1600  0.1000   0.600  100.00
RD  2100  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  NS17
KM  NS17
BA0.0811
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.820
UK  1500  0.0800   0.600  100.00
RD  1200  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YNS17
KM  0
HC     2
ZW C=FLOW
*
KK  NS18
KM  NS18
BA0.1877
PB
* PI
```

```
BF    -1  -0.001    1.50
LU  0.10  0.2500  94.050
UK  3200  0.1000   0.600  100.00
RD  3000  0.0500   0.060          TRAP    10.0    10.0
ZW C=FLOW
*
KK  NS19
KM  NS19
BA0.0434
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.690
UK  1600  0.0500   0.600  100.00
RD  1000  0.0400   0.060          TRAP    10.0    10.0
ZW C=FLOW
*
KK YNS19
KM  0
HC     2
ZW C=FLOW
*
KKYNS19C
KM  0
HC     2
ZW C=FLOW
*
KK  NS20
KM  NS20
BA0.0548
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.700
UK   600  0.0800   0.600  100.00
RD  1200  0.0500   0.060          TRAP    10.0    10.0
ZW C=FLOW
*
KK YNS20
KM  0
HC     2
ZW C=FLOW
*
KKYNS20C
KM  0
HC     2
ZW C=FLOW
*
KK  NS21
KM  NS21
BA0.1390
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2480  90.560
UK  1450  0.0500   0.600  100.00
RD  2500  0.0500   0.060          TRAP    10.0    10.0
ZW C=FLOW
*
KK YNS21
KM  0
HC     2
ZW C=FLOW
*
KK NS30D
KM  NS30D
BA0.0577
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.860
UK   900  0.0800   0.600  100.00
RD  1400  0.0500   0.060          TRAP    10.0    10.0
ZW C=FLOW
*
KK NS30A
KM  NS30A
BA0.0266
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2440  90.140
UK   800  0.0800   0.600  100.00
RD  1600  0.0500   0.060          TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS30A
KM  0
HC     2
ZW C=FLOW
*
KKYS30CC
KM  0
HC     2
```

```
ZW C=FLOW
*
KK NS30B
KM  NS30B
BA0.1400
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2360  89.370
UK  1600  0.1000   0.600  100.00
RD  2000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS30B
KM  0
HC     2
ZW C=FLOW
*
KK NS30E
KM  NS30E
BA0.0022
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.330
UK   200  0.1000   0.600  100.00
RD   500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS30E
KM  0
HC     2
ZW C=FLOW
*
KK NS30F
KM  NS30F
BA0.0023
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.580
UK   200  0.1000   0.600  100.00
RD   500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS30F
KM  0
HC     2
ZW C=FLOW
*
KK NS30C
KM  NS30C
BA0.1237
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.1510  86.160
UK  1600  0.0800   0.600  100.00
RD  2000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS30C
KM  0
HC     2
ZW C=FLOW
*
KKY30CCC
KM  0
HC     2
ZW C=FLOW
*
KK NS33B
KM  NS33B
BA0.0301
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.1000  84.540
UK  1000  0.0500   0.600  100.00
RD  1000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS33B
KM  0
HC     2
ZW C=FLOW
*
KKYNSALL
KM  0
HC     2
ZW C=FLOW
*
*
KKUW5END
```

```
KM  ROUTE FOR BACKWATER AT NW5
RS     1    FLOW      -1
SV  0.00    0.75    54.4   131.2     377    1086
SQ   0.0   267.0    2853    3500    6287    9653
ZW C=FLOW
*
* - - - - - -
*
*
KK  NS34
KM  NS34
BA0.0437
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.220
UK   900  0.0800   0.600  100.00
RD   900  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  NS35
KM  NS35
BA0.1517
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.1850  86.070
UK  1900  0.0500   0.600  100.00
RD  2500  0.0400   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YNS35
KM  0
HC     2
ZW C=FLOW
*
KK XMAR1
KM XMAR1
BA0.2922
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2440  90.000
UK  1900  0.1000   0.600  100.00
RD  2000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK XMAR2
KM XMAR2
BA0.4066
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2410  90.000
UK  2200  0.1000   0.600  100.00
RD  3100  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK XMAR3
KM XMAR3
BA0.6221
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2480  90.000
UK  3500  0.1000   0.600  100.00
RD  3400  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK XMAR4
KM XMAR4
BA0.2489
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.000
UK  2300  0.1000   0.600  100.00
RD  1100  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK XMAR5
KM XMAR5
BA0.3335
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.000
UK  1700  0.1000   0.600  100.00
RD  2600  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMAR5
KM  0
HC     2
```

```
ZW C=FLOW
*
KK XMAR6
KM XMAR6
BA0.1147
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.000
UK  1500  0.1000   0.600  100.00
RD  1650  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK XMAR7
KM XMAR7
BA0.3439
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.000
UK  2800  0.1000   0.600  100.00
RD  1400  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMAR7
KM  0
HC     2
ZW C=FLOW
*
KK XMAR8
KM XMAR8
BA0.2218
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.000
UK  2200  0.1000   0.600  100.00
RD  3500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMAR8
KM  0
HC     2
ZW C=FLOW
*
KK XMAR9
KM XMAR9
BA0.2500
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.000
UK  2100  0.1000   0.600  100.00
RD  3400  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKXMAR10
KM XMAR10
BA0.2272
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.000
UK  2300  0.1000   0.600  100.00
RD  2400  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKXMAR11
KM XMAR11
BA0.1037
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.1850  90.000
UK  1100  0.1000   0.600  100.00
RD  1500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMAR11
KM  0
HC     2
ZW C=FLOW
*
KKXMAR12
KM XMAR12
BA0.1361
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2060  90.000
UK  1250  0.1000   0.600  100.00
RD  2200  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
```

```
KKXMAR13
KM XMAR13
BA0.2679
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2490  90.000
UK  1800  0.1000   0.600  100.00
RD  4000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMAR13
KM  0
HC     2
ZW C=FLOW
*
KKYMARC1
KM  0
HC     2
ZW C=FLOW
*
KKXMAR14
KM XMAR14
BA0.0483
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.000
UK   500  0.1000   0.600  100.00
RD   500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKXMAR15
KM XMAR15
BA0.0140
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.000
UK   500  0.1000   0.600  100.00
RD   500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMAR15
KM  0
HC     3
ZW C=FLOW
*
KKXMAR17
KM XMAR17
BA0.2288
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2200  90.000
UK  1300  0.1000   0.600  100.00
RD  2700  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMAR17
KM  0
HC     2
ZW C=FLOW
*
KKMAR19A
KM  MAR19A
BA0.0295
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  92.440
UK  1000  0.1000   0.600  100.00
RD  1000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKMAR19B
KM  MAR19B
BA0.0074
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.200
UK   500  0.1000   0.600  100.00
RD  1000  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKXMAR18
KM XMAR18
BA0.1517
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2480  90.000
UK  1600  0.1000   0.600  100.00
```

```
RD  2500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMAR18
KM  0
HC     3
ZW C=FLOW
*
KKXMAR20
KM XMAR20
BA0.2009
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2440  91.000
UK  1700  0.1000   0.600  100.00
RD  2700  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKMAR21A
KM  MAR21A
BA0.0602
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  91.900
UK   500  0.1000   0.600  100.00
RD   500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKMAR21B
KM  MAR21B
BA0.0241
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2450  90.550
UK   500  0.1000   0.600  100.00
RD  1000  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK YR21B
KM  0
HC     2
ZW C=FLOW
*
* SA Note: Use New Overflow analysis instead
* DIVERT At Upstream Highway Crossing, where water can't cross under roadway
KK N11DV
DTN11DIV
DI     0     190     200     800    1600    5000
DQ     0       1       5     604    1403    4802
ZW C=FLOW
*
KKMAR22B
KM  MAR22B
BA0.0266
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2300  88.260
UK   500  0.1000   0.600  100.00
RD  1000  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKMAR22A
KM  MAR22A
BA0.0165
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.2500  90.250
UK   500  0.1000   0.600  100.00
RD   500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YR22A
KM  0
HC     2
ZW C=FLOW
*
KKXMAR23
KM XMAR23
BA0.0439
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.1380  87.000
UK   500  0.0500   0.600  100.00
RD  2000  0.0200   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKYMAR23
KM  0
```

```
HC     2
ZW C=FLOW
*
*
KK UWEND
KM  ROUTE FOR BACKWATER AT W1
RS     1    FLOW      -1
SV  0.00   10.00    49.2   292.0   859.7  867.00
SQ   0.0    18.0   239.0   244.0   250.0  1034.0
ZW C=FLOW
*
KKXMAR24
KM XMAR24
BA0.0055
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.1000  87.000
UK   200  0.0200   0.600  100.00
RD   500  0.0100   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKXMAR25
KM XMAR25
BA0.0147
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.1260  87.000
UK  1000  0.0200   0.600  100.00
RD  1000  0.0100   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYMAR25
KM  0
HC     3
ZW C=FLOW
*
KK NS33A
KM  NS33A
BA0.0118
PB
* PI
BF    -1  -0.001    1.50
LU  0.10  0.1970  85.200
UK  1000  0.0200   0.600  100.00
RD  1000  0.0200   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS33A
KM  0
HC     2
ZW C=FLOW
*
*
KK  UHWY
KM  ROUTE FOR BACKWATER AT HWY
RS     1    FLOW      -1
SV  0.00    0.13    0.60    32.4    61.6   114.6   265.3  330.00
SQ   0.0   200.0   491.0    3074    4293    5718  5847.0  9000.0
ZW C=FLOW
*
* ----------END---------------
KKN11DIV
DRN11DIV
ZW C=FLOW
*
*
ZZ
```

B-1A. HEC-1 Post-Project PDP Input WARM EVENT VALLEY TRAIL ALTERNATIVE

```
ID PLACER COUNTY WATERSHED MODEL, PLACER COUNTY, CA
ID WATERSHED UPDATE MODELS - DRAFT ULT BUILDOUT
ID DRAFT MODEL FOR HYD ROUTING - HEC1VOLS UTILITY
ID CESI 2/22/2012
ID
IT     5 13FEB08       0     300
IO     5               0
IN     5       0       0
*DIAGRAM
*
*
KK    E2
KM    Large Offsite Shed  155.8ac
BA0.2434
PB
* PI
BF -38.7
LU  0.10  0.2110   2.000
UK  1500  0.0830   0.600  100.00
RD  4000  0.0300   0.060            TRAP     2.0    25.0
ZW C=FLOW
*
KK   E15
KM   Other Large Upstream offsite shed 111.1 ac
BA0.1736
PB
* PI
BF -38.7
LU  0.10  0.1470   2.000
UK  1000  0.0580   0.600  100.00
RD  2500  0.0300   0.060            TRAP     2.0    10.0     YES
ZW C=FLOW
*
KK   E10
KM    Large Undeveloped upstream watershed. (139.2)
BA0.0311
PB
* PI
BF -38.7
LU  0.10  0.1790   2.000
UK  2000  0.0750   0.600  100.00
RD  3200  0.0700   0.060   .0500    TRAP    20.0    40.0
RD  3300  0.0010   0.040   .1500    TRAP    20.0    20.0
ZW C=FLOW
*
KK YE10C
KM    Upstream of Project
HC     2
ZW C=FLOW
*
KK VE12R
KM    ROUTE TO BOTTOM OF E20
RD  1500  0.0170   0.040            TRAP    15.0     5.0
ZW C=FLOW
*
KK  E20A
KM    12.0 AC
BA0.0106
PB
* PI
BF -38.7
LU  0.10  0.2430   3.000
UK  1200  0.0580   0.600  100.00
RD   700  0.0170   0.060            TRAP    15.0     5.0
ZW C=FLOW
*
KK YE20A
KM  0
HC     2
ZW C=FLOW
*
KK  E14A
KM    Small Roadway Shed 4 ac
BA0.0063
PB
* PI
BF -38.7
LU  0.10  0.1000  10.000
UK   500  0.0300   0.600  100.00
RD   500  0.0300   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  E18A
KM    Small Hopkins Roadway Drain 3.6ac
BA0.0057
PB
* PI
BF -38.7
LU  0.10  0.2070  10.000
UK   450  0.0300   0.600  100.00
RD   500  0.0300   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK  E16A
```

```
KM    Small Hopkins Roadway Drain 0.4ac
BA0.0006
PB
* PI
BF -38.7
LU  0.10  0.2130  90.000
UK    50  0.0200   0.600  100.00
RD   100  0.0300   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYE16AC
KM  0
HC     2
ZW C=FLOW
*
KK  E20B
KM    10.9 AC
BA0.0182
PB
* PI
BF -38.7
LU  0.10  0.2000   5.000
UK   800  0.0700   0.600  100.00
RD   200  0.0170   0.060            TRAP    15.0     5.0
ZW C=FLOW
*
KK YE20B
KM  0
HC     2
ZW C=FLOW
*
KKVE16AR
KM    ROUTE TO BOTTOM OF E20
RD  2000  0.0170   0.040            TRAP    15.0     5.0
ZW C=FLOW
*
KK  E20C
KM    4.8 AC
BA0.0075
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  90.000
UK   500  0.0500   0.600      90
UK    18  0.0200   0.110      10
RD   200  0.0170   0.060   .0500    TRAP    15.0     5.0
RD   500  0.0010   0.040            TRAP    15.0     5.0
ZW C=FLOW
*
KK YE20C
KM  0
HC     3
ZW C=FLOW
*
KK  E20D
KM    10.6 AC
BA0.0166
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000    0.10  0.2500  90.000
UK   500  0.0500   0.600      89
UK    18  0.0200   0.110      11
RD   200  0.0170   0.060   .0500    TRAP    15.0     5.0
RD   600  0.0010   0.040            TRAP    15.0     5.0
ZW C=FLOW
*
KK  E20E
KM    8.4 AC Mostly diverted area added to this shed
BA0.0132
PB
* PI
BF -38.7
LU  0.10  0.2500  12.000    0.10  0.2500  90.000
UK   900  0.0200   0.600      90
UK    18  0.0200   0.110      10
RD   200  0.0170   0.060   .0500    TRAP    15.0     5.0
RD   600  0.0010   0.040            TRAP    15.0     5.0
ZW C=FLOW
*
KK YE20D
KM  0
HC     3
ZW C=FLOW
*
KK   E30
KM    MAIN SHED ABOVE TWIN CULVERTS IN S. MILL RD.  40.8AC
BA0.0638
PB
* PI
BF -38.7
LU  0.10  0.2500   8.990
UK   600  0.0380   0.600  100.00
RD  1900  0.0140   0.060            TRAP    15.0    10.0     YES
```

```
ZW C=FLOW
*
KK   E19
KM    HILLSIDE ABOVE SM RD.     4.2AC
BA0.0065
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  90.000
UK   400  0.0180   0.600      89
UK    18  0.0200   0.110      11
RD   570  0.0140   0.060            TRAP     2.0    25.0
RD   550  0.0010   0.012            CIRC     1.0     0.0      NO
ZW C=FLOW
*
KK VE19R
KM    ROUTE TO BOTTOM OF E20
RD   600  0.0400   0.040            TRAP    10.0    40.0
ZW C=FLOW
*
KK   E21
KM    HILLSIDE ABOVE ROAD           5.7AC
BA0.0084
PB
* PI
BF -38.7
LU  0.10  0.2500   7.000    0.10  0.2500  90.000
UK   600  0.0170   0.600      74
UK    18  0.0200   0.110      26
RD   800  0.0150   0.060            TRAP     2.0    25.0
RD   800  0.0010   0.015            TRAP     2.0    25.0      NO
ZW C=FLOW
*
KK  YE21
KM  0
HC     2
ZW C=FLOW
*
KK   E22
KM  "  HILLSIDE ABOVE 15"" CULVERT   2.9AC                                                "
BA0.0045
PB
* PI
BF -38.7
LU  0.10  0.2500   7.000
UK   350  0.0270   0.600  100.00
RD   250  0.0300   0.060            TRAP     2.0    10.0      NO
ZW C=FLOW
*
KK YE22C
KM    COMBINE E21 AND E22
HC     2
ZW C=FLOW
*
KK VE22R
KM    ROUTE TO BOTTOM OF E30
RD   700  0.0140   0.040            TRAP    15.0    10.0
ZW C=FLOW
*
KK   E23
KM    PORTION OF S.MILL RD.     0.5AC
BA0.0008
PB
* PI
BF -38.7
LU  0.10  0.2500  90.000
UK    18  0.0200   0.110  100.00
RD   500  0.0240   0.060            TRAP     2.0    25.0      NO
ZW C=FLOW
*
KK  YE23
KM  0
HC     2
ZW C=FLOW
*
KK VE23R
KM    ROUTE TO BOTTOM OF E30
RD   400  0.0140   0.040            TRAP    15.0    10.0
ZW C=FLOW
*
KK YE30C
KM     COMBINE AT BOTTOM OF E30
HC     2
ZW C=FLOW
*
*
KKUE30CR
KM  0
RS     1    FLOW      -1
SV  0.00    0.54    0.84    1.03    1.34    1.56    1.82    2.09    7.48
SQ   0.0    73.0   104.0   125.0   153.0   173.0   195.0   217.0   700.0
ZW C=FLOW
*
KK   E40
```

```
KM    LARGE SHED DOWNSTREAM OF S. MILL RD.    85.5Ac
BA0.1147
PB
* PI
BF -38.7
LU  0.10  0.1800   8.480
UK  1600  0.0340   0.600  100.00
RD   600  0.0400   0.060   .0100    TRAP    10.0    40.0
RD  3000  0.0010   0.040            TRAP    40.0    20.0     YES
ZW C=FLOW
*
KK  E40B
KM    LARGE SHED DOWNSTREAM OF S. MILL RD.    85.5Ac
BA0.0190
PB
* PI
BF -38.7
LU  0.10  0.2480  10.920
UK   600  0.0100   0.600  100.00
RD   600  0.0400   0.060   .0100    TRAP    10.0    40.0
RD  1000  0.0010   0.040            TRAP    40.0    20.0
ZW C=FLOW
*
KKYE40BC
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK  E14C
KM    OFF-SITE SHED WEST OF S. MILL RD.    3.6AC
BA0.0059
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   600  0.0800   0.600  100.00
RD   500  0.0070   0.060   .0030    TRAP     2.0    25.0
RD   500  0.0010   0.040            TRAP     2.0    10.0      NO
ZW C=FLOW
*
KK VE60R
KM    ROUTE TO MAIN CHANNEL OF E64
RD  1100  0.0700   0.060            TRAP    40.0    40.0
ZW C=FLOW
*
KK  E64A
KM    EAST OF S. MILL RD.      16.1AC
BA0.0248
PB
* PI
BF -38.7
LU  0.10  0.1590  14.000    0.10  0.1590  90.000
UK  1000  0.0500   0.600      94
UK    18  0.0200   0.110       6
RD  1000  0.0700   0.060   .0140    TRAP    40.0    40.0
RD   500  0.0010   0.040            TRAP    20.0    10.0
ZW C=FLOW
*
KK YE64A
KM  0
HC     2
ZW C=FLOW
*
KK  E64B
KM    EAST OF S. MILL RD.      12.1AC
BA0.0190
PB
* PI
BF -38.7
LU  0.10  0.1750  15.000    0.10  0.1750  90.000
UK   800  0.0700   0.600      97
UK    18  0.0200   0.110       3
RD  1000  0.0700   0.060   .0140    TRAP    40.0    40.0
RD   500  0.0010   0.040            TRAP    20.0    10.0
ZW C=FLOW
*
KK YE64B
KM  0
HC     2
ZW C=FLOW
*
KK VE64R
KM    ROUTE TO MAIN CHANNEL OF E75
RD  1000  0.0350   0.040            TRAP    40.0    10.0
ZW C=FLOW
*
* - - - - - -
*
*
KK   E70
KM    OFF-SITE- LAHONTAN UNITS 7&8 AND LAHONTAN II    78.6AC
```

```
BA0.1255
PB
* PI
BF -38.7
LU  0.10  0.1710   8.000    0.10  0.1710  90.000
UK  1200  0.0410   0.600      95
UK    18  0.0200   0.110       5
RD   450  0.0140   0.060   .0100    TRAP     2.0    25.0
RD  1800  0.0010   0.040            TRAP    20.0    10.0      NO
ZW C=FLOW
*
KK   E71
KM    OFF-SITE PORTION OF LAHONTAN II    17.8Ac
BA0.0279
PB
* PI
BF -38.7
LU  0.10  0.2270  19.100
UK  1400  0.0500   0.600  100.00
RD   700  0.0300   0.060   .0070    TRAP     2.0    25.0
RD   400  0.0010   0.040   .0150    TRAP     2.0     5.0
ZW C=FLOW
*
KK   E72
KM    OFF-SITE PORTION OF LAHONTAN II   12.1Ac
BA0.0178
PB
* PI
BF -38.7
LU  0.10  0.1980   9.600
UK  1700  0.0370   0.600  100.00
RD   850  0.0530   0.060   .0100    TRAP    20.0    20.0
RD   700  0.0010   0.040            TRAP    10.0    20.0      NO
ZW C=FLOW
*
KKYE7012
KM  0
HC     2
ZW C=FLOW
*
KK VE72R
KM    ROUTE TO MAIN CHANNEL OF E75
RD   750  0.0300   0.040            TRAP    40.0    10.0
ZW C=FLOW
*
KKY72&64
KM    ROUTE TO MAIN CHANNEL OF E75
HC     2
ZW C=FLOW
*
KK   E75
KM    MOSTLY OFF-SITE AND DOWNSTREAM SHED  57.9Ac
BA0.0905
PB
* PI
BF -38.7
LU  0.10  0.1910   3.200
UK  1200  0.0580   0.600  100.00
RD   600  0.0500   0.060   .0050    TRAP    20.0    20.0
RD  1400  0.0010   0.040            TRAP    10.0    50.0     YES
ZW C=FLOW
*
KK  YE75
KM  0
HC     2
ZW C=FLOW
*
*
KKUE75CR
KM  0
RS     1    FLOW      -1
SV  0.00    0.33    0.45    0.52    0.61    0.67    0.73    0.79    0.87    2.95
SQ   0.0    24.0    35.0    42.0    51.0    58.0    66.0    73.0    83.0   400.0
ZW C=FLOW
*
* - - - - - -
*
*
KK  E14B
KM    OFF-SITE SHED WEST OF S. MILL RD.
BA0.0397
PB
* PI
BF -38.7
LU  0.10  0.1920   2.000
UK   800  0.0800   0.600  100.00
RD   800  0.0300   0.060   .0200    TRAP    40.0    40.0
RD   400  0.0010   0.040            TRAP     2.0     6.0      NO
ZW C=FLOW
*
KK VE50R
KM    ROUTE TO MAIN CHANNEL OF E55
RD   850  0.0700   0.060            TRAP    40.0    40.0
ZW C=FLOW
```

```
*
KK  E55A
KM    EAST OF S. MILL RD.   16.7AC
BA0.0261
PB
* PI
BF -38.7
LU  0.10  0.1360  20.000
UK   500  0.0400   0.600  100.00
RD   400  0.0700   0.060   .0070    TRAP    40.0    40.0
RD   500  0.0010   0.040            TRAP    10.0     5.0
ZW C=FLOW
*
KK YE55A
KM  0
HC     2
ZW C=FLOW
*
*
KKUE55AR
KM  0
RS     1    FLOW      -1
SV  0.00    0.08    0.10    0.12    0.14    0.15    0.16    0.17    0.30
SQ   0.0    18.0    25.0    30.0    36.0    41.0    45.0    49.0    80.0
ZW C=FLOW
*
KK  E58D
KM    EAST OF S. MILL RD.   23.7AC
BA0.0229
PB
* PI
BF -38.7
LU  0.10  0.2500   9.500
UK   800  0.0400   0.600  100.00
RD   400  0.0700   0.060   .0070    TRAP    40.0    40.0
RD  1400  0.0010   0.040            TRAP    10.0     5.0
ZW C=FLOW
*
KK YE58D
KM  0
HC     2
ZW C=FLOW
*
KK  E55B
KM    EAST OF S. MILL RD.   3.2AC
BA0.0050
PB
* PI
BF -38.7
LU  0.10  0.1920  40.000
UK   200  0.0500   0.600  100.00
RD   400  0.0700   0.060   .0070    TRAP    40.0    40.0
RD   500  0.0010   0.040            TRAP    10.0     5.0
ZW C=FLOW
*
KK  E55C
KM    EAST OF S. MILL RD.   7.7AC
BA0.0120
PB
* PI
BF -38.7
LU  0.10  0.2470  22.000
UK   200  0.0500   0.600  100.00
RD   400  0.0700   0.060   .0070    TRAP    40.0    40.0
RD   500  0.0010   0.040            TRAP    10.0     5.0
ZW C=FLOW
*
KK YE55C
KM  0
HC     2
ZW C=FLOW
*
*
KKU55CCR
KM  0
RS     1    FLOW      -1
SV  0.00    0.55    0.76    0.91    1.13    1.28    1.62    2.09    2.89
SQ   0.0    20.0    28.0    34.0    42.0    47.0    53.0    59.0    80.0
ZW C=FLOW
*
KK  E55E
KM    EAST OF S. MILL RD.   3.6AC
BA0.0056
PB
* PI
BF -38.7
LU  0.10  0.2500  25.000
UK   300  0.0200   0.600  100.00
RD   400  0.0700   0.060   .0070    TRAP    40.0    40.0
RD   500  0.0010   0.040            TRAP    10.0     5.0
ZW C=FLOW
*
KK YE55E
KM  0
```

```
HC     2
ZW C=FLOW
*
KK  E55F
KM    EAST OF S. MILL RD.   1.8AC
BA0.0028
PB
* PI
BF -38.7
LU  0.10  0.2500  25.000
UK   250  0.0300   0.600  100.00
RD   200  0.0700   0.060   .0070    TRAP    40.0    40.0
RD   300  0.0010   0.040            TRAP    10.0     5.0
ZW C=FLOW
*
KK  E55G
KM    EAST OF S. MILL RD.   1AC
BA0.0015
PB
* PI
BF -38.7
LU  0.10  0.2500  11.000
UK   150  0.0200   0.600  100.00
RD   200  0.0700   0.060   .0070    TRAP    40.0    40.0
RD   300  0.0010   0.040            TRAP    10.0     5.0
ZW C=FLOW
*
KKYE55GC
KM  0
HC     2
ZW C=FLOW
*
KK YE55G
KM  0
HC     2
ZW C=FLOW
*
*
KKUE55CR
KM  0
RS     1    FLOW      -1
SV  0.00    0.55    0.76    0.91    1.13    1.28    1.62    2.09    2.89
SQ   0.0    20.0    28.0    34.0    42.0    47.0    53.0    59.0    80.0
ZW C=FLOW
*
KK  E58C
KM    EAST OF S. MILL RD.   5.6AC
BA0.0088
PB
* PI
BF -38.7
LU  0.10  0.2500  36.000
UK   250  0.0600   0.600  100.00
RD   200  0.0700   0.060   .0070    TRAP    40.0    40.0
RD   500  0.0010   0.040            TRAP    10.0     5.0
ZW C=FLOW
*
KK YE58C
KM  0
HC     2
ZW C=FLOW
*
KK  E55H
KM    EAST OF S. MILL RD.                             44.1AC
BA0.0057
PB
* PI
BF -38.7
LU  0.10  0.2500   2.400
UK   400  0.0200   0.600  100.00
RD   400  0.0700   0.060   .0300    TRAP    40.0    40.0
RD  1000  0.0010   0.040            TRAP    10.0     5.0
ZW C=FLOW
*
KK YE55H
KM  0
HC     2
ZW C=FLOW
*
KK  E58A
KM    EAST OF S. MILL RD.   5.3AC
BA0.0083
PB
* PI
BF -38.7
LU  0.10  0.2500  22.000
UK   300  0.0400   0.600  100.00
RD   200  0.0700   0.060   .0070    TRAP    40.0    40.0
RD   500  0.0010   0.040            TRAP    10.0     5.0
ZW C=FLOW
*
KK YE58A
KM  0
HC     2
```

```
ZW C=FLOW
*
KK  E58E
KM    EAST OF S. MILL RD.   3.7AC
BA0.0370
PB
* PI
BF -38.7
LU  0.10  0.2250  22.000
UK   300  0.0200   0.600  100.00
RD   200  0.0700   0.060   .0070    TRAP    40.0    40.0
RD   500  0.0010   0.040            TRAP    10.0     5.0
ZW C=FLOW
*
KK YE58E
KM  0
HC     2
ZW C=FLOW
*
KK   E80
KM    LAST DOWNSTREAM SHED
BA0.0452
PB
* PI
BF -38.7
LU  0.10  0.1310   2.000
UK  1300  0.0400   0.600  100.00
RD  1000  0.0250   0.060   .0200    TRAP    20.0    20.0
RD  1100  0.0010   0.040            TRAP    10.0    50.0     YES
ZW C=FLOW
*
KKYE5875
KM  0
HC     3
ZW C=FLOW
*
KK YE80C
KM    COMBINE WITH E40 FOR TOTAL AT LAST DOWNSTREAM POINT
HC     2
ZW C=FLOW
*
KK  E40C
KM    LARGE SHED DOWNSTREAM OF S. MILL RD.    85.5Ac
BA0.0344
PB
* PI
BF -38.7
LU  0.10  0.1660   9.310
UK  1200  0.0100   0.600  100.00
RD   600  0.0400   0.060   .0100    TRAP    10.0    40.0
RD  1000  0.0010   0.040            TRAP    40.0    20.0
ZW C=FLOW
*
KK  E40E
KM    LARGE SHED DOWNSTREAM OF S. MILL RD.    85.5Ac
BA0.0058
PB
* PI
BF -38.7
LU  0.10  0.2500  10.510
UK   600  0.0100   0.600  100.00
RD   600  0.0400   0.060   .0100    TRAP    10.0    40.0
RD  1000  0.0010   0.040            TRAP    40.0    20.0
ZW C=FLOW
*
KK  E40D
KM    LARGE SHED DOWNSTREAM OF S. MILL RD.    85.5Ac
BA0.0074
PB
* PI
BF -38.7
LU  0.10  0.1940   8.270
UK   600  0.0100   0.600  100.00
RD   600  0.0400   0.060   .0100    TRAP    10.0    40.0
RD  1000  0.0010   0.040            TRAP    40.0    20.0
ZW C=FLOW
*
KK YE40D
KM  0
HC     3
ZW C=FLOW
*
KKYE40DC
KM  0
HC     2
ZW C=FLOW
*
KK   E85
KM    OFFSITE DOWNSTREAM SHED     313.9
BA0.4599
PB
* PI
BF -38.7
LU  0.10  0.1750   2.270
```

```
UK  2500  0.0625   0.600  100.00
RD  2000  0.0250   0.060   .1000    TRAP    20.0    20.0
RD  5000  0.0010   0.040            TRAP    10.0    50.0
ZW C=FLOW
*
KK  YE85
KM  0
HC     2
ZW C=FLOW
*
KK  E85B
KM  E85B
BA0.0312
PB
* PI
BF -38.7
LU  0.10  0.2300   3.350
UK   400  0.0200   0.600  100.00
RD   500  0.0500   0.060            TRAP    20.0    10.0
ZW C=FLOW
*
KK YE85B
KM  0
HC     2
ZW C=FLOW
*
*
KKUW3END
KM  ROUTE FOR BACKWATER AT NW3
RS     1    FLOW      -1
SV  0.00    0.01    0.03   20.60  247.00  250.00
SQ   0.0    40.0   243.0   508.0   637.0   800.0
ZW C=FLOW
*
KK  E85C
KM  E85C
BA0.0079
PB
* PI
BF -38.7
LU  0.10  0.2380   2.390
UK   400  0.0200   0.600  100.00
RD   500  0.0500   0.060            TRAP    20.0    10.0
ZW C=FLOW
*
KKYE85CC
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK  E5A1
KM    E5A1 Drop Inlet
BA0.0730
PB
* PI
BF -38.7
LU  0.10  0.2040   2.000    0.10  0.2040  95.000
UK  1350  0.1330   0.600      98
UK   200  0.0200   0.110       3
RD  2000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK   E5B
KM    E5B
BA0.0139
PB
* PI
BF -38.7
LU  0.10  0.2450   2.000    0.10  0.2450  95.000
UK   600  0.0800   0.600      91
UK   200  0.0200   0.110       9
RD  2000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  YE5B
KM  0
HC     2
ZW C=FLOW
*
KK   E5C
KM    E5C
BA0.0051
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   600  0.0700   0.600      92
UK   200  0.0200   0.110       8
RD   500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
```

```
KK  YE5C
KM  0
HC     2
ZW C=FLOW
*
*
KKUE5ADT
KM  0
RS     1    FLOW      -1
SV  0.00    0.10    0.20    0.30    0.40    1.70    2.40
SQ   0.0     0.0     0.1     2.0    50.0    80.0   200.0
ZW C=FLOW
*
KK   E5D
KM    E5D
BA0.0850
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1500  0.0500   0.600  100.00
RD  1500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YE5DC
KM  0
HC     2
ZW C=FLOW
*
KK  E6A1
KM    E6A1
BA0.0570
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1000  0.0680   0.600  100.00
RD  2700  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK  E6A2
KM    E6A2
BA0.0149
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   600  0.0680   0.600  100.00
RD   800  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYE6A1C
KM  0
HC     2
ZW C=FLOW
*
KK   E6C
KM    E6C
BA0.0939
PB
* PI
BF -38.7
LU  0.10  0.2460   2.000
UK  1600  0.0900   0.600  100.00
RD  1400  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YE6CC
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK GS10D
KM    GS10D
BA0.0124
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   900  0.0700   0.600      79
UK   100  0.0200   0.110      21
RD   200  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK GS10C
KM    GS10C
BA0.0169
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
```

```
UK   300  0.0600   0.600      91
UK   100  0.0200   0.110       9
RD   400  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYS10CC
KM  0
HC     2
ZW C=FLOW
*
KK GS10B
KM    GS10B
BA0.0044
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   600  0.0800   0.600      86
UK   100  0.0200   0.110      14
RD   400  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKGS10A1
KM    GS10A1
BA0.0290
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   600  0.0800   0.600      96
UK   100  0.0200   0.110       4
RD   500  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK GS10F
KM    GS10F
BA0.0248
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   600  0.0800   0.600      92
UK   100  0.0200   0.110       8
RD   900  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKY10FCC
KM  0
HC     2
ZW C=FLOW
*
KK GS10E
KM    GS10E
BA0.0153
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   300  0.0800   0.600      78
UK   100  0.0200   0.110      22
RD   600  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYS10AC
KM   COMBINATION AT MEADOWS ROUTING AREA
HC     2
ZW C=FLOW
*
KKGS10A2
KM   GS10A2
BA0.0278
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK  1400  0.0800   0.600      96
UK   100  0.0200   0.110       4
RD  1400  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYGDTCC
KM  0
HC     2
ZW C=FLOW
*
*
KKUGS10R
KM   MEADOWS WQ AND DETENTION RESERVOIR AT GS10E
RS     1    FLOW      -1
SV 11.60   13.00   15.95
SQ  61.0   100.0   330.0
ZW C=FLOW
*
*
```

```
KKUS10ER
KM   Channel Attenuation downstream of GS10R
RS     1    FLOW      -1
SV  0.00    0.05    0.27    0.50    0.72    0.95    1.15
SQ   0.0     0.0     5.0    15.0    27.0    37.0    62.0
ZW C=FLOW
*
KK GS10J
KM    GS10J
BA0.0099
PB
* PI
BF -38.7
LU  0.10  0.2500  83.000    0.10  0.2500  95.000
UK   300  0.0800   0.600      92
UK   200  0.0200   0.110       8
RD   500  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKYS10JC
KM  0
HC     2
ZW C=FLOW
*
KK GS10G
KM    GS10G
BA0.0081
PB
* PI
BF -38.7
LU  0.10  0.2500  83.000    0.10  0.2500  95.000
UK   300  0.0800   0.600      90
UK   200  0.0200   0.110      10
RD   500  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
*
KKUS10JR
KM   Channel Attenuation From GS10J to GS10I
RS     1    FLOW      -1
SV  0.00    0.05    0.10    0.12    0.19    0.22    0.35
SQ   0.0     0.0     5.0    15.0    27.0    37.0    80.0
ZW C=FLOW
*
KK GS10H
KM    GS10H
BA0.0066
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   300  0.0800   0.600      81
UK   200  0.0200   0.110      19
RD   400  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KK GS10I
KM    GS10I
BA0.0071
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   300  0.0600   0.600      78
UK   200  0.0200   0.110      22
RD   400  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KK   E8A
KM    E8A
BA0.0049
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   200  0.1200   0.600      73
UK   100  0.0200   0.110      27
RD   300  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
*
KKUE8ASQ
KM  0
RS     1    FLOW      -1
SV  0.00    0.03    0.05    0.08    0.10    0.20    1.00
SQ   0.0     0.0     0.0     0.0     3.5    80.0   200.0
ZW C=FLOW
*
KK   E8B
KM    E8B
BA0.0122
PB
* PI
BF -38.7
```

```
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   400  0.0800   0.600      95
UK   100  0.0200   0.110       5
RD  1400  0.1000   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK   E8C
KM    E8C
BA0.0244
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   800  0.0800   0.600  100.00
RD  1400  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YE8CC
KM  0
HC     2
ZW C=FLOW
*
KKYGS10C
KM  0
HC     2
ZW C=FLOW
*
KKYS10IC
KM  0
HC     2
ZW C=FLOW
*
*
KKUS10IR
KM   Storage Upstream of Siller Ranch Road -  Channel Routing Meadow to Schaffer m
RS     1    FLOW      -1
SV  0.00    0.05    0.12    0.19    0.26    0.33    1.55
SQ   0.0     0.0     5.0    15.0    27.0    37.0   400.0
ZW C=FLOW
*
*
KK UGS9R
KM  0
RS     1    FLOW      -1
SV  0.00    0.09    0.17    0.24    0.41    0.59    0.83    0.94    4.03
SQ   0.0    33.0    55.0    76.0   114.0   145.0   177.0   206.0   644.0
ZW C=FLOW
*
KK    E9
KM    E9
BA0.0213
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   600  0.0800   0.600  100.00
RD  1000  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
*
KKUGS11R
KM  0
RS     1    FLOW      -1
SV  0.00    0.25    0.42    0.58    0.95    1.37    2.24    2.77    6.95
SQ   0.0    33.0    55.0    76.0   114.0   145.0   177.0   206.0   644.0
ZW C=FLOW
*
KK GS11B
KM    GS11B
BA0.0031
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   700  0.1000   0.600  100.00
RD   300  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK GS11A
KM    GS11A
BA0.0354
PB
* PI
BF -38.7
LU  0.10  0.2370   2.000
UK   700  0.1000   0.600  100.00
RD  1100  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKYGS11A
KM  0
HC     2
ZW C=FLOW
*
```

```
*
KKUS11RR
KM  0
RS     1    FLOW      -1
SV  0.00    1.25    1.51    1.75    2.27    2.78    3.53    4.26    4.67
SQ   0.0    33.0    55.0    76.0   114.0   145.0   177.0   206.0   244.0
ZW C=FLOW
*
KK GS13C
KM   GS13C
BA0.0066
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   300  0.0700   0.600  100.00
RD   300  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK GS13B
KM   GS13B
BA0.0168
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   300  0.0700   0.600  100.00
RD  1100  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK GS18A
KM   GS18A
BA0.0020
PB
* PI
BF -38.7
LU  0.10  0.2500   3.000
UK   800  0.0940   0.600  100.00
RD   300  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK  GS18
KM    GS18
BA0.0248
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   800  0.0940   0.600  100.00
RD  1600  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKYGS18C
KM  0
HC     2
ZW C=FLOW
*
KK GS13A
KM   GS13A
BA0.0196
PB
* PI
BF -38.7
LU  0.10  0.1810   2.000
UK   600  0.0670   0.600  100.00
RD  1100  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYGS13A
KM  0
HC     2
ZW C=FLOW
*
KK YGS13
KM  0
HC     2
ZW C=FLOW
*
KK  GS19
KM    GS19
BA0.0617
PB
* PI
BF -38.7
LU  0.10  0.1920   2.000
UK   700  0.0860   0.600  100.00
RD  1000  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK  GS20
KM    GS20
BA0.0178
PB
* PI
```

```
BF -38.7
LU  0.10  0.1680   2.000
UK   600  0.1000   0.600  100.00
RD   600  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYGS20C
KM  0
HC     2
ZW C=FLOW
*
*
KKUOOSED
KM   GOOSENECK LAKE RESERVOIR _ CURRENT ROUTING/DISCHARGE RATING
RS     1    FLOW      -1
SV  0.00   43.30   90.10  144.10  173.90  205.40  238.90  274.10
SQ   0.0     2.0    84.8   360.0   670.8  1273.0  3585.0  8880.0
ZW C=FLOW
*
* - - - - - -
*
*
KKGS21B1
KM            4.2 AC.
BA0.0065
PB
* PI
BF -38.7
LU  0.10  0.2500  10.060
UK   300  0.0700   0.600  100.00
RD   800  0.1000   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KKVR21B1
KM   ROUTE GS21B1
RD   540  0.0704   0.015            CIRC     2.0     0.0
ZW C=FLOW
*
KKGS21B2
KM            3.2 AC.
BA0.0050
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   300  0.0700   0.600  100.00
RD   900  0.0800   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KKYQG21B
KM     COMBINE
HC     2
ZW C=FLOW
*
KK GS21A
KM   GS21A
BA0.0412
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK  1000  0.0700   0.600      80
UK   200  0.0200   0.240      20
RD  2500  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK  GS22
KM    GS22
BA0.0741
PB
* PI
BF -38.7
LU  0.10  0.2490   2.000
UK   700  0.0570   0.600  100.00
RD  1000  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKYGS21A
KM     COMBINE
HC     2
ZW C=FLOW
*
*
KKUGS22R
KM  0
RS     1    FLOW      -1
SV  0.00    0.67    0.84    0.97    1.28    1.45    1.87    2.23    5.29
SQ   0.0    65.0    85.0   102.0   144.0   184.0   232.0   291.0   575.0
ZW C=FLOW
*
KK  GS23
KM    GS23
BA0.0596
PB
```

```
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  2000  0.0400   0.600  100.00
RD  1100  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK  GS24
KM    GS24
BA0.0352
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   500  0.1000   0.600  100.00
RD   900  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYGS24C
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KKGS25B3
KM            1.2 AC.
BA0.0019
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   300  0.0700   0.600  100.00
RD   310  0.0500   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KKGS25B4
KM             1.8 AC.
BA0.0029
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   300  0.0700   0.600  100.00
RD   440  0.1200   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KKYC25B4
KM     COMBINE
HC     2
ZW C=FLOW
*
KKGS25C4
KM             4.4 AC.
BA0.0069
PB
* PI
BF -38.7
LU  0.10  0.2500  11.750
UK   300  0.0700   0.600  100.00
RD   550  0.1000   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KKGS25C5
KM             1.7 AC.
BA0.0026
PB
* PI
BF -38.7
LU  0.10  0.2500   9.800
UK   300  0.0700   0.600  100.00
RD   450  0.1100   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KKYC25C5
KM     COMBINE
HC     2
ZW C=FLOW
*
KKGS25C6
KM             1.6 AC.
BA0.0023
PB
* PI
BF -38.7
LU  0.10  0.2500   4.600
UK   300  0.0700   0.600  100.00
RD   240  0.1080   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KKYC25C6
KM     COMBINE
HC     3
```

```
ZW C=FLOW
*
KKGS25C9
KM            3.0 AC.
BA0.0047
PB
* PI
BF -38.7
LU  0.10  0.2500  11.360
UK   300  0.0700   0.600  100.00
RD   550  0.0509   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KKGS21A2
KM            1.3 AC.
BA0.0020
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   300  0.0700   0.600  100.00
RD   750  0.0825   0.060            CIRC     2.0     0.0
ZW C=FLOW
*
KKGS25C1
KM            .4 AC.
BA0.0006
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   300  0.0700   0.600  100.00
RD   290  0.0621   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KKYC25C1
KM   COMBINE
HC     2
ZW C=FLOW
*
KKVR25C1
KM     ROUTR COMBINED GS25C1
RD   312  0.0401   0.015          CIRC       2.0     0.0
ZW C=FLOW
*
KKYC25C9
KM     COMBINE
HC     3
ZW C=FLOW
*
KKGS25C3
KM            3.9 AC.
BA0.0060
PB
* PI
BF -38.7
LU  0.10  0.2500  11.230
UK   300  0.0700   0.600  100.00
RD  1045  0.0670   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KKGS25C7
KM            3.8 AC.
BA0.0060
PB
* PI
BF -38.7
LU  0.10  0.2500  13.180
UK   300  0.0700   0.600  100.00
RD   620  0.0452   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KKYC25C7
KM     COMBINE
HC     3
ZW C=FLOW
*
KK GS27C
KM            2.8 AC.
BA0.0044
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   300  0.0700   0.600  100.00
RD   220  0.0636   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KK GS23B
KM  0
BA0.0061
PB
* PI
BF -38.7
```

```
LU  0.10  0.2500  15.000
UK   300  0.0700   0.600  100.00
RD   470  0.0638   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KKYWQ25C
KM     COMBINE
HC     3
ZW C=FLOW
*
KK GS25E
KM    GS25E
BA0.0340
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   900  0.1000   0.600  100.00
RD  1000  0.1000   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKY25ECC
KM  0
HC     2
ZW C=FLOW
*
KKGS25A2
KM            1.9 AC.
BA0.0029
PB
* PI
BF -38.7
LU  0.10  0.2500   8.500
UK   300  0.0700   0.600  100.00
RD   700  0.0500   0.060            TRAP     2.0     3.0
ZW C=FLOW
*
KKGS25A1
KM            .4 AC.
BA0.0007
PB
* PI
BF -38.7
LU  0.10  0.2500   8.500
UK   300  0.0700   0.600  100.00
RD  1400  0.0660   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KKGS25A3
KM            1.2 AC.
BA0.0018
PB
* PI
BF -38.7
LU  0.10  0.2500   8.500
UK   300  0.0700   0.600  100.00
RD  1010  0.0620   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KKYC25A3
KM     COMBINE
HC     3
ZW C=FLOW
*
KKVR25A3
KM       ROUTE COMBINED GS25A3
RD   561  0.0238   0.015            CIRC     2.0     0.0
ZW C=FLOW
*
KKGS25D3
KM            1.3 AC.
BA0.0022
PB
* PI
BF -38.7
LU  0.10  0.2500  11.100
UK   300  0.0700   0.600  100.00
RD   900  0.0650   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KKYC25D3
KM     COMBINE
HC     2
ZW C=FLOW
*
KKGS25D2
KM            2.9 AC.
BA0.0045
PB
* PI
BF -38.7
LU  0.10  0.2500   8.500
UK   300  0.0700   0.600  100.00
RD   840  0.0710   0.060            TRAP    10.0     1.0
```

```
ZW C=FLOW
*
KKYC25D2
KM     COMBINE
HC     2
ZW C=FLOW
*
KKGS25D1
KM             4.1 AC
BA0.0062
PB
* PI
BF -38.7
LU  0.10  0.2500   8.500
UK   300  0.0700   0.600  100.00
RD  1520  0.0700   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KKYC25D1
KM     COMBINE
HC     2
ZW C=FLOW
*
KKVR25D1
KM     ROUTE COMBINED GS25D1
RD   923  0.0368   0.015           CIRC     2.0     0.0
ZW C=FLOW
*
KKGS28B2
KM            6.7 AC.
BA0.0105
PB
* PI
BF -38.7
LU  0.10  0.2500   5.250
UK   300  0.0700   0.600  100.00
RD  1780  0.0625   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KKGS27B1
KM         5.5 AC.
BA0.0087
PB
* PI
BF -38.7
LU  0.10  0.2500   8.500
UK   300  0.0700   0.600  100.00
RD  1040  0.0557   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KK YC27B
KM     COMBINE
HC     3
ZW C=FLOW
*
KKGS25C2
KM            3.0 AC
BA0.0047
PB
* PI
BF -38.7
LU  0.10  0.2500   9.930
UK   300  0.0700   0.600  100.00
RD  1800  0.0566   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KKYC25C2
KM     COMBINE
HC     2
ZW C=FLOW
*
KKGS27B3
KM            3.3 AC.
BA0.0052
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   300  0.0700   0.600  100.00
RD   660  0.0720   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KKGS27B2
KM  0
BA0.0053
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   300  0.0700   0.600  100.00
RD   560  0.0640   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KKYQG27B
```

```
KM     COMBINE
HC     3
ZW C=FLOW
*
KKGS25E1
KM    GS25E
BA0.0131
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   900  0.1000   0.600  100.00
RD  1000  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYGS25E
KM  0
HC     2
ZW C=FLOW
*
KK GS30B
KM            1.1 AC
BA0.0018
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   300  0.0700   0.600  100.00
RD   800  0.0350   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KKGS28B1
KM            1.6 AC.
BA0.0025
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   300  0.0700   0.600  100.00
RD  1000  0.0437   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KKYC28B1
KM     COMBINE
HC     2
ZW C=FLOW
*
KKGS28B3
KM            .09 AC.
BA0.0015
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   300  0.0700   0.600  100.00
RD   830  0.0554   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KKYC28B3
KM     COMBINE
HC     2
ZW C=FLOW
*
KKGS28A1
KM            7.6 AC.
BA0.0120
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   300  0.0700   0.600  100.00
RD  1000  0.0690   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KKYQG28B
KM     COMBINE
HC     2
ZW C=FLOW
*
KKGS28A2
KM   GS28A
BA0.0154
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   500  0.0710   0.600      50
UK   200  0.0200   0.240      50
RD   500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYGS28A
KM  0
HC     2
```

```
ZW C=FLOW
*
KKYGS29C
KM  0
HC     2
ZW C=FLOW
*
KK GS30A
KM    GS30
BA0.0427
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   900  0.0560   0.600      89
UK    50  0.0200   0.110      11
RD  1400  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK GS31A
KM   GS31A
BA0.0843
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK  1000  0.0500   0.600      90
UK   200  0.0200   0.400      10
RD  1100  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKYGS31C
KM  0
HC     2
ZW C=FLOW
*
KKYS31CC
KM  0
HC     2
ZW C=FLOW
*
KK  GS32
KM    GS32
BA0.0320
PB
* PI
BF -38.7
LU  0.10  0.2300   2.000
UK   500  0.1000   0.600  100.00
RD  1800  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
* - - - - - -
*
*
KK MD1H3
KM   MD1H3
BA0.0040
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   300  0.1200   0.600      75
UK    50  0.0200   0.110      25
RD   400  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK MD1H2
KM   MD1H2
BA0.0027
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   300  0.1200   0.600      75
UK    50  0.0200   0.110      25
RD   300  0.0500   0.060           TRAP     2.0     2.0
ZW C=FLOW
*
KKYD1H2C
KM  0
HC     2
ZW C=FLOW
*
KK MD1E4
KM   MD1E4
BA0.0132
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   300  0.1000   0.600      87
UK    50  0.0200   0.110      13
RD   600  0.0500   0.060           TRAP     2.0     2.0
```

```
ZW C=FLOW
*
KKYD1H2D
KM  0
HC     2
ZW C=FLOW
*
KK MD1E3
KM   MD1E3
BA0.0039
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   300  0.1000   0.600      78
UK    50  0.0200   0.110      22
RD   500  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKYD1E3C
KM  0
HC     2
ZW C=FLOW
*
KK MD1E2
KM   MD1E2
BA0.0031
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   300  0.1000   0.600      84
UK    50  0.0200   0.110      16
RD   600  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYD1E2C
KM  0
HC     2
ZW C=FLOW
*
KKMD1E1E
KM   MD1E1-2
BA0.0042
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1200  0.1070   0.600  100.00
RD   800  0.0640   0.060            TRAP    10.0     0.0
ZW C=FLOW
*
KK YMD1E
KM  0
HC     2
ZW C=FLOW
*
KKMD1E1C
KM   MD1E1-3
BA0.0686
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1000  0.0800   0.600  100.00
RD  1858  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKMD1E1B
KM   MD1E1-2
BA0.0141
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1200  0.1070   0.600  100.00
RD   800  0.0640   0.060            TRAP    10.0     0.0
ZW C=FLOW
*
KKYM1E1B
KM  0
HC     2
ZW C=FLOW
*
KK MD1H1
KM    MD1H1-1
BA0.0073
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   400  0.0600   0.600  100.00
RD   200  0.0080   0.060            TRAP    10.0    10.0
ZW C=FLOW
```

```
*
KK MD1H4
KM    MD1H1-2
BA0.0049
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   650  0.0600   0.600  100.00
RD   100  0.0030   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKMD1I_1
KM    MD1I-1
BA0.0242
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1000  0.1000   0.600  100.00
RD   350  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYD1H1C
KM  0
HC     3
ZW C=FLOW
*
KK MD1G3
KM   MD1G3
BA0.0096
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   300  0.0800   0.600      90
UK    50  0.0200   0.110      10
RD   600  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYD1G3C
KM  0
HC     2
ZW C=FLOW
*
KKVD1G3R
KM  0
RD  1600  0.0500   0.040            TRAP    10.0    10.0
ZW C=FLOW
*
KK MD1G2
KM   MD1G2
BA0.0033
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   200  0.0800   0.600      72
UK    50  0.0200   0.110      28
RD   300  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKMD1G2B
KM   MD1G2B
BA0.0055
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   200  0.0850   0.600  100.00
RD   300  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKYM1G2B
KM  0
HC     2
ZW C=FLOW
*
KKMD1G1B
KM   MD1G1-2
BA0.0195
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1300  0.0600   0.600  100.00
RD  1568  0.1070   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYM1G1B
KM  0
HC     2
ZW C=FLOW
*
```

```
KKY26OUP
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK GS26A
KM    GS26A
BA0.0074
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   600  0.1000   0.600      85
UK    50  0.0200   0.110      15
RD   400  0.0500   0.060            TRAP     2.0      2.0
ZW C=FLOW
*
KK GS26B
KM    GS26B
BA0.0139
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   600  0.2000   0.600      89
UK    50  0.0200   0.110      11
RD   800  0.0500   0.060            TRAP     2.0      2.0     YES
ZW C=FLOW
*
KK GS26C
KM    GS26C
BA0.0126
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   600  0.2000   0.600      90
UK    50  0.0200   0.110      10
RD   800  0.0500   0.060            TRAP     2.0      2.0     YES
ZW C=FLOW
*
KK GS26D
KM    GS26D
BA0.0144
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   600  0.1000   0.600      89
UK    50  0.0200   0.110      11
RD   400  0.0500   0.060            TRAP     2.0      2.0
ZW C=FLOW
*
KKYS26DC
KM  0
HC     2
ZW C=FLOW
*
KK GS26E
KM    GS26E
BA0.0028
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   300  0.0800   0.600      75
UK    50  0.0200   0.110      25
RD   600  0.0500   0.060            TRAP     2.0      2.0     YES
ZW C=FLOW
*
KK GS26F
KM    GS26F
BA0.0074
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   400  0.1000   0.600      87
UK    50  0.0200   0.110      13
RD   400  0.0500   0.060            TRAP     2.0      2.0     YES
ZW C=FLOW
*
KKGS26N1
KM    GS26N-1
BA0.0046
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   335  0.0200   0.110  100.00
RD   500  0.0500   0.060            TRAP     2.0      2.0
```

```
ZW C=FLOW
*
KK GS26G
KM    GS26G
BA0.0231
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   600  0.1000   0.600      91
UK    50  0.0200   0.110       9
RD   400  0.0500   0.060            TRAP     2.0      2.0     YES
ZW C=FLOW
*
KKYS26NC
KM  0
HC     2
ZW C=FLOW
*
KK GS26H
KM    GS26H
BA0.0026
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   100  0.0800   0.600      75
UK    50  0.0200   0.110      25
RD   500  0.0500   0.060            TRAP     2.0      2.0     YES
ZW C=FLOW
*
KK GS15C
KM    GS15C
BA0.0106
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   600  0.1500   0.600      91
UK    50  0.0200   0.110       9
RD   400  0.0500   0.060            TRAP     2.0      2.0
ZW C=FLOW
*
KK GS15D
KM    GS15D
BA0.0133
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   300  0.1350   0.600      91
UK    50  0.0200   0.110       9
RD   400  0.0500   0.060            TRAP     2.0      2.0     YES
ZW C=FLOW
*
KK GS15A
KM    GS15A
BA0.0913
PB
* PI
BF -38.7
LU  0.10  0.2370   2.000    0.10  0.2370  95.000
UK  1800  0.1200   0.600      97
UK    50  0.0200   0.110       3
RD   600  0.0500   0.060            TRAP     2.0      2.0
ZW C=FLOW
*
KK GS15B
KM    GS15B
BA0.0151
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   400  0.1000   0.600      94
UK    50  0.0200   0.110       6
RD   600  0.0500   0.060            TRAP     2.0      2.0     YES
ZW C=FLOW
*
KKYS15BC
KM  0
HC     2
ZW C=FLOW
*
KKGS16A1
KM    GS16A1
BA0.0190
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   400  0.1000   0.600      96
UK    50  0.0200   0.110       4
RD   500  0.0500   0.060            TRAP     2.0      2.0     YES
```

```
ZW C=FLOW
*
KKGS16A2
KM    GS16A2
BA0.0137
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   400  0.1000   0.600      91
UK    50  0.0200   0.110       9
RD   600  0.0500   0.060            TRAP      2.0      2.0      YES
ZW C=FLOW
*
KK GS16B
KM    GS16B
BA0.0260
PB
* PI
BF -38.7
LU  0.10  0.2330   2.000    0.10  0.2330  95.000
UK  1800  0.1500   0.600      93
UK    50  0.0200   0.110       7
RD   500  0.0500   0.060            TRAP      2.0      2.0
ZW C=FLOW
*
KK GS16C
KM    GS16C
BA0.0141
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   400  0.1500   0.600      89
UK    50  0.0200   0.110      11
RD   400  0.0500   0.060            TRAP      2.0      2.0      YES
ZW C=FLOW
*
KK GS17C
KM    GS17C
BA0.0147
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   600  0.1200   0.600      91
UK    50  0.0200   0.110       9
RD   600  0.0500   0.060            TRAP      2.0      2.0      YES
ZW C=FLOW
*
KK  E6A3
KM    E6A3
BA0.0421
PB
* PI
BF -38.7
LU  0.10  0.1800   2.000    0.10  0.1800  95.000
UK  1800  0.2000   0.600      94
UK    50  0.0200   0.110       6
RD   800  0.0500   0.060            TRAP      2.0      2.0
ZW C=FLOW
*
KK GS12B
KM    GS12B
BA0.0089
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   600  0.1200   0.600      89
UK    50  0.0200   0.110      11
RD   600  0.0500   0.060            TRAP      2.0      2.0      YES
ZW C=FLOW
*
KK GS12C
KM    GS12C
BA0.0068
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   300  0.1200   0.600      70
UK    50  0.0200   0.110      30
RD  1600  0.0500   0.060            TRAP      2.0      2.0
ZW C=FLOW
*
KKY12CCC
KM  0
HC     2
ZW C=FLOW
*
KK GS12F
KM    GS12F
BA0.0082
```

```
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   400  0.1000   0.600      94
UK    50  0.0200   0.110       6
RD   400  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKYS12FC
KM  0
HC     2
ZW C=FLOW
*
KK GS12H
KM    GS12H
BA0.0082
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   800  0.1000   0.600      94
UK    50  0.0200   0.110       6
RD   600  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KK GS12D
KM    GS12D
BA0.0044
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   400  0.1500   0.600      84
UK    50  0.0200   0.110      16
RD   300  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KK GS12E
KM    GS12E
BA0.0044
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   400  0.1500   0.600      90
UK    50  0.0200   0.110      10
RD   400  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KKY12ECC
KM  0
HC     2
ZW C=FLOW
*
KK GS12I
KM    GS12I
BA0.0177
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   800  0.1000   0.600      95
UK    50  0.0200   0.110       5
RD  1000  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKYS12IC
KM  0
HC     2
ZW C=FLOW
*
KKVNTOLK
KM  0
RD  1000  0.0500   0.040            TRAP     2.0     2.0
ZW C=FLOW
*
KKYGS17C
KM  0
HC     2
ZW C=FLOW
*
KKYGS16A
KM  0
HC     2
ZW C=FLOW
*
KK GS17A
KM    GS17A
BA0.0226
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
```

```
UK   800  0.1000   0.600      90
UK    50  0.0200   0.110      10
RD  1000  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKYAKCOM
KM  0
HC     3
ZW C=FLOW
*
*
KKULFDT2
KM   DETENTION AT GS17A
RS     1    FLOW      -1
SV  0.00    0.55    1.91    3.69    7.81
SQ   0.0    60.0   170.0   311.0   630.0
ZW C=FLOW
*
KK GS26N
KM   GS26N-2
BA0.0299
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1419  0.0660   0.600  100.00
RD  1800  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
*
KKUSTDET
KM GOLF LAKE/WET MEADOW AT SOUTH SIDE OF B STREET
* NEW 10-11-04
* NEW 12-04 for 30ft weir @ 6177.2 and low swq below
KO     1
RS     1    ELEV    6176
* SV     0    6.92   8.320   9.821  11.439   13.17
*  sv Revised by BAT 2/15/05 TO REFLECT NORMAL POOL ELEV AT 6176
SA     0    0.01    1.34    1.67    2.15
SE  6166  6175.9    6176    6178    6180
SQ     0    .001    0.50    64.0   217.0   421.0
SE  6166    6176    6177    6178    6179    6180
ZW C=FLOW
*
KKGS26OA
KM    AREA=20.2 AC
BA0.0321
PB
* PI
BF -38.7
LU  0.10  0.2500  86.000    0.10  0.2500  90.000
UK   800  0.0500   0.600      95
UK    50  0.0200   0.110       5
RD   800  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKGS26OB
KM    AREA=3.3 AC UNIT 4A
BA0.0047
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  90.000
UK   600  0.0500   0.600      95
UK    50  0.0200   0.110       5
RD   600  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKYS26OC
KM  0
HC     4
ZW C=FLOW
*
*
KKUPLAKE
KM   CONCERT PARK LAKE
KO     1
RS     1    ELEV    6149
SA  0.01    0.25    0.32    0.36
SE  6140    6148    6149    6150
*  LOW FLOW PIPE (SL RECORD) IS A DUMMY
SL  6146   0.001    0.62     0.5
SS  6148      20     2.6     1.5
ZW C=FLOW
*
KK MD1C2
KM    MD1C2
BA0.0063
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  90.000
UK   250  0.0500   0.600      90
UK    50  0.0200   0.110      10
```

```
RD   300  0.0500   0.060           TRAP     2.0     2.0
ZW C=FLOW
*
KKYMD1C2
KM  0
HC     2
ZW C=FLOW
*
KKGS26L3
KM    AREA=0.7 AC   UNIT 4A
BA0.0012
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  90.000
UK   500  0.0580   0.600      90
UK    50  0.0200   0.110      10
RD   500  0.0500   0.060           TRAP     2.0     2.0
ZW C=FLOW
*
KKYNIT4A
KM  0
HC     2
ZW C=FLOW
*
KKMD1F-1
KM    MD1F-1
BA0.0069
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   600  0.0800   0.600      90
UK    50  0.0200   0.110      10
RD  1000  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK  MD1F
KM    MD1F-2
BA0.0035
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   500  0.0800   0.600      90
UK    50  0.0200   0.110      10
RD  1000  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD1F
KM  0
HC     2
ZW C=FLOW
*
KKMD1D1D
KM    MD1D1D
BA0.0124
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   800  0.0600   0.600  100.00
RD   400  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYD1D1D
KM  0
HC     2
ZW C=FLOW
*
KKMD1D1C
KM    MD1D1C
BA0.0074
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   500  0.0500   0.600  100.00
RD   200  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYD1D1C
KM  0
HC     2
ZW C=FLOW
*
KK  MD1E
KM    MD1E
BA0.0160
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   600  0.0800   0.600      95
```

```
UK    50  0.0200   0.110       5
RD  1000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
*
KKUD1EWQ
KM  0
RS     1    FLOW      -1
SV  0.00    0.25    0.50    0.75
SQ   0.0     0.1    30.0    60.0
ZW C=FLOW
*
KKMD1D1A
KM    MD1D1A
BA0.0059
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   400  0.1200   0.600  100.00
RD   500  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKMD1D1B
KM    MD1D1B
BA0.0028
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   400  0.1200   0.600  100.00
RD   500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYD1D1B
KM  0
HC     2
ZW C=FLOW
*
KK MD1D2
KM    MD1D2
BA0.0077
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   600  0.2000   0.600  100.00
RD  1000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYD1D2D
KM  0
HC     3
ZW C=FLOW
*
KKYD1C2C
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK GS26J
KM    GS26J
BA0.0023
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   230  0.0780   0.600  100.00
RD   250  0.0770   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KK GS26K
KM    GS26K
BA0.0032
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   194  0.0920   0.600  100.00
RD   200  0.0830   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKYGS26K
KM  0
HC     2
ZW C=FLOW
*
KK GS26L
KM    GS26L REVISED AREA = 5.8 AC UNIT 4A
BA0.0091
PB
```

```
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  90.000
UK   500  0.0580   0.600      90
UK    50  0.0200   0.110      10
RD   500  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKYGS26L
KM  0
HC     2
ZW C=FLOW
*
KKGS26L2
KM    GS26L2
BA0.0029
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  90.000
UK   250  0.0470   0.600      90
UK    50  0.0200   0.110      10
RD   250  0.0300   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KK MD1C1
KM    MD1C1
BA0.0155
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  90.000
UK   400  0.0500   0.600      85
UK    50  0.0200   0.110      15
RD  1800  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KKYD1C1C
KM  0
HC     2
ZW C=FLOW
*
*
KKUWLAKE
KM CULTURAL CENTER LAKE LOWER LAKE
* CULTURAL LAKE HAS BEEN RELOCATED AND THE THE GRADING REVISED.
* THE LAKE NOW CONSISTS OF AN UPPER LAKE AND A LOWER LAKE.
* THE UPPER LAKE IS UPLAKE. THIS IS LOWER LAKE.  UPPER LAKE IS
* DESIGNATED UPLAKE
* REVISION DATE 7/7/2006
KO     1
RS     1    ELEV    6133
SA  0.98    2.89    3.08    3.34    3.65    4.01
SE  6119    6133    6134    6136    6138    6140
SQ     0     1.8    10.5    54.1   116.9   194.2   283.6   383.6   493.2
SE  6133  6133.6    6134    6135    6136    6137    6138    6139    6140
ZW C=FLOW
*
*
KKUAINWQ
KM   AT MD1C1
RS     1    FLOW      -1
SV  0.00    0.34    0.69    1.03    1.38    1.83    2.29    2.86    3.44
SQ   0.0     0.5     1.0     8.5    30.0    60.0   100.0   150.0   600.0
ZW C=FLOW
*
KK MD1C4
KM    MD1C4
BA0.0169
PB
* PI
BF -38.7
LU  0.10  0.2240   2.000    0.10  0.2240  90.000
UK   400  0.0500   0.600      95
UK    50  0.0200   0.110       5
RD  1800  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
*
KKU1C4WQ
KM   AT MD1C4
RS     1    FLOW      -1
SV  0.00    0.23    0.51    0.92    1.24    1.60    1.95    2.30
SQ   0.0     0.3     0.5     0.8     1.0     1.5    45.0   500.0
ZW C=FLOW
*
* - - - - - -
*
*
KK   MA1
KM     MA1
BA0.2995
PB
* PI
```

```
BF -38.7
LU  0.10  0.1910   2.000
UK  1600  0.2340   0.600  100.00
RD  3500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK   MA2
KM     MA2
BA0.5483
PB
* PI
BF -38.7
LU  0.10  0.2000   2.000
UK  2200  0.2840   0.600  100.00
RD  4300  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK   MA3
KM     MA3
BA0.6259
PB
* PI
BF -38.7
LU  0.10  0.2290   2.000
UK  2300  0.2720   0.600  100.00
RD  7500  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK   MA4
KM     MA4
BA0.2870
PB
* PI
BF -38.7
LU  0.10  0.2270   2.000
UK  2000  0.3000   0.600  100.00
RD  3300  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK   MA5
KM     MA5
BA0.2025
PB
* PI
BF -38.7
LU  0.10  0.2140   2.000
UK  1500  0.1830   0.600  100.00
RD  2500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK   MA6
KM     MA6
BA0.4152
PB
* PI
BF -38.7
LU  0.10  0.2280   2.000
UK  1800  0.0970   0.600  100.00
RD  3000  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK YMA6C
KM  0
HC     2
ZW C=FLOW
*
KK   MA7
KM     MA7
BA0.2326
PB
* PI
BF -38.7
LU  0.10  0.2330   2.000
UK  3300  0.2270   0.600  100.00
RD  1500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMA7C
KM  0
HC     2
ZW C=FLOW
*
KK   MA8
KM     MA8
BA0.4308
PB
* PI
BF -38.7
LU  0.10  0.1650   2.000
UK  1250  0.3200   0.600  100.00
RD  5500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMA8C
```

```
KM  0
HC     2
ZW C=FLOW
*
KK   MA9
KM     MA9
BA0.0913
PB
* PI
BF -38.7
LU  0.10  0.2370   2.000
UK   600  0.2080   0.600  100.00
RD  1500  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK MA10A
KM    MA10A
BA0.2885
PB
* PI
BF -38.7
LU  0.10  0.2410   2.000    0.10  0.2410  15.000
UK  1600  0.0380   0.600      85
UK   200  0.0200   0.240      15
RD  2800  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK MA10B
KM    MA10B
BA0.0100
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   900  0.0900   0.600      90
UK    50  0.0200   0.110      10
RD   200  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYA10BC
KM  0
HC     2
ZW C=FLOW
*
*
KKU0DCUL
KM  0
RS     1    FLOW      -1
SV  0.00    2.50    5.00    8.50   12.50
SQ   0.0   500.0  1200.0  2300.0  3500.0
ZW C=FLOW
*
* - - - - - -
*
*
KKMB7B3A
KM    MB7B3A
BA0.0051
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   500  0.0800   0.600      95
UK    50  0.0200   0.110       5
RD   550  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKMB7B4A
KM    MB7B4A
BA0.0156
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   500  0.0900   0.600      95
UK    50  0.0200   0.110       5
RD   570  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKMB7B3B
KM    MB7B3B
BA0.0064
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   600  0.0800   0.600      95
UK    50  0.0200   0.110       5
RD   600  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKMB7B4B
KM    MB7B4B
BA0.0044
```

```
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   400  0.0700   0.600      95
UK    50  0.0200   0.110       5
RD   500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYB7B34
KM  0
HC     3
ZW C=FLOW
*
KKMB7B4C
KM    MB7B4C
BA0.0023
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   170  0.0530   0.600      95
UK    50  0.0200   0.110       5
RD   300  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
*
KKUA10EQ
KM  0
RS     1    FLOW      -1
SV  0.00    0.05    0.10    0.15    0.20    0.25
SQ   0.0     0.0     0.0     0.0    30.0    60.0
ZW C=FLOW
*
KKYA10EC
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KKMB7B1A
KM    MB7B1A
BA0.0709
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1300  0.1920   0.600  100.00
RD  3000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKMB7B1C
KM    MB7B1C
BA0.0041
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   400  0.0800   0.600      95
UK    50  0.0200   0.110       5
RD   200  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKMB7B1B
KM    MB7B1B
BA0.0107
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   500  0.0800   0.600      95
UK    50  0.0200   0.110       5
RD   600  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKYMB7B1
KM  0
HC     2
ZW C=FLOW
*
KKMB7B1D
KM    MB7B1D
BA0.0146
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   500  0.0700   0.600      95
UK    50  0.0200   0.110       5
RD   650  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
```

```
KKMB7B1E
KM    MB7B1E
BA0.0054
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   500  0.0500   0.600      95
UK    50  0.0200   0.110       5
RD   350  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
*
KKUB7B1Q
KM  0
RS     1    FLOW      -1
SV  0.00    0.10    0.20    0.30    0.40    0.50
SQ   0.0     0.1     0.1     0.7    20.0    80.0
ZW C=FLOW
*
KK MB7B2
KM    MB7B2
BA0.0216
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK  1300  0.1920   0.600      95
UK    50  0.0200   0.110       5
RD   600  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
*
KKUB7B2Q
KM  0
RS     1    FLOW      -1
SV  0.00    0.33    0.66    1.00    1.33
SQ   0.0     0.2     0.3     0.3   150.0
ZW C=FLOW
*
KKYMB7BC
KM  0
HC     2
ZW C=FLOW
*
*
KKUPONDD
KM  0
RS     1    FLOW      -1
SV  0.00    1.00    2.00    3.00    4.00    5.00    6.00    7.00    8.00
SQ   0.0    50.0   100.0   200.0   400.0   600.0  1000.0  2000.0  4000.0
ZW C=FLOW
*
* - - - - - -
*
*
KK   MB1
KM     MB1
BA0.5333
PB
* PI
BF -38.7
LU  0.10  0.1880   2.000
UK  4000  0.2750   0.600  100.00
RD  2700  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK   MB2
KM     MB2
BA1.2667
PB
* PI
BF -38.7
LU  0.10  0.1920   2.000
UK  2800  0.3390   0.600  100.00
RD  3400  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK   MB3
KM     MB3
BA0.5006
PB
* PI
BF -38.7
LU  0.10  0.2180   2.000
UK  1800  0.2780   0.600  100.00
RD  1600  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK   MB4
KM     MB4
BA0.6535
PB
* PI
```

```
BF -38.7
LU  0.10  0.2450   2.000
UK  1900  0.1840   0.600  100.00
RD  4000  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK   MB5
KM     MB5
BA0.1602
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1800  0.2780   0.600  100.00
RD  1500  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK  MB6A
KM   AREA = 7.0 AC
BA0.0073
PB
* PI
BF -38.7
LU  0.10  0.2500   6.600
UK  1335  0.1543   0.600  100.00
RD   625  0.0800   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
*
KKUB6ADT
KM  0
RS     1    FLOW      -1
SV  0.00    0.15    0.30    0.45
SQ   0.0   100.0   200.0   300.0
ZW C=FLOW
*
KKYMB6AC
KM  0
HC     2
ZW C=FLOW
*
*
KKUB6CUL
KM  0
RS     1    FLOW      -1
SV  0.00    2.50    5.00    8.50   12.50
SQ   0.0   500.0  1100.0  2000.0  3000.0
ZW C=FLOW
*
KK  MB6B
KM   AREA = 3.9 AC
BA0.0061
PB
* PI
BF -38.7
LU  0.10  0.2500  11.800
UK   240  0.0708   0.600  100.00
RD   520  0.0800   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
*
KKUB6BDT
KM  0
RS     1    FLOW      -1
SV  0.00    0.15    0.30    0.45
SQ   0.0   100.0   200.0   300.0
ZW C=FLOW
*
KKYMB6BC
KM  0
HC     2
ZW C=FLOW
*
KK  MB6C
KM   AREA = 3.2 AC
BA0.0039
PB
* PI
BF -38.7
LU  0.10  0.2500   7.600
UK   370  0.1081   0.600  100.00
RD   490  0.0683   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
*
KKUB6CDT
KM  0
RS     1    FLOW      -1
SV  0.00    0.15    0.30    0.45
SQ   0.0   100.0   200.0   300.0
ZW C=FLOW
*
KKYMB6CC
KM  0
```

```
HC     2
ZW C=FLOW
*
KK  MB6D
KM    MB6D
BA0.0223
PB
* PI
BF -38.7
LU  0.10  0.2460   2.000    0.10  0.2460  15.000
UK   200  0.1250   0.600      65
UK   200  0.0200   0.240      35
RD  1500  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK  MB6G
KM  MB6G
BA0.0109
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   500  0.1250   0.600      30
UK   200  0.0200   0.240      70
RD   500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  MB6F
KM  MB6F
BA0.0062
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   500  0.1250   0.600      30
UK   200  0.0200   0.240      70
RD   500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK MB6D1
KM  MB6D1
BA0.0036
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   500  0.1250   0.600      30
UK   200  0.0200   0.240      70
RD   500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMB6D1
KM  0
HC     3
ZW C=FLOW
*
KK  MB6E
KM    MB6E
BA0.0050
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   500  0.1250   0.600      30
UK   200  0.0200   0.240      70
RD   500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMB6E
KM  0
HC     2
ZW C=FLOW
*
*
KKUB6EDT
KM  0
RS     1    FLOW      -1
SV  0.00    0.15    0.30    0.45
SQ   0.0   100.0   200.0   300.0
ZW C=FLOW
*
KKYMB6EC
KM  0
HC     2
ZW C=FLOW
*
KKYMB6DD
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
```

```
KK MB7A1
KM     MB7A1
BA0.1465
PB
* PI
BF -38.7
LU  0.10  0.2080   2.000    0.10  0.2080  95.000
UK  1300  0.1920   0.600      97
UK    50  0.0200   0.110       3
RD  2500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKMB7A2A
KM     MB7A2A
BA0.0247
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   550  0.1920   0.600      92
UK    50  0.0200   0.110       8
RD   580  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKMB7A2B
KM     MB7A2B
BA0.0059
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   300  0.1920   0.600  100.00
RD   500  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
*
KKUB7A2Q
KM  0
RS     1    FLOW      -1
SV  0.00    0.12    0.25    0.38    0.50    0.62
SQ   0.0     0.1     0.1     0.1    20.0   120.0
ZW C=FLOW
*
KK  MB7C
KM     MB7C
BA0.0236
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   200  0.1000   0.600      92
UK    50  0.0200   0.110       8
RD   500  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKMB7D1A
KM     MB7D1A
BA0.0044
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   500  0.1000   0.600      79
UK    50  0.0200   0.110      21
RD   200  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKMB7D1B
KM     MB7D1B
BA0.0025
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   300  0.1000   0.600      79
UK    50  0.0200   0.110      21
RD   400  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYB7D1C
KM  0
HC     2
ZW C=FLOW
*
KK MB7D1
KM     MB7D1
BA0.0011
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   100  0.1000   0.600  100.00
RD   300  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
```

```
*
KK MB7D2
KM     MB7D2
BA0.0215
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   200  0.1000   0.600      95
UK    50  0.0200   0.110       5
RD   500  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKYMB7CC
KM  0
HC     2
ZW C=FLOW
*
KK  MB7E
KM     MB7E
BA0.0585
PB
* PI
BF -38.7
LU  0.10  0.2470   2.000    0.10  0.2470  95.000
UK   200  0.1000   0.600      96
UK    50  0.0200   0.110       4
RD  1500  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
*
KKUB8SWQ
KM  0
RS     1    FLOW      -1
SV  0.00    0.25    0.50    0.75    1.00
SQ   0.0     0.2     0.2     0.2   200.0
ZW C=FLOW
*
KKYMB7EC
KM  0
HC     2
ZW C=FLOW
*
KK   MB8
KM     MB8
BA0.0545
PB
* PI
BF -38.7
LU  0.10  0.2140   2.000    0.10  0.2140  15.000
UK  1000  0.1000   0.600      85
UK   200  0.0200   0.240      15
RD  2500  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
* - - - - - -
*
*
KK   MC1
KM   AREA = 258.6 AC
BA0.4041
PB
* PI
BF -38.7
LU  0.10  0.2390   2.000
UK  1530  0.4281   0.600  100.00
RD  5300  0.2394   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  MC2A
KM   AREA = 59.1 AC
BA0.0923
PB
* PI
BF -38.7
LU  0.10  0.2500   2.200
UK  1035  0.4010   0.600  100.00
RD  2590  0.3421   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMC2AC
KM  0
HC     2
ZW C=FLOW
*
KK  MC2B
KM   AREA = 0.9 AC
BA0.0014
PB
* PI
BF -38.7
LU  0.10  0.2500  10.300
UK   550  0.0764   0.600  100.00
RD   200  0.0800   0.060            TRAP     0.1     1.0
```

```
ZW C=FLOW
*
KK  MC2K
KM  MC2K
BA0.0001
PB
* PI
BF -38.7
LU  0.10  0.2500   4.700
UK  1225  0.1551   0.600  100.00
RD   565  0.0800   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
KK YMC2K
KM  0
HC     2
ZW C=FLOW
*
*
KKUC2BDT
KM  0
RS     1    FLOW      -1
SV  0.00    0.15    0.30    0.45
SQ   0.0   100.0   200.0   300.0
ZW C=FLOW
*
KKYMC2BC
KM  0
HC     2
ZW C=FLOW
*
KK  MD1D
KM     MD1d AREA = 5.9 AC
BA0.0092
PB
* PI
BF -38.7
LU  0.10  0.2500   3.400
UK   800  0.2375   0.600  100.00
RD   190  0.0414   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
KK  MD1B
KM     MD1b AREA = 5.9 AC
BA0.0092
PB
* PI
BF -38.7
LU  0.10  0.2500   3.600
UK   800  0.2375   0.600  100.00
RD   260  0.0414   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
KK YMD1B
KM  0
HC     2
ZW C=FLOW
*
KK MC2A2
KM  MC2A2
BA0.0061
PB
* PI
BF -38.7
LU  0.10  0.2500   4.700
UK  1225  0.1551   0.600  100.00
RD   565  0.0800   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
KKYMC2A2
KM  0
HC     3
ZW C=FLOW
*
KK  MD1C
KM    MD1c AREA = 2.9 AC
BA0.0045
PB
* PI
BF -38.7
LU  0.10  0.2500   7.900
UK   500  0.2178   0.600  100.00
RD   364  0.2178   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK MC2A3
KM  MC2A3
BA0.0044
PB
* PI
BF -38.7
LU  0.10  0.2500   4.700
UK  1225  0.1551   0.600  100.00
RD   565  0.0800   0.060            TRAP     0.1     1.0
```

```
ZW C=FLOW
*
KKYMC2A3
KM  0
HC     3
ZW C=FLOW
*
KK  MC2D
KM   AREA = 7.8 AC
BA0.0122
PB
* PI
BF -38.7
LU  0.10  0.2500   4.700
UK  1225  0.1551   0.600  100.00
RD   565  0.0800   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
*
KKUC2DDT
KM  0
RS     1    FLOW      -1
SV  0.00    0.15    0.30    0.45
SQ   0.0   100.0   200.0   300.0
ZW C=FLOW
*
KK  MC2E
KM   AREA = 3.9 AC
BA0.0060
PB
* PI
BF -38.7
LU  0.10  0.2500   8.500
UK   895  0.1777   0.600  100.00
RD   565  0.0800   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
*
KKUC2EDT
KM  0
RS     1    FLOW      -1
SV  0.00    0.15    0.30    0.45
SQ   0.0   100.0   200.0   300.0
ZW C=FLOW
*
KKYMC2EC
KM  0
HC     2
ZW C=FLOW
*
KK  MC2G
KM   AREA = 9.7 AC
BA0.0151
PB
* PI
BF -38.7
LU  0.10  0.2500  90.000
UK   395  0.2051   0.600  100.00
RD   360  0.0800   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
KK YMC2G
KM  0
HC     2
ZW C=FLOW
*
KK  MC2H
KM   AREA = 2.4 AC
BA0.0038
PB
* PI
BF -38.7
LU  0.10  0.2500   9.500
UK   365  0.1096   0.600  100.00
RD   530  0.0800   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
KKYMC2HC
KM  0
HC     2
ZW C=FLOW
*
KK  MC2L
KM  MC2L
BA0.0519
PB
* PI
BF -38.7
LU  0.10  0.2500  10.300
UK   550  0.0764   0.600  100.00
RD   200  0.0800   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
KK YMC2L
```

```
KM  0
HC     3
ZW C=FLOW
*
KK  MC2I
KM   AREA = 0.7 AC
BA0.0011
PB
* PI
BF -38.7
LU  0.10  0.2500  24.300
UK   225  0.1289   0.600  100.00
RD   100  0.0800   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
KK  MC2J
KM   AREA = 0.6 AC
BA0.0011
PB
* PI
BF -38.7
LU  0.10  0.2500  19.200
UK   225  0.1600   0.600  100.00
RD   310  0.0800   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
KKYMC2IC
KM  0
HC     2
ZW C=FLOW
*
KK YMC2I
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK  MD4A
KM     MD4A
BA0.1163
PB
* PI
BF -38.7
LU  0.10  0.2500   2.500
UK   500  0.4140   0.600  100.00
RD  2399  0.3040   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  MD3C
KM     MD3c AREA = 6.9 AC = 0.01078 SQ MI % IMPERV = 4.6
BA0.0108
PB
* PI
BF -38.7
LU  0.10  0.2500   4.400
UK   500  0.3184   0.600  100.00
RD   737  0.3184   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD3C
KM  0
HC     2
ZW C=FLOW
*
KK  MD3B
KM     MD3b AREA = 8.5 AC = 0.01328 SQ MI % IMPERV = 3.8
BA0.0133
PB
* PI
BF -38.7
LU  0.10  0.2500   3.600
UK   500  0.3073   0.600  100.00
RD  1173  0.3073   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMD3BC
KM  0
HC     2
ZW C=FLOW
*
KK MD3A1
KM     MD3a AREA = 25.4 AC = 0.03969 SQ MI % IMPERV = 2.6
BA0.0397
PB
* PI
BF -38.7
LU  0.10  0.2500   2.500
UK   500  0.3458   0.600  100.00
RD  2530  0.3458   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMD3A1
```

```
KM  0
HC     2
ZW C=FLOW
*
KK MD1A1
KM     MD1a  AREA = 3.0 AC = 0.00469 SQ MI % IMPERV = 7.1
BA0.0047
PB
* PI
BF -38.7
LU  0.10  0.2500   6.400
UK   500  0.2420   0.600  100.00
RD   135  0.2420   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMD1A1
KM  0
HC     2
ZW C=FLOW
*
KK MC2A4
KM   AREA = 59.1 AC
BA0.0022
PB
* PI
BF -38.7
LU  0.10  0.2500   2.200
UK  1035  0.4010   0.600  100.00
RD  2590  0.3421   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMC2A4
KM  0
HC     2
ZW C=FLOW
*
KKYC2A4C
KM  0
HC     2
ZW C=FLOW
*
KK YMD8C
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK MD1B1
KM   MD1B1
BA0.0157
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   800  0.0500   0.600      51
UK    50  0.0200   0.110      49
RD  1000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK MD1B2
KM   MD1B2
BA0.0392
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   800  0.0800   0.600      94
UK    50  0.0200   0.110       6
RD  1000  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKYMD1B2
KM  0
HC     2
ZW C=FLOW
*
KK  MD1A
KM     MD1a  AREA = 3.0 AC = 0.00469 SQ MI % IMPERV = 7.1
BA0.0581
PB
* PI
BF -38.7
LU  0.10  0.1940   6.400
UK   500  0.2420   0.600  100.00
RD   135  0.2420   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD1A
KM  0
HC     2
ZW C=FLOW
*
```

```
KKYMD1C4
KM  0
HC     2
ZW C=FLOW
*
KK  MD2D
KM     MD2D
BA0.0040
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   550  0.0350   0.600      90
UK    50  0.0200   0.110      10
RD   350  0.0300   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KK YMD2D
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK  MD3D
KM     MD3d
BA0.0094
PB
* PI
BF -38.7
LU  0.10  0.2500   8.000
UK   682  0.1610   0.600  100.00
RD   200  0.2350   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKMD1E1A
KM  MD1E1A
BA0.0018
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   600  0.0800   0.600      95
UK    50  0.0200   0.110       5
RD  1000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYD1E1A
KM  0
HC     2
ZW C=FLOW
*
KK   MD6
KM     MD6
BA0.0072
PB
* PI
BF -38.7
LU  0.10  0.2500   7.500
UK   635  0.1560   0.600  100.00
RD   300  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  YMD6
KM  0
HC     2
ZW C=FLOW
*
KK   MD1
KM     MD1  AREA = 5.7 AC = 0.00891 SQ MI % IMPERV = 14.0
BA0.0088
PB
* PI
BF -38.7
LU  0.10  0.2500  13.000
UK   483  0.1451   0.600  100.00
RD   100  0.1451   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  MD2A
KM  MD2A
BA0.0026
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   250  0.0350   0.600      90
UK    50  0.0200   0.110      10
RD   300  0.0400   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KK YMD2A
KM  0
```

```
HC     2
ZW C=FLOW
*
KKYMD6CC
KM  0
HC     2
ZW C=FLOW
*
KK  MD27
KM     MD27
BA0.0048
PB
* PI
BF -38.7
LU  0.10  0.2500  11.000
UK   559  0.0500   0.600  100.00
RD   123  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD27
KM  0
HC     2
ZW C=FLOW
*
KK MD28A
KM     MD28A
BA0.0043
PB
* PI
BF -38.7
LU  0.10  0.2500  15.200
UK   559  0.0500   0.600  100.00
RD   123  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMD28A
KM  0
HC     2
ZW C=FLOW
*
KK MD28B
KM     MD28B
BA0.0092
PB
* PI
BF -38.7
LU  0.10  0.2500   4.800
UK   559  0.0500   0.600  100.00
RD   123  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  MD3A
KM     MD3a AREA = 25.4 AC = 0.03969 SQ MI % IMPERV = 2.6
BA0.0076
PB
* PI
BF -38.7
LU  0.10  0.2500   2.500
UK   500  0.3458   0.600  100.00
RD  2530  0.3458   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMD28B
KM  0
HC     3
ZW C=FLOW
*
KK YMD3A
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK  MD7B
KM     MD7B
BA0.0042
PB
* PI
BF -38.7
LU  0.10  0.2500   9.000
UK   760  0.0500   0.600  100.00
RD   160  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
*
KKUD7BDT
KM  0
RS     1    FLOW      -1
SV  0.00    0.15    0.30    0.45
SQ   0.0   100.0   200.0   300.0
ZW C=FLOW
*
```

```
KK  MD4C
KM     MD4c
BA0.0056
PB
* PI
BF -38.7
LU  0.10  0.2500   8.800
UK   626  0.0500   0.600  100.00
RD   200  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD4C
KM  0
HC     2
ZW C=FLOW
*
KK  MD4E
KM  MD4E
BA0.0016
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1500  0.2830   0.600  100.00
RD  1100  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD4E
KM  0
HC     2
ZW C=FLOW
*
KK  MD4D
KM     MD4d
BA0.0062
PB
* PI
BF -38.7
LU  0.10  0.2500   7.500
UK   895  0.1010   0.600  100.00
RD   350  0.2980   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD4D
KM  0
HC     2
ZW C=FLOW
*
KK   MD9
KM     MD9
BA0.0106
PB
* PI
BF -38.7
LU  0.10  0.2500   7.900
UK   824  0.2530   0.600  100.00
RD   572  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK   MD8
KM     MD8
BA0.0047
PB
* PI
BF -38.7
LU  0.10  0.2500   4.800
UK   519  0.1260   0.600  100.00
RD   354  0.2350   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  YMD8
KM  0
HC     3
ZW C=FLOW
*
KK  YMD9
KM  0
HC     2
ZW C=FLOW
*
KK  MD6A
KM  MD6A
BA0.1279
PB
* PI
BF -38.7
LU  0.10  0.2190   7.500
UK   635  0.1560   0.600  100.00
RD   300  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD6A
KM  0
HC     2
```

```
ZW C=FLOW
*
* - - - - - -
*
*
KK  MD7D
KM     MD7d
BA0.0051
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   500  0.1060   0.600  100.00
RD   723  0.0640   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  MD7C
KM     MD7c
BA0.0061
PB
* PI
BF -38.7
LU  0.10  0.2500   3.200
UK   500  0.1060   0.600  100.00
RD   741  0.0640   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD7C
KM  0
HC     2
ZW C=FLOW
*
KK  MD7E
KM  MD7E
BA0.0094
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK  1200  0.3130   0.600      90
UK  1200  0.3000   0.240      10
RD  2000  0.0200   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD7E
KM  0
HC     2
ZW C=FLOW
*
KK  MD7F
KM  MD7F
BA0.0067
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK  1200  0.3130   0.600      90
UK  1200  0.3000   0.240      10
RD  2000  0.0200   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD7F
KM  0
HC     2
ZW C=FLOW
*
KK  MD11
KM     MD11
BA0.0056
PB
* PI
BF -38.7
LU  0.10  0.2500   4.800
UK   595  0.0500   0.600  100.00
RD   200  0.3330   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD11
KM  0
HC     2
ZW C=FLOW
*
KKYMD7FC
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK  MD2B
KM     MD2B
BA0.0056
PB
```

```
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   690  0.0460   0.600      90
UK    50  0.0200   0.110      10
RD   130  0.0100   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KK  ME3A
KM     ME3A
BA0.0040
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   420  0.0380   0.600      90
UK    50  0.0200   0.110      10
RD   200  0.0300   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KK YME3A
KM  0
HC     2
ZW C=FLOW
*
*
KKUE3CUL
KM  0
RS     1    FLOW      -1
SV  0.00    2.50    5.00    8.50   12.50   17.50
SQ   0.0   500.0  1200.0  2300.0  3500.0  5500.0
ZW C=FLOW
*
KKYME3AC
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK  MD17
KM     MD17
BA0.0075
PB
* PI
BF -38.7
LU  0.10  0.2500   5.700
UK   830  0.1260   0.600  100.00
RD   150  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  MD18
KM    MD18
BA0.0051
PB
* PI
BF -38.7
LU  0.10  0.2500   6.000
UK   930  0.1480   0.600  100.00
RD   200  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  MD19
KM     MD19
BA0.0056
PB
* PI
BF -38.7
LU  0.10  0.2500   6.100
UK  1055  0.2100   0.600  100.00
RD   150  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD19
KM  0
HC     3
ZW C=FLOW
*
KKYMD19C
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK MD2A1
KM     MD2A
BA0.0019
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
```

```
UK   250  0.0350   0.600      90
UK    50  0.0200   0.110      10
RD   300  0.0400   0.060           TRAP     2.0     2.0
ZW C=FLOW
*
KK   MD2
KM     MD2
BA0.0059
PB
* PI
BF -38.7
LU  0.10  0.2500  16.800
UK   295  0.1250   0.600  100.00
RD   200  0.3210   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK  YMD2
KM  0
HC     2
ZW C=FLOW
*
KK ME3A2
KM    ME3A2
BA0.0062
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   500  0.0440   0.600      90
UK    50  0.0200   0.110      10
RD   300  0.0500   0.060           TRAP     2.0     2.0
ZW C=FLOW
*
KK YMD2C
KM  0
HC     2
ZW C=FLOW
*
KKYME3A2
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK  MD13
KM     MD13
BA0.4368
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   500  0.4770   0.600  100.00
RD  5450  0.3010   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKME6_19
KM  ME6_19
BA0.0236
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   330  0.0530   0.600  100.00
RD   522  0.0880   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKME6_14
KM  ME6_14
BA0.0063
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   330  0.0530   0.600  100.00
RD   522  0.0880   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYME614
KM  0
HC     2
ZW C=FLOW
*
KK YMD13
KM  0
HC     2
ZW C=FLOW
*
KK  MD12
KM     MD12
BA0.0428
PB
* PI
```

```
BF -38.7
LU  0.10  0.2500   2.500
UK   500  0.1060   0.600  100.00
RD  2855  0.0640   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD12
KM  0
HC     2
ZW C=FLOW
*
KK MD12B
KM     MD12b
BA0.0024
PB
* PI
BF -38.7
LU  0.10  0.2500  24.700
UK   352  0.2560   0.600  100.00
RD   190  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK MD12C
KM     MD12c
BA0.0084
PB
* PI
BF -38.7
LU  0.10  0.2500   6.500
UK   500  0.2050   0.600  100.00
RD   498  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMD12C
KM  0
HC     2
ZW C=FLOW
*
KK MD14B
KM     MD14b
BA0.0016
PB
* PI
BF -38.7
LU  0.10  0.2500  12.600
UK   500  0.1060   0.600  100.00
RD    42  0.0640   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMD14B
KM  0
HC     2
ZW C=FLOW
*
KK MD14C
KM     MD14c
BA0.0060
PB
* PI
BF -38.7
LU  0.10  0.2500   4.300
UK   500  0.1060   0.600  100.00
RD   406  0.0640   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMD14C
KM  0
HC     3
ZW C=FLOW
*
KKME6_13
KM   1.17 AC
BA0.0022
PB
* PI
BF -38.7
LU  0.10  0.2500   2.900
UK   525  0.1750   0.600  100.00
RD   345  0.0800   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK ME8_3
KM   3.07 AC
BA0.0048
PB
* PI
BF -38.7
LU  0.10  0.2500   7.400
UK   675  0.1640   0.600  100.00
RD   100  0.1700   0.060            TRAP     0.1     2.0
ZW C=FLOW
*
KKYME8_3
KM  0
```

```
HC     2
ZW C=FLOW
*
KK YME83
KM  0
HC     2
ZW C=FLOW
*
KK MD13B
KM  MD13B
BA0.0392
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   500  0.4770   0.600  100.00
RD  5450  0.3010   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMD13B
KM  0
HC     2
ZW C=FLOW
*
KK  MD14
KM     MD14
BA0.0060
PB
* PI
BF -38.7
LU  0.10  0.2500   9.300
UK   663  0.1650   0.600  100.00
RD   280  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK MD14A
KM  MD14A
BA0.0009
PB
* PI
BF -38.7
LU  0.10  0.2500   9.300
UK   663  0.1650   0.600  100.00
RD   280  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMD14A
KM  0
HC     2
ZW C=FLOW
*
KKYD14AC
KM  0
HC     2
ZW C=FLOW
*
KK ME3_5
KM  ME3_5
BA0.0007
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   300  0.1000   0.600      65
UK   300  0.1000   0.240      35
RD  1500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME3_5
KM  0
HC     2
ZW C=FLOW
*
KK  MD15
KM    MD15
BA0.0073
PB
* PI
BF -38.7
LU  0.10  0.2500   9.200
UK   870  0.1590   0.600  100.00
RD   140  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK MD15A
KM  MD15A
BA0.0002
PB
* PI
BF -38.7
LU  0.10  0.2500   9.200
UK   870  0.1590   0.600  100.00
RD   140  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
```

```
*
KKYMD15A
KM  0
HC     2
ZW C=FLOW
*
KK MD16A
KM  MD16A
BA0.0036
PB
* PI
BF -38.7
LU  0.10  0.2500  10.000
UK   772  0.1250   0.600  100.00
RD   150  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMD16A
KM  0
HC     2
ZW C=FLOW
*
KK  MD16
KM     MD16
BA0.0063
PB
* PI
BF -38.7
LU  0.10  0.2500  10.000
UK   772  0.1250   0.600  100.00
RD   150  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD16
KM  0
HC     2
ZW C=FLOW
*
KKYMD16C
KM  0
HC     2
ZW C=FLOW
*
KK MD13C
KM  MD13C
BA0.0068
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   500  0.4770   0.600  100.00
RD  5450  0.3010   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMD13C
KM  0
HC     2
ZW C=FLOW
*
KK  MD20
KM     MD20
BA0.0020
PB
* PI
BF -38.7
LU  0.10  0.2500   9.000
UK   740  0.0500   0.600  100.00
RD   180  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD20
KM  0
HC     2
ZW C=FLOW
*
KKYD13CC
KM  0
HC     2
ZW C=FLOW
*
KK  ME3B
KM     ME3B
BA0.0182
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   300  0.1000   0.600      65
UK   300  0.1000   0.240      35
RD  1500  0.1000   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
* - - - - - -
*
```

```
*
KKGS31B1
KM    GS31B1
BA0.0029
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   580  0.0380   0.600      90
UK    50  0.0200   0.110      10
RD   275  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKGS31B2
KM    GS31B2
BA0.0047
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   690  0.0570   0.600      90
UK    50  0.0200   0.110      10
RD   340  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKGS31B3
KM    GS31B3
BA0.0056
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   530  0.0600   0.600      90
UK    50  0.0200   0.110      10
RD   250  0.0400   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKYGS311
KM  0
HC     3
ZW C=FLOW
*
KKGS31B4
KM    GS31B4
BA0.0012
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   250  0.0480   0.600      90
UK    50  0.0200   0.110      10
RD   150  0.0400   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKGS31B5
KM    GS31B5
BA0.0056
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   500  0.0500   0.600      90
UK    50  0.0200   0.110      10
RD   350  0.0400   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKYGS312
KM  0
HC     3
ZW C=FLOW
*
KKYS31BC
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK ME8_1
KM   0.48 AC
BA0.0007
PB
* PI
BF -38.7
LU  0.10  0.2500  26.000
UK   180  0.0660   0.600  100.00
RD    80  0.0600   0.060            TRAP     0.1     2.0
ZW C=FLOW
*
KK ME3_1
KM  ME3_1
BA0.0009
PB
```

```
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   300  0.1000   0.600      65
UK   300  0.1000   0.240      35
RD  1500  0.1000   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYME3_1
KM  0
HC     2
ZW C=FLOW
*
KK ME3_2
KM  ME3_2
BA0.0024
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   300  0.1000   0.600      65
UK   300  0.1000   0.240      35
RD  1500  0.1000   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYME3_2
KM  0
HC     2
ZW C=FLOW
*
KK ME3_3
KM  ME3_3
BA0.0031
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   300  0.1000   0.600      65
UK   300  0.1000   0.240      35
RD  1500  0.1000   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYME3_3
KM  0
HC     2
ZW C=FLOW
*
KK ME3_4
KM  ME3_4
BA0.0024
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   300  0.1000   0.600      65
UK   300  0.1000   0.240      35
RD  1500  0.1000   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYME3_4
KM  0
HC     2
ZW C=FLOW
*
KK  MD21
KM     MD21
BA0.0033
PB
* PI
BF -38.7
LU  0.10  0.2500   7.200
UK   640  0.0500   0.600  100.00
RD   150  0.3210   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD21
KM  0
HC     2
ZW C=FLOW
*
KK ME3C3
KM  ME3C3
BA0.0066
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   300  0.1000   0.600      65
UK   300  0.1000   0.240      35
RD  1500  0.1000   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYME3C3
KM  0
```

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HC     2
ZW C=FLOW
*
KK ME3C1
KM  ME3C1
BA0.0016
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   300  0.1000   0.600      65
UK   300  0.1000   0.240      35
RD  1500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME3C1
KM  0
HC     2
ZW C=FLOW
*
KKYME3CC
KM  0
HC     2
ZW C=FLOW
*
KK  ME4A
KM     ME4A
BA0.0939
PB
* PI
BF -38.7
LU  0.10  0.2320   2.000    0.10  0.2320  15.000
UK   500  0.1200   0.600      90
UK   300  0.1200   0.240      10
RD  2500  0.1000   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
* - - - - - -
*
*
KKME6_11
KM   0.13 AC
BA0.0002
PB
* PI
BF -38.7
LU  0.10  0.2500  49.100
UK    30  0.0200   0.110  100.00
RD    95  0.0600   0.060            TRAP     0.1    50.0
ZW C=FLOW
*
KKME6_10
KM   0.21 AC
BA0.0003
PB
* PI
BF -38.7
LU  0.10  0.2500  67.300
UK    30  0.0200   0.110  100.00
RD   235  0.0600   0.060            TRAP     0.1    50.0
ZW C=FLOW
*
KKYME610
KM  CME610
HC     2
ZW C=FLOW
*
KKME6_25
KM   7.81 AC
BA0.0094
PB
* PI
BF -38.7
LU  0.10  0.2500   7.100
UK   125  0.1600   0.600  100.00
RD   235  0.1149   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME625
KM  0
HC     2
ZW C=FLOW
*
KKME6_33
KM  ME6_33
BA0.0026
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   330  0.0530   0.600  100.00
RD   522  0.0880   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
```

```
KKYME633
KM  0
HC     2
ZW C=FLOW
*
KKME6_26
KM   0.43 AC
BA0.0008
PB
* PI
BF -38.7
LU  0.10  0.2500   3.000
UK   200  0.1300   0.600  100.00
RD   205  0.1268   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME626
KM  0
HC     2
ZW C=FLOW
*
KK ME7_1
KM   8.34 AC
BA0.0127
PB
* PI
BF -38.7
LU  0.10  0.2500   4.600
UK   470  0.2468   0.600  100.00
RD   340  0.1471   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME7_1
KM  CME7_1
HC     2
ZW C=FLOW
*
KK ME7_2
KM   0.25 AC
BA0.0004
PB
* PI
BF -38.7
LU  0.10  0.2500  83.600
UK    30  0.0200   0.110  100.00
RD   620  0.0800   0.060            TRAP     0.1    50.0
ZW C=FLOW
*
KKYME7_2
KM  0
HC     2
ZW C=FLOW
*
KK ME7D6
KM  ME7D6
BA0.0060
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   500  0.1800   0.600      75
UK   300  0.1800   0.240      25
RD  1000  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME7D6
KM  0
HC     2
ZW C=FLOW
*
KKME7D14
KM  ME7D14
BA0.0037
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   150  0.1300   0.600  100.00
RD   300  0.1200   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKME7D16
KM  ME7D16
BA0.0018
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   177  0.0450   0.600  100.00
RD   430  0.1200   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKME7D15
KM  ME7D15
```

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BA0.0031
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   175  0.0570   0.600  100.00
RD   570  0.1100   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKYM7D14
KM  0
HC     2
ZW C=FLOW
*
KKME7D24
KM  ME7D24
BA0.0022
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   144  0.0900   0.600  100.00
RD   270  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYM7D24
KM  0
HC     2
ZW C=FLOW
*
KKME4B13
KM  ME4B13
BA0.0056
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   270  0.0200   0.600  100.00
RD   515  0.0540   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYM4B13
KM  0
HC     2
ZW C=FLOW
*
KK ME7C4
KM  ME7C4
BA0.0054
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   500  0.1500   0.600       5
UK   300  0.1500   0.240      95
RD  1000  0.1000   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK ME7C5
KM  ME7C5
BA0.0061
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   500  0.1500   0.600       5
UK   300  0.1500   0.240      95
RD  1000  0.1000   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYME7C5
KM  0
HC     2
ZW C=FLOW
*
KK ME4B3
KM  ME4B3
BA0.0029
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   300  0.0500   0.600      15
UK   300  0.0500   0.240      85
RD  2000  0.1000   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYME4B3
KM  0
HC     2
ZW C=FLOW
*
*
KKUE4BDT
```

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KM  0
RS     1    FLOW      -1
SV  0.00    0.15    0.30    0.45
SQ   0.0   100.0   200.0   300.0
ZW C=FLOW
*
KKME4B12
KM  ME4B12
BA0.0065
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   430  0.0180   0.600  100.00
RD   720  0.0700   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME4BC
KM  0
HC     2
ZW C=FLOW
*
KKYM4BCC
KM  0
HC     2
ZW C=FLOW
*
KKME4B23
KM  ME4B23
BA0.0088
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   210  0.0700   0.600  100.00
RD   400  0.0600   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKME4B22
KM  ME4B22
BA0.0074
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   220  0.1000   0.600  100.00
RD   720  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK ME3C2
KM  ME3C2
BA0.0032
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   300  0.1600   0.600      60
UK   300  0.1600   0.240      40
RD  1500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKME4B11
KM  ME4B11
BA0.0049
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   340  0.0530   0.600  100.00
RD   530  0.0750   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKME4B21
KM  ME4B21
BA0.0024
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   220  0.1000   0.600  100.00
RD   720  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKME4B10
KM  ME4B-10
BA0.0027
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   150  0.0800   0.600  100.00
RD   275  0.0700   0.060           TRAP     10.0    10.0
ZW C=FLOW
*
```

```
KK  ME4B
KM     ME4B
BA0.0055
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   300  0.0500   0.600      15
UK   300  0.0500   0.240      85
RD  2000  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YME4B
KM  0
HC     2
ZW C=FLOW
*
KKYME4CC
KM  0
HC     3
ZW C=FLOW
*
KKYM4CCC
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KKMG3_3B
KM  MG3_3B
BA0.1460
PB
* PI
BF -38.7
LU  0.10  0.2500   2.900
UK   575  0.2250   0.600  100.00
RD   925  0.2260   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKMG3_3C
KM  MG3_3C
BA0.0127
PB
* PI
BF -38.7
LU  0.10  0.2500   2.900
UK   575  0.2250   0.600  100.00
RD   925  0.2260   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMG_3C
KM  0
HC     2
ZW C=FLOW
*
KKME6_12
KM   14.48 AC
BA0.0096
PB
* PI
BF -38.7
LU  0.10  0.2500   3.400
UK   600  0.2950   0.600  100.00
RD  1920  0.2495   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME_12
KM  0
HC     2
ZW C=FLOW
*
KKME6_16
KM   10.41 AC
BA0.0002
PB
* PI
BF -38.7
LU  0.10  0.2500   4.400
UK   600  0.2950   0.600  100.00
RD  1595  0.3003   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME_16
KM  0
HC     2
ZW C=FLOW
*
KKME6_18
KM   2.92 AC
BA0.0046
PB
* PI
```

```
BF -38.7
LU  0.10  0.2500  10.200
UK   150  0.2133   0.600  100.00
RD   155  0.1032   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME_18
KM  0
HC     2
ZW C=FLOW
*
KKME6_20
KM   3.75 AC
BA0.0060
PB
* PI
BF -38.7
LU  0.10  0.2500   6.300
UK   200  0.2100   0.600  100.00
RD   155  0.2330   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKME6_24
KM   0.70 AC
BA0.0026
PB
* PI
BF -38.7
LU  0.10  0.2500  18.600
UK   305  0.0910   0.600  100.00
RD   120  0.0300   0.060            TRAP     0.1    50.0
ZW C=FLOW
*
KKYME_24
KM  0
HC     3
ZW C=FLOW
*
KKME6_23
KM   4.19 AC
BA0.0065
PB
* PI
BF -38.7
LU  0.10  0.2500   8.200
UK   200  0.1700   0.600  100.00
RD   265  0.1060   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKME6_32
KM   0.39 AC
BA0.0006
PB
* PI
BF -38.7
LU  0.10  0.2500  33.900
UK    24  0.0200   0.110  100.00
RD   415  0.0800   0.060            TRAP     0.1    50.0
ZW C=FLOW
*
KKYME_32
KM  0
HC     2
ZW C=FLOW
*
KKME6_28
KM   4.93 AC
BA0.0077
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   355  0.1130   0.600  100.00
RD   590  0.1010   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK ME627
KM   1.77 AC
BA0.0027
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   120  0.1070   0.600  100.00
RD   400  0.1057   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME627
KM  0
HC     2
ZW C=FLOW
*
KKME6_29
KM   1.37 AC
```

```
BA0.0021
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   370  0.1140   0.600  100.00
RD   335  0.0930   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYME_29
KM  0
HC     2
ZW C=FLOW
*
KKME6_30
KM   1.27 AC
BA0.0020
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   295  0.0880   0.600  100.00
RD   195  0.0790   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKME6A25
KM  ME6A25
BA0.0029
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   330  0.0530   0.600  100.00
RD   522  0.0880   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYM6A25
KM  0
HC     2
ZW C=FLOW
*
KK  ME7B
KM     ME7B
BA0.0270
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   400  0.0500   0.600      75
UK   300  0.0500   0.240      25
RD  1500  0.1000   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
*
KKUE7BDT
KM  0
RS     1    FLOW      -1
SV  0.00    0.15    0.30    0.45
SQ   0.0   100.0   200.0   300.0
ZW C=FLOW
*
KK  ME7A
KM     ME7A
BA0.1404
PB
* PI
BF -38.7
LU  0.10  0.2270   2.000    0.10  0.2270  15.000
UK  1300  0.1920   0.600      10
UK   300  0.1900   0.240      90
RD  3000  0.1000   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKYME7AC
KM  0
HC     2
ZW C=FLOW
*
KK YGSMC
KM  0
HC     2
ZW C=FLOW
*
KKVGSMCR
KM  0
RD  2000  0.0100   0.040           TRAP    10.0    10.0
ZW C=FLOW
*
KK   MF1
KM     MF1
BA0.3780
PB
* PI
BF -38.7
```

```
LU  0.10  0.2050   2.000
UK  1500  0.0870   0.600  100.00
RD  2000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMF1C
KM  0
HC     2
ZW C=FLOW
*
KKVMF1CR
KM  0
RD  2000  0.0100   0.040            TRAP    10.0    10.0
ZW C=FLOW
*
KK   MF2
KM     MF2
BA0.0582
PB
* PI
BF -38.7
LU  0.10  0.2470   2.000
UK  1000  0.0700   0.600  100.00
RD  2000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMF2C
KM  0
HC     2
ZW C=FLOW
*
KKVMF2CR
KM  0
RD  3000  0.0100   0.040            TRAP    10.0    10.0
ZW C=FLOW
*
* - - - - - -
*
*
KKMD4_1A
KM     MD4
BA0.1899
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1500  0.2830   0.600  100.00
RD  1100  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKMG4_1B
KM     6.35 AC
BA0.0100
PB
* PI
BF -38.7
LU  0.10  0.2500   2.100
UK   500  0.3500   0.600  100.00
RD   491  0.4296   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKMG5_2A
KM   8.61 AC
BA0.0134
PB
* PI
BF -38.7
LU  0.10  0.2500   3.200
UK   600  0.2033   0.600  100.00
RD  1065  0.3014   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMG52A
KM  0
HC     3
ZW C=FLOW
*
KK MG3_1
KM   1.78 AC
BA0.0028
PB
* PI
BF -38.7
LU  0.10  0.2500   5.400
UK   500  0.2800   0.600  100.00
RD  1070  0.3293   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKMG3_1A
KM   1.00 AC
BA0.0016
PB
* PI
BF -38.7
```

```
LU  0.10  0.2500   5.400
UK   498  0.2800   0.600  100.00
RD   575  0.3270   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYMG31A
KM  0
HC     2
ZW C=FLOW
*
KKMG3_1C
KM   1.47 AC
BA0.0023
PB
* PI
BF -38.7
LU  0.10  0.2500   5.400
UK   498  0.2811   0.600  100.00
RD   567  0.3422   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYMG31C
KM  0
HC     2
ZW C=FLOW
*
KK MG3_6
KM   0.09 AC
BA0.0002
PB
* PI
BF -38.7
LU  0.10  0.2500  90.000
UK    30  0.0200   0.110  100.00
RD   360  0.0120   0.060           TRAP     0.1     1.0
ZW C=FLOW
*
KK YMG36
KM  0
HC     2
ZW C=FLOW
*
KK MG4_2
KM   4.61 AC
BA0.0072
PB
* PI
BF -38.7
LU  0.10  0.2500   3.100
UK   500  0.2840   0.600  100.00
RD   535  0.3551   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK YMG42
KM  0
HC     2
ZW C=FLOW
*
KKMG4_3B
KM  MG4_3B
BA0.0002
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK  2300  0.3260   0.600      95
UK   600  0.2500   0.240       5
RD  2500  0.1000   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYMG43B
KM  0
HC     2
ZW C=FLOW
*
KKMG4_3A
KM   0.07 AC
BA0.0001
PB
* PI
BF -38.7
LU  0.10  0.2500  90.000
UK    30  0.0200   0.110  100.00
RD   250  0.0098   0.060           TRAP     0.1     1.0
ZW C=FLOW
*
KKYMG43A
KM  0
HC     2
ZW C=FLOW
*
KKMG5_2B
KM   0.06 AC
BA0.0001
```

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PB
* PI
BF -38.7
LU  0.10  0.2500  90.000
UK    12  0.0100   0.600  100.00
RD   400  0.0500   0.060            TRAP    10.0    50.0
ZW C=FLOW
*
KK MG4_4
KM   0.10 AC
BA0.0002
PB
* PI
BF -38.7
LU  0.10  0.2500  90.000
UK    30  0.0200   0.110  100.00
RD   350  0.0098   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
KK YMG44
KM  0
HC     2
ZW C=FLOW
*
KKMG4_5C
KM  MG4_5C
BA0.0078
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK  2300  0.3260   0.600      95
UK   600  0.2500   0.240       5
RD  2500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMG45C
KM  0
HC     4
ZW C=FLOW
*
KKMG5_1A
KM   18.98 AC
BA0.0296
PB
* PI
BF -38.7
LU  0.10  0.2500   2.800
UK   600  0.1550   0.600  100.00
RD  1820  0.2357   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKMG5_1B
KM  MG5_1B
BA0.0090
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   200  0.1000   0.600       5
UK   200  0.1000   0.240      95
RD   500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMG51B
KM  0
HC     2
ZW C=FLOW
*
KK MG5_3
KM   0.04 AC
BA0.0001
PB
* PI
BF -38.7
LU  0.10  0.2500  90.000
UK    30  0.0200   0.110  100.00
RD   300  0.0775   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
KK MG5_4
KM   0.15 AC
BA0.0003
PB
* PI
BF -38.7
LU  0.10  0.2500  90.000
UK    30  0.0200   0.110  100.00
RD   300  0.0775   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
KK YMG54
KM  0
HC     3
```

```
ZW C=FLOW
*
KK MG5_5
KM  MG5_5
BA0.0024
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   200  0.1000   0.600       5
UK   200  0.1000   0.240      95
RD   500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMG55
KM  0
HC     2
ZW C=FLOW
*
KKYMG55C
KM  0
HC     2
ZW C=FLOW
*
KKMG3_3A
KM   8.25 AC
BA0.0129
PB
* PI
BF -38.7
LU  0.10  0.2500   2.900
UK   575  0.2250   0.600  100.00
RD   925  0.2260   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK MG3_2
KM   2.58 AC
BA0.0040
PB
* PI
BF -38.7
LU  0.10  0.2500   6.100
UK   390  0.2051   0.600  100.00
RD   370  0.3000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK MG3_4
KM   014 AC
BA0.0002
PB
* PI
BF -38.7
LU  0.10  0.2500  88.800
UK    30  0.0200   0.110  100.00
RD   300  0.0691   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
KK YMG34
KM  0
HC     3
ZW C=FLOW
*
KKMG3_1B
KM   0.87 AC
BA0.0014
PB
* PI
BF -38.7
LU  0.10  0.2500   5.400
UK   500  0.2800   0.600  100.00
RD   300  0.3467   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKMG3_1D
KM   0.57 AC
BA0.0009
PB
* PI
BF -38.7
LU  0.10  0.2500   5.400
UK   504  0.2778   0.600  100.00
RD   360  0.3083   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK MG3_5
KM   0.07 AC
BA0.0001
PB
* PI
BF -38.7
LU  0.10  0.2500  90.000
UK    30  0.0200   0.110  100.00
RD   350  0.0094   0.060            TRAP     0.1     1.0
ZW C=FLOW
```

```
*
KK YMG35
KM  0
HC     3
ZW C=FLOW
*
KKMG3_5A
KM  MG3_5A
BA0.0073
PB
* PI
BF -38.7
LU  0.10  0.2500   2.900
UK   575  0.2250   0.600  100.00
RD   925  0.2260   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMG35A
KM  0
HC     3
ZW C=FLOW
*
KK ME6_1
KM   10.24 AC
BA0.0082
PB
* PI
BF -38.7
LU  0.10  0.2500   3.900
UK   310  0.1740   0.600  100.00
RD   250  0.1640   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK ME6_2
KM   1.28 AC
BA0.0099
PB
* PI
BF -38.7
LU  0.10  0.2500   6.900
UK   505  0.1940   0.600  100.00
RD   235  0.0800   0.060            TRAP     0.1    50.0
ZW C=FLOW
*
KK ME6_3
KM   0.02 AC
BA0.0003
PB
* PI
BF -38.7
LU  0.10  0.2500  86.500
UK    15  0.0200   0.600  100.00
RD   235  0.0800   0.060            TRAP     0.1    50.0
ZW C=FLOW
*
KKYM6123
KM  0
HC     3
ZW C=FLOW
*
KK ME6_5
KM   1.40 AC
BA0.0022
PB
* PI
BF -38.7
LU  0.10  0.2500  16.500
UK   160  0.1500   0.600  100.00
RD   365  0.0800   0.060            TRAP     0.1    50.0
ZW C=FLOW
*
KK YME65
KM  0
HC     2
ZW C=FLOW
*
KK ME6_7
KM   0.81 AC
BA0.0013
PB
* PI
BF -38.7
LU  0.10  0.2500  16.200
UK   190  0.1680   0.600  100.00
RD   145  0.1100   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YME67
KM  0
HC     2
ZW C=FLOW
*
KK ME6_8
KM    .44 AC
```

```
BA0.0007
PB
* PI
BF -38.7
LU  0.10  0.2500  87.800
UK    20  0.0200   0.600  100.00
RD   555  0.0560   0.060            TRAP    10.0    50.0
ZW C=FLOW
*
KK YME68
KM  0
HC     2
ZW C=FLOW
*
KK MG1_2
KM   0.67 AC
BA0.0010
PB
* PI
BF -38.7
LU  0.10  0.2500  11.100
UK   100  0.1400   0.600  100.00
RD   255  0.1686   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK MG1_3
KM   1.89 AC
BA0.0025
PB
* PI
BF -38.7
LU  0.10  0.2500   9.500
UK   300  0.0700   0.600  100.00
RD   205  0.2293   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK MG1_1
KM   1.38 AC
BA0.0026
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   185  0.1946   0.600  100.00
RD   205  0.0600   0.060            TRAP     0.1     2.0
ZW C=FLOW
*
KK MG1_4
KM   0.18 AC
BA0.0003
PB
* PI
BF -38.7
LU  0.10  0.2500  46.900
UK    30  0.0200   0.110  100.00
RD   295  0.0800   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
KKYG1234
KM  0
HC     5
ZW C=FLOW
*
KKMG3_33
KM  MG3_33
BA0.0087
PB
* PI
BF -38.7
LU  0.10  0.2500   2.900
UK   575  0.2250   0.600  100.00
RD   925  0.2260   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMG33
KM  0
HC     2
ZW C=FLOW
*
KKME6_8A
KM  ME6_8A
BA0.0006
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   330  0.0530   0.600  100.00
RD   522  0.0880   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME68A
KM  0
HC     3
ZW C=FLOW
```

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*
KK   MG2
KM     MG2
BA0.1195
PB
* PI
BF -38.7
LU  0.10  0.2450   2.000    0.10  0.2450  15.000
UK   700  0.1430   0.600      90
UK   700  0.1400   0.240      10
RD  1500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  YMG2
KM  0
HC     3
ZW C=FLOW
*
* - - - - - -
*
*
KK ME6_6
KM   0.16 AC
BA0.0003
PB
* PI
BF -38.7
LU  0.10  0.2500  73.000
UK    30  0.0200   0.110  100.00
RD   340  0.0800   0.060            TRAP     0.1    50.0
ZW C=FLOW
*
KKME6_21
KM   2.50 AC
BA0.0039
PB
* PI
BF -38.7
LU  0.10  0.2500  12.000
UK   200  0.1250   0.600  100.00
RD   235  0.1490   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKME6_31
KM   0.44 AC
BA0.0007
PB
* PI
BF -38.7
LU  0.10  0.2500  42.900
UK    24  0.0200   0.110  100.00
RD   480  0.0800   0.060            TRAP     0.1    50.0
ZW C=FLOW
*
KKYME631
KM  0
HC     3
ZW C=FLOW
*
KKMG1B19
KM  MG1B19
BA0.0072
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   150  0.0400   0.600  100.00
RD   780  0.1300   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKMG1B20
KM  MG1B20
BA0.0039
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   240  0.0800   0.600  100.00
RD   710  0.1200   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  ME6A
KM     ME6A
BA0.0030
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   300  0.1200   0.600      50
UK   300  0.1200   0.240      50
RD  1500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YME6A
```

```
KM  0
HC     3
ZW C=FLOW
*
KKMG1B26
KM  MG1B26
BA0.0038
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   250  0.0960   0.600  100.00
RD   550  0.0910   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK  MG1B
KM     MG1B
BA0.0119
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   300  0.1000   0.600      50
UK   200  0.1000   0.240      50
RD   800  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKME6A27
KM  ME6A27
BA0.0094
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   230  0.0950   0.600  100.00
RD   520  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMG1B
KM  0
HC     3
ZW C=FLOW
*
KK  MG1A
KM     MG1A
BA0.0185
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   200  0.1000   0.600      50
UK   200  0.1000   0.240      50
RD  1000  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMG1A
KM  0
HC     2
ZW C=FLOW
*
KK YMGCC
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK MG5B1
KM  MG5B1
BA0.1242
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   200  0.1000   0.600       5
UK   200  0.1000   0.240      95
RD   500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK MG5A2
KM  MG5A2
BA0.0613
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   200  0.1000   0.600       5
UK   200  0.1000   0.240      95
RD   500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMG5A2
KM  0
```

```
HC     2
ZW C=FLOW
*
KK  MG6B
KM     MG6B
BA0.0479
PB
* PI
BF -38.7
LU  0.10  0.2010   2.000    0.10  0.2010  15.000
UK  1000  0.2500   0.600      85
UK   400  0.2500   0.240      15
RD  1500  0.1000   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK MG5A1
KM  MG5A1
BA0.0134
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   200  0.1000   0.600       5
UK   200  0.1000   0.240      95
RD   500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMG5A1
KM  0
HC     2
ZW C=FLOW
*
KK YMGCC
KM  0
HC     2
ZW C=FLOW
*
KK   MG7
KM     MG7
BA0.1439
PB
* PI
BF -38.7
LU  0.10  0.2070   2.160
UK   600  0.2500   0.600  100.00
RD  3500  0.0100   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK NS24A
KM  NS24A
BA0.0297
PB
* PI
BF -38.7
LU  0.10  0.2500   2.080
UK   900  0.1000   0.600  100.00
RD  1000  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK NS24B
KM  NS24B
BA0.0120
PB
* PI
BF -38.7
LU  0.10  0.2500   5.580
UK   300  0.1000   0.600  100.00
RD   500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS24B
KM  0
HC     2
ZW C=FLOW
*
KK NS24C
KM  NS24C
BA0.0400
PB
* PI
BF -38.7
LU  0.10  0.1820   2.680
UK   800  0.1000   0.600  100.00
RD  1000  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS24C
KM  0
HC     3
ZW C=FLOW
*
KK  NS25
KM  NS25
BA0.0370
```

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PB
* PI
BF -38.7
LU  0.10  0.2490   2.140
UK   800  0.0500   0.600  100.00
RD  1200  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YNS25
KM  0
HC     2
ZW C=FLOW
*
KK  NS26
KM  NS26
BA0.1102
PB
* PI
BF -38.7
LU  0.10  0.1220   2.800
UK  1000  0.0500   0.600  100.00
RD  1500  0.0200   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YNS26
KM  0
HC     3
ZW C=FLOW
*
*
KKUW4END
KM  ROUTE FOR BACKWATER AT NW4
RS     1    FLOW      -1
SV  0.00    0.46    1.70    6.66   46.30  520.00
SQ   0.0   178.0  1833.0  2500.0  4382.0  8550.0
ZW C=FLOW
*
* - - - - - -
*
*
KK NS22A
KM  NS22A
BA0.0103
PB
* PI
BF -38.7
LU  0.10  0.2500   2.830
UK   750  0.1000   0.600  100.00
RD  1000  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK NS22C
KM  NS22C
BA0.0063
PB
* PI
BF -38.7
LU  0.10  0.2500   4.580
UK   300  0.1000   0.600  100.00
RD   500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS22C
KM  0
HC     2
ZW C=FLOW
*
KK NS23A
KM  NS23A
BA0.0374
PB
* PI
BF -38.7
LU  0.10  0.1900   2.000
UK   950  0.0700   0.600  100.00
RD  1100  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS23A
KM  0
HC     2
ZW C=FLOW
*
KK  NS27
KM  NS27
BA0.0574
PB
* PI
BF -38.7
LU  0.10  0.1000   2.180
UK   830  0.0300   0.600  100.00
RD  1000  0.0200   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
```

```
KK YNS27
KM  0
HC     4
ZW C=FLOW
*
KK NS28B
KM  NS28B
BA0.0417
PB
* PI
BF -38.7
LU  0.10  0.1000   2.000
UK   500  0.0100   0.600  100.00
RD  1000  0.0100   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  E85Z
KM  E85Z
BA0.0291
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   400  0.0200   0.600  100.00
RD   500  0.0500   0.060            TRAP    20.0    10.0
ZW C=FLOW
*
KKYNS28B
KM  0
HC     3
ZW C=FLOW
*
KK NS28A
KM  NS28A
BA0.0415
PB
* PI
BF -38.7
LU  0.10  0.1000   2.000
UK   500  0.0100   0.600  100.00
RD  1000  0.0100   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS28A
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK  NS22
KM  NS22
BA0.2037
PB
* PI
BF -38.7
LU  0.10  0.2500   2.070
UK  2100  0.0800   0.600  100.00
RD  2500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  NS31
KM  NS31
BA0.0592
PB
* PI
BF -38.7
LU  0.10  0.2500   2.370
UK  1250  0.1000   0.600  100.00
RD  1300  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YNS31
KM  0
HC     2
ZW C=FLOW
*
KK NS22B
KM  NS22B
BA0.0098
PB
* PI
BF -38.7
LU  0.10  0.2500   4.910
UK   500  0.1000   0.600  100.00
RD   500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS22B
KM  0
HC     2
ZW C=FLOW
*
```

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KK NS23B
KM  NS23B
BA0.1061
PB
* PI
BF -38.7
LU  0.10  0.1910   2.040
UK  1350  0.0500   0.600  100.00
RD  1500  0.0200   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS23B
KM  0
HC     2
ZW C=FLOW
*
KK NS32A
KM  NS32A
BA0.0191
PB
* PI
BF -38.7
LU  0.10  0.2500   3.080
UK   500  0.1000   0.600  100.00
RD  1000  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK NS32B
KM  NS32B
BA0.1481
PB
* PI
BF -38.7
LU  0.10  0.1650   2.130
UK  1500  0.0800   0.600  100.00
RD  2500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS32B
KM  0
HC     3
ZW C=FLOW
*
KK   NS1
KM   BASIN 1 - 330 Ac
BA0.5174
PB
* PI
BF -38.7
LU  0.10  0.1780   2.000    0.10  0.1780   2.000
UK  3300  0.2400   0.800      57
UK  3300  0.2400   0.600      43
RD  2800  0.1800   0.060            TRAP     5.0     3.0
RD  2800  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
*
KKUR-NS1
KM   ROUTE NS-1
RS     1    FLOW      -1
SV  0.70    1.10    1.50    1.90    2.20    2.80    3.90    4.90
SQ 100.0   200.0   300.0   400.0   500.0   700.0  1100.0  1500.0
ZW C=FLOW
*
KK   NS2
KM   BASIN 2 - 267 Ac
BA0.4184
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500   2.000
UK  2800  0.2500   0.800      54
UK  2800  0.2500   0.600      46
RD  2200  0.1600   0.060            TRAP     5.0     3.0
RD  2200  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KKYCMB-2
KM   COMBINE NS-1 & 2
HC     2
ZW C=FLOW
*
*
KKUCMB-2
KM   ROUTE CMB-2
RS     1    FLOW      -1
SV  0.70    1.00    1.40    1.70    2.00    2.50    3.40    4.30
SQ 100.0   200.0   300.0   400.0   500.0   700.0  1100.0  1500.0
ZW C=FLOW
*
KK   NS3
KM   BASIN 3 - 331 Ac
BA0.5218
PB
```

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* PI
BF -38.7
LU  0.10  0.2500  65.000    0.10  0.2500   2.000
UK  2950  0.1800   0.240       3
UK  2950  0.1800   0.600      98
RD  3000  0.2000   0.060            TRAP     5.0     3.0
RD  3000  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KKYCMB-3
KM   COMBINE NS-1 THRU 3
HC     2
ZW C=FLOW
*
*
KKUCMB-3
KM   ROUTE CMB-3
RS     1    FLOW      -1
SV  1.40    2.30    3.00    3.70    4.20    5.70    7.70    9.20
SQ 100.0   200.0   300.0   400.0   500.0   700.0  1100.0  1500.0
ZW C=FLOW
*
KK   NS4
KM   BASIN 4 - 166 Ac
BA0.2602
PB
* PI
BF -38.7
LU  0.10  0.2500  65.000    0.10  0.2500   2.000
UK  2110  0.2200   0.240      29
UK  2110  0.2200   0.600      71
RD  2500  0.1000   0.060            TRAP     5.0     3.0
RD  2500  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KKYCMB-4
KM   COMBINE NS-1 THRU 4
HC     2
ZW C=FLOW
*
*
KKUCMB-4
KM   ROUTE CMB-4
RS     1    FLOW      -1
SV  0.20    0.30    0.40    0.40    0.50    0.60    2.20    2.90
SQ 100.0   200.0   300.0   400.0   500.0   700.0  1100.0  1500.0
ZW C=FLOW
*
KK   NS5
KM   BASIN 5 - 21 Ac
BA0.0319
PB
* PI
BF -38.7
LU  0.10  0.2500  65.000    0.10  0.2500   2.000
UK  1400  0.2500   0.240      36
UK  1400  0.2500   0.600      64
RD   700  0.1400   0.060            TRAP     5.0     3.0
RD   700  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KKYCMB-5
KM   COMBINE NS-1 THRU 5
HC     2
ZW C=FLOW
*
*
KKUCMB-5
KM   ROUTE CMB-5
RS     1    FLOW      -1
SV  0.40    0.60    0.80    1.10    1.30    1.60    2.30    2.90
SQ 100.0   200.0   300.0   400.0   500.0   700.0  1100.0  1500.0
ZW C=FLOW
*
KK   NS6
KM   BASIN 6 - 178 Ac
BA0.2162
PB
* PI
BF -38.7
LU  0.10  0.2500  65.000    0.10  0.2500   2.000
UK  3100  0.2700   0.240      71
UK  3100  0.2700   0.600      29
RD  3100  0.1600   0.060            TRAP     5.0     3.0
RD  3100  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KKVR-NS6
KM   ROUTE NS-6
RD   970  0.0700   0.015            TRAP     1.0     1.0
ZW C=FLOW
*
KK   NS7
KM   BASIN 7 - 38 Ac
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BA0.0602
PB
* PI
BF -38.7
LU  0.10  0.2500  65.270    0.10  0.2500   2.000
UK  1570  0.1900   0.240      69
UK  1570  0.1900   0.600      31
RD   800  0.0800   0.060            TRAP     2.0     1.0
RD   800  0.0010   0.060            TRAP     2.0     1.0
ZW C=FLOW
*
KKYCMB-7
KM   COMBINE NS-6 & 7
HC     2
ZW C=FLOW
*
KKYMB-7A
KM   COMBINE NS-1 THRU 7
HC     2
ZW C=FLOW
*
*
KKUCMB7A
KM   ROUTE CMB-7A
RS     1    FLOW      -1
SV  0.60    1.10    1.40    1.70    2.10    2.60    3.60    4.60
SQ 100.0   200.0   300.0   400.0   500.0   700.0  1100.0  1500.0
ZW C=FLOW
*
KK   NS8
KM   BASIN 8 - 673 Ac
BA1.1304
PB
* PI
BF -38.7
LU  0.10  0.2390   2.000    0.10  0.2390   2.000
UK  4200  0.2100   0.800      92
UK  4200  0.2100   0.600       9
RD  1900  0.0800   0.060            TRAP     5.0     3.0
RD  1900  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
*
KKURES-A
KM   RESERVOIR A
RS     1    FLOW      -1
SV  0.00    3.40    6.80   10.20   13.60   17.00   20.40   23.80   27.20   34.00
SQ   0.0    23.9    67.5   124.0   190.0   266.0   350.0   441.0   540.0   754.0
ZW C=FLOW
*
KKV-RESA
KM   ROUTE RES-A
RD  1400  0.1100   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KK   NS9
KM   BASIN 9 - 144 Ac
BA0.1855
PB
* PI
BF -38.7
LU  0.10  0.2490   2.000
UK  4400  0.2000   0.600  100.00
RD  1200  0.1100   0.060            TRAP     5.0     3.0
RD  1200  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KKYCMB-9
KM   COMBINE NS-8 & 9
HC     2
ZW C=FLOW
*
KKVCMB-9
KM   ROUTE CMB-9
RD  2800  0.1100   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KK  NS10
KM   BASIN 10 - 214 Ac
BA0.3581
PB
* PI
BF -38.7
LU  0.10  0.2230   2.000
UK  3905  0.2000   0.600  100.00
RD  2200  0.0900   0.060            TRAP     5.0     3.0
RD  2200  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KKYMB-10
KM   COMBINE NS-8 THRU 10
HC     2
ZW C=FLOW
*
```

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KKVCMB10
KM   ROUTE CMB-10
RD  3600  0.0800   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KK  NS11
KM   BASIN 11 - 60 Ac
BA0.0389
PB
* PI
BF -38.7
LU  0.10  0.2490  65.000    0.10  0.2490   2.000
UK  1600  0.3400   0.240       6
UK  1600  0.3400   0.600      95
RD  3600  0.0800   0.060            TRAP     5.0     3.0
RD  3600  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KKYMB-11
KM   COMBINE NS-8 THRU 11
HC     2
ZW C=FLOW
*
KKYMB11A
KM   COMBINE NS-1 THRU 11
HC     2
ZW C=FLOW
*
*
KKUCM11A
KM   ROUTE CMB11A
RS     1    FLOW      -1
SV  0.20    0.30    0.50    0.60    0.70    0.90    1.20    1.60
SQ 100.0   200.0   300.0   400.0   500.0   700.0  1100.0  1500.0
ZW C=FLOW
*
KK NS11B
KM   BASIN 11 - 60 Ac
BA0.0546
PB
* PI
BF -38.7
LU  0.10  0.2500  65.000    0.10  0.2500   2.000
UK  1600  0.3400   0.240       6
UK  1600  0.3400   0.600      95
RD  3600  0.0800   0.060            TRAP     5.0     3.0
RD  3600  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KKYNS11B
KM  0
HC     2
ZW C=FLOW
*
KK  NS12
KM   BASIN 12 - 40 Ac
BA0.0619
PB
* PI
BF -38.7
LU  0.10  0.2500  65.340    0.10  0.2500   2.000
UK   400  0.1000   0.240      71
UK   400  0.1000   0.800      30
RD  1500  0.0700   0.060            TRAP     5.0     3.0
RD  1500  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KKYMB-12
KM   COMBINE NS-1 THRU 12
HC     2
ZW C=FLOW
*
KK  NS13
KM   BASIN 13 - 15 Ac
BA0.1459
PB
* PI
BF -38.7
LU  0.10  0.2500  65.200    0.10  0.2500  98.000
UK   500  0.1600   0.240      86
UK   500  0.1600   0.110      14
RD   900  0.1300   0.060            TRAP     5.0     3.0
RD   900  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KKV-NS13
KM   ROUTE NS-13
RD  1400  0.0800   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KK  NS14
KM   BASIN 14 - 47 Ac
BA0.0434
PB
```

```
* PI
BF -38.7
LU  0.10  0.2500  65.980    0.10  0.2500  98.000
UK   775  0.3500   0.240      90
UK   775  0.3500   0.110      10
RD   800  0.0600   0.060            TRAP     5.0     3.0
RD   800  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KKYMB-14
KM   COMBINE NS-13 & 14
HC     2
ZW C=FLOW
*
KK NS14B
KM  NS14B
BA0.0204
PB
* PI
BF -38.7
LU  0.10  0.2500   2.860
UK   500  0.1000   0.600  100.00
RD   500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMB14A
KM   COMBINE NS-1 THRU 14
HC     3
ZW C=FLOW
*
KK NS20B
KM  NS20B
BA0.0322
PB
* PI
BF -38.7
LU  0.10  0.2500   3.400
UK   640  0.1000   0.600  100.00
RD  1000  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  NS15
KM  NS15
BA0.0860
PB
* PI
BF -38.7
LU  0.10  0.2500   2.400
UK  1000  0.0800   0.600  100.00
RD  1500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YNS15
KM  0
HC     2
ZW C=FLOW
*
KKYNS15C
KM  0
HC     2
ZW C=FLOW
*
KK  NS16
KM  NS16
BA0.1019
PB
* PI
BF -38.7
LU  0.10  0.2460   2.000
UK  1600  0.1000   0.600  100.00
RD  2100  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  NS17
KM  NS17
BA0.0811
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1500  0.0800   0.600  100.00
RD  1200  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YNS17
KM  0
HC     2
ZW C=FLOW
*
KK  NS18
KM  NS18
BA0.1877
PB
* PI
```

```
BF -38.7
LU  0.10  0.2500   2.000
UK  3200  0.1000   0.600  100.00
RD  3000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  NS19
KM  NS19
BA0.0434
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1600  0.0500   0.600  100.00
RD  1000  0.0400   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YNS19
KM  0
HC     2
ZW C=FLOW
*
KKYNS19C
KM  0
HC     2
ZW C=FLOW
*
KK  NS20
KM  NS20
BA0.0548
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   600  0.0800   0.600  100.00
RD  1200  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YNS20
KM  0
HC     2
ZW C=FLOW
*
KKYNS20C
KM  0
HC     2
ZW C=FLOW
*
KK  NS21
KM  NS21
BA0.1390
PB
* PI
BF -38.7
LU  0.10  0.2480   2.130
UK  1450  0.0500   0.600  100.00
RD  2500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YNS21
KM  0
HC     2
ZW C=FLOW
*
KK NS30D
KM  NS30D
BA0.0577
PB
* PI
BF -38.7
LU  0.10  0.2500   2.500
UK   900  0.0800   0.600  100.00
RD  1400  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK NS30A
KM  NS30A
BA0.0266
PB
* PI
BF -38.7
LU  0.10  0.2440   2.780
UK   800  0.0800   0.600  100.00
RD  1600  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS30A
KM  0
HC     2
ZW C=FLOW
*
KKYS30CC
KM  0
HC     2
```

```
ZW C=FLOW
*
KK NS30B
KM  NS30B
BA0.1400
PB
* PI
BF -38.7
LU  0.10  0.2360   2.060
UK  1600  0.1000   0.600  100.00
RD  2000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS30B
KM  0
HC     2
ZW C=FLOW
*
KK NS30E
KM  NS30E
BA0.0022
PB
* PI
BF -38.7
LU  0.10  0.2500   4.370
UK   200  0.1000   0.600  100.00
RD   500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS30E
KM  0
HC     2
ZW C=FLOW
*
KK NS30F
KM  NS30F
BA0.0023
PB
* PI
BF -38.7
LU  0.10  0.2500   5.380
UK   200  0.1000   0.600  100.00
RD   500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS30F
KM  0
HC     2
ZW C=FLOW
*
KK NS30C
KM  NS30C
BA0.1237
PB
* PI
BF -38.7
LU  0.10  0.1510   2.010
UK  1600  0.0800   0.600  100.00
RD  2000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS30C
KM  0
HC     2
ZW C=FLOW
*
KKY30CCC
KM  0
HC     2
ZW C=FLOW
*
KK NS33B
KM  NS33B
BA0.0301
PB
* PI
BF -38.7
LU  0.10  0.1000   2.000
UK  1000  0.0500   0.600  100.00
RD  1000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS33B
KM  0
HC     2
ZW C=FLOW
*
KKYNSALL
KM  0
HC     2
ZW C=FLOW
*
*
KKUW5END
```

```
KM  ROUTE FOR BACKWATER AT NW5
RS     1    FLOW      -1
SV  0.00    0.75   54.40  131.20  377.00 1086.00
SQ   0.0   267.0  2853.0  3500.0  6287.0  9653.0
ZW C=FLOW
*
* - - - - - -
*
*
KK  NS34
KM  NS34
BA0.0437
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   900  0.0800   0.600  100.00
RD   900  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  NS35
KM  NS35
BA0.1517
PB
* PI
BF -38.7
LU  0.10  0.1850   2.000
UK  1900  0.0500   0.600  100.00
RD  2500  0.0400   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YNS35
KM  0
HC     2
ZW C=FLOW
*
KK XMAR1
KM  XMAR1
BA0.2922
PB
* PI
BF -38.7
LU  0.10  0.2440   2.000
UK  1900  0.1000   0.600  100.00
RD  2000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK XMAR2
KM  XMAR2
BA0.4066
PB
* PI
BF -38.7
LU  0.10  0.2410   2.000
UK  2200  0.1000   0.600  100.00
RD  3100  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK XMAR3
KM  XMAR3
BA0.6221
PB
* PI
BF -38.7
LU  0.10  0.2480   2.000
UK  3500  0.1000   0.600  100.00
RD  3400  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK XMAR4
KM  XMAR4
BA0.2489
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  2300  0.1000   0.600  100.00
RD  1100  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK XMAR5
KM  XMAR5
BA0.3335
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1700  0.1000   0.600  100.00
RD  2600  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMAR5
KM  0
HC     2
```

```
ZW C=FLOW
*
KK XMAR6
KM  XMAR6
BA0.1147
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1500  0.1000   0.600  100.00
RD  1650  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK XMAR7
KM  XMAR7
BA0.3439
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  2800  0.1000   0.600  100.00
RD  1400  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMAR7
KM  0
HC     2
ZW C=FLOW
*
KK XMAR8
KM  XMAR8
BA0.2218
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  2200  0.1000   0.600  100.00
RD  3500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMAR8
KM  0
HC     2
ZW C=FLOW
*
KK XMAR9
KM  XMAR9
BA0.2500
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  2100  0.1000   0.600  100.00
RD  3400  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKXMAR10
KM  XMAR10
BA0.2272
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  2300  0.1000   0.600  100.00
RD  2400  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKXMAR11
KM  XMAR11
BA0.1037
PB
* PI
BF -38.7
LU  0.10  0.1850   2.000
UK  1100  0.1000   0.600  100.00
RD  1500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMAR11
KM  0
HC     2
ZW C=FLOW
*
KKXMAR12
KM  XMAR12
BA0.1361
PB
* PI
BF -38.7
LU  0.10  0.2060   2.000
UK  1250  0.1000   0.600  100.00
RD  2200  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
```

```
KKXMAR13
KM  XMAR13
BA0.2679
PB
* PI
BF -38.7
LU  0.10  0.2490   2.000
UK  1800  0.1000   0.600  100.00
RD  4000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMAR13
KM  0
HC     2
ZW C=FLOW
*
KKYMARC1
KM  0
HC     2
ZW C=FLOW
*
KKXMAR14
KM  XMAR14
BA0.0483
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   500  0.1000   0.600  100.00
RD   500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKXMAR15
KM  XMAR15
BA0.0140
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   500  0.1000   0.600  100.00
RD   500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMAR15
KM  0
HC     3
ZW C=FLOW
*
KKXMAR17
KM  XMAR17
BA0.2288
PB
* PI
BF -38.7
LU  0.10  0.2200   2.000
UK  1300  0.1000   0.600  100.00
RD  2700  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMAR17
KM  0
HC     2
ZW C=FLOW
*
KKMAR19A
KM  MAR19A
BA0.0295
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1000  0.1000   0.600  100.00
RD  1000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKMAR19B
KM  MAR19B
BA0.0074
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   500  0.1000   0.600  100.00
RD  1000  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKXMAR18
KM  XMAR18
BA0.1517
PB
* PI
BF -38.7
LU  0.10  0.2480   2.000
UK  1600  0.1000   0.600  100.00
```

```
RD  2500  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYMAR18
KM  0
HC     3
ZW C=FLOW
*
KKXMAR20
KM  XMAR20
BA0.2009
PB
* PI
BF -38.7
LU  0.10  0.2440   2.000
UK  1700  0.1000   0.600  100.00
RD  2700  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKMAR21A
KM  MAR21A
BA0.0602
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   500  0.1000   0.600  100.00
RD   500  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKMAR21B
KM  MAR21B
BA0.0241
PB
* PI
BF -38.7
LU  0.10  0.2450   2.000
UK   500  0.1000   0.600  100.00
RD  1000  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK YR21B
KM  0
HC     2
ZW C=FLOW
*
* SA Note: Use New Overflow analysis instead
* DIVERT At Upstream Highway Crossing, where water can't cross under roadway
KK N11DV
DTN11DIV
DI     0     190     200     800    1600    5000
DQ     0       1       5     604    1403    4802
ZW C=FLOW
*
KKMAR22B
KM  MAR22B
BA0.0266
PB
* PI
BF -38.7
LU  0.10  0.2300   2.000
UK   500  0.1000   0.600  100.00
RD  1000  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKMAR22A
KM  MAR22A
BA0.0165
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   500  0.1000   0.600  100.00
RD   500  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK YR22A
KM  0
HC     2
ZW C=FLOW
*
KKXMAR23
KM  XMAR23
BA0.0439
PB
* PI
BF -38.7
LU  0.10  0.1380   2.000
UK   500  0.0500   0.600  100.00
RD  2000  0.0200   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKYMAR23
KM  0
```

```
HC     2
ZW C=FLOW
*
*
KK UWEND
KM  ROUTE FOR BACKWATER AT W1
RS     1    FLOW      -1
SV  0.00   10.00   49.20  292.00  859.70  867.00
SQ   0.0    18.0   239.0   244.0   250.0  1034.0
ZW C=FLOW
*
KKXMAR24
KM  XMAR24
BA0.0055
PB
* PI
BF -38.7
LU  0.10  0.1000   2.000
UK   200  0.0200   0.600  100.00
RD   500  0.0100   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKXMAR25
KM  XMAR25
BA0.0147
PB
* PI
BF -38.7
LU  0.10  0.1260   2.000
UK  1000  0.0200   0.600  100.00
RD  1000  0.0100   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYMAR25
KM  0
HC     3
ZW C=FLOW
*
KK NS33A
KM  NS33A
BA0.0118
PB
* PI
BF -38.7
LU  0.10  0.1970   2.000
UK  1000  0.0200   0.600  100.00
RD  1000  0.0200   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS33A
KM  0
HC     2
ZW C=FLOW
*
*
KK  UHWY
KM  ROUTE FOR BACKWATER AT HWY
RS     1    FLOW      -1
SV  0.00    0.13    0.60   32.40   61.60  114.60  266.00  330.00
SQ   0.0   200.0   491.0  3074.0  4293.0  5718.0  8410.0  9000.0
* SV  0.00    0.13    0.60   32.40   61.60  114.60  265.30  266.00  330.00
* SQ   0.0   200.0   491.0  3074.0  4293.0  5718.0  5847.0  8410.0  9000.0
ZW C=FLOW
*
KKN11DIV
DRN11DIV
ZW C=FLOW
*
*
KK  E30A
KM  Drains Away
BA0.0064
PB
* PI
BF -38.7
LU  0.10  0.2500  10.060
UK   600  0.0380   0.600  100.00
RD  1900  0.0140   0.060           TRAP    15.0    10.0
ZW C=FLOW
*
* ----------END---------------
*
*
ZZ
```

B-1B. HEC-1 Post-Project PDP Input WARM EVENT HIGHWAY TRAIL ALTERNATIVE

```
ID PLACER COUNTY WATERSHED MODEL, PLACER COUNTY, CA
ID WATERSHED UPDATE MODELS - DRAFT ULT BUILDOUT
ID DRAFT MODEL FOR HYD ROUTING - HEC1VOLS UTILITY
ID CESI 2/22/2012
ID
IT     5 13FEB08       0     300
IO     5               0
IN     5       0       0
*DIAGRAM
*
*
KK    E2
KM    Large Offsite Shed  155.8ac
BA0.2434
PB
* PI
BF -38.7
LU  0.10  0.2110   2.000
UK  1500  0.0830   0.600  100.00
RD  4000  0.0300   0.060            TRAP     2.0    25.0
ZW C=FLOW
*
KK   E15
KM   Other Large Upstream offsite shed 111.1 ac
BA0.1736
PB
* PI
BF -38.7
LU  0.10  0.1470   2.000
UK  1000  0.0580   0.600  100.00
RD  2500  0.0300   0.060            TRAP     2.0    10.0     YES
ZW C=FLOW
*
KK   E10
KM    Large Undeveloped upstream watershed. (139.2)
BA0.0311
PB
* PI
BF -38.7
LU  0.10  0.1790   2.000
UK  2000  0.0750   0.600  100.00
RD  3200  0.0700   0.060   .0500    TRAP    20.0    40.0
RD  3300  0.0010   0.040   .1500    TRAP    20.0    20.0
ZW C=FLOW
*
KK YE10C
KM    Upstream of Project
HC     2
ZW C=FLOW
*
KK VE12R
KM    ROUTE TO BOTTOM OF E20
RD  1500  0.0170   0.040            TRAP    15.0     5.0
ZW C=FLOW
*
KK  E20A
KM    12.0 AC
BA0.0106
PB
* PI
BF -38.7
LU  0.10  0.2430   3.000
UK  1200  0.0580   0.600  100.00
RD   700  0.0170   0.060            TRAP    15.0     5.0
ZW C=FLOW
*
KK YE20A
KM  0
HC     2
ZW C=FLOW
*
KK  E14A
KM    Small Roadway Shed 4 ac
BA0.0063
PB
* PI
BF -38.7
LU  0.10  0.1000  10.000
UK   500  0.0300   0.600  100.00
RD   500  0.0300   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  E18A
KM    Small Hopkins Roadway Drain 3.6ac
BA0.0057
PB
* PI
BF -38.7
LU  0.10  0.2070  10.000
UK   450  0.0300   0.600  100.00
RD   500  0.0300   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK  E16A
```

```
KM    Small Hopkins Roadway Drain 0.4ac
BA0.0006
PB
* PI
BF -38.7
LU  0.10  0.2130  90.000
UK    50  0.0200   0.600  100.00
RD   100  0.0300   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYE16AC
KM  0
HC     2
ZW C=FLOW
*
KK  E20B
KM    10.9 AC
BA0.0182
PB
* PI
BF -38.7
LU  0.10  0.2000   5.000
UK   800  0.0700   0.600  100.00
RD   200  0.0170   0.060            TRAP    15.0     5.0
ZW C=FLOW
*
KK YE20B
KM  0
HC     2
ZW C=FLOW
*
KKVE16AR
KM    ROUTE TO BOTTOM OF E20
RD  2000  0.0170   0.040            TRAP    15.0     5.0
ZW C=FLOW
*
KK  E20C
KM    4.8 AC
BA0.0075
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  90.000
UK   500  0.0500   0.600      90
UK    18  0.0200   0.110      10
RD   200  0.0170   0.060   .0500    TRAP    15.0     5.0
RD   500  0.0010   0.040            TRAP    15.0     5.0
ZW C=FLOW
*
KK YE20C
KM  0
HC     3
ZW C=FLOW
*
KK  E20D
KM    10.6 AC
BA0.0166
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000    0.10  0.2500  90.000
UK   500  0.0500   0.600      89
UK    18  0.0200   0.110      11
RD   200  0.0170   0.060   .0500    TRAP    15.0     5.0
RD   600  0.0010   0.040            TRAP    15.0     5.0
ZW C=FLOW
*
KK  E20E
KM    8.4 AC Mostly diverted area added to this shed
BA0.0132
PB
* PI
BF -38.7
LU  0.10  0.2500  12.000    0.10  0.2500  90.000
UK   900  0.0200   0.600      90
UK    18  0.0200   0.110      10
RD   200  0.0170   0.060   .0500    TRAP    15.0     5.0
RD   600  0.0010   0.040            TRAP    15.0     5.0
ZW C=FLOW
*
KK YE20D
KM  0
HC     3
ZW C=FLOW
*
KK   E30
KM    MAIN SHED ABOVE TWIN CULVERTS IN S. MILL RD.  40.8AC
BA0.0638
PB
* PI
BF -38.7
LU  0.10  0.2500   8.990
UK   600  0.0380   0.600  100.00
RD  1900  0.0140   0.060            TRAP    15.0    10.0     YES
```

```
ZW C=FLOW
*
KK   E19
KM    HILLSIDE ABOVE SM RD.     4.2AC
BA0.0065
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  90.000
UK   400  0.0180   0.600      89
UK    18  0.0200   0.110      11
RD   570  0.0140   0.060            TRAP     2.0    25.0
RD   550  0.0010   0.012            CIRC     1.0     0.0      NO
ZW C=FLOW
*
KK VE19R
KM    ROUTE TO BOTTOM OF E20
RD   600  0.0400   0.040            TRAP    10.0    40.0
ZW C=FLOW
*
KK   E21
KM    HILLSIDE ABOVE ROAD           5.7AC
BA0.0084
PB
* PI
BF -38.7
LU  0.10  0.2500   7.000    0.10  0.2500  90.000
UK   600  0.0170   0.600      74
UK    18  0.0200   0.110      26
RD   800  0.0150   0.060            TRAP     2.0    25.0
RD   800  0.0010   0.015            TRAP     2.0    25.0      NO
ZW C=FLOW
*
KK  YE21
KM  0
HC     2
ZW C=FLOW
*
KK   E22
KM  "  HILLSIDE ABOVE 15"" CULVERT   2.9AC                                               "
BA0.0045
PB
* PI
BF -38.7
LU  0.10  0.2500   7.000
UK   350  0.0270   0.600  100.00
RD   250  0.0300   0.060            TRAP     2.0    10.0      NO
ZW C=FLOW
*
KK YE22C
KM    COMBINE E21 AND E22
HC     2
ZW C=FLOW
*
KK VE22R
KM    ROUTE TO BOTTOM OF E30
RD   700  0.0140   0.040            TRAP    15.0    10.0
ZW C=FLOW
*
KK   E23
KM    PORTION OF S.MILL RD.     0.5AC
BA0.0008
PB
* PI
BF -38.7
LU  0.10  0.2500  90.000
UK    18  0.0200   0.110  100.00
RD   500  0.0240   0.060            TRAP     2.0    25.0      NO
ZW C=FLOW
*
KK  YE23
KM  0
HC     2
ZW C=FLOW
*
KK VE23R
KM    ROUTE TO BOTTOM OF E30
RD   400  0.0140   0.040            TRAP    15.0    10.0
ZW C=FLOW
*
KK YE30C
KM     COMBINE AT BOTTOM OF E30
HC     2
ZW C=FLOW
*
*
KKUE30CR
KM  0
RS     1    FLOW      -1
SV  0.00    0.54    0.84    1.03    1.34    1.56    1.82    2.09    7.48
SQ   0.0    73.0   104.0   125.0   153.0   173.0   195.0   217.0   700.0
ZW C=FLOW
*
KK   E40
```

```
KM    LARGE SHED DOWNSTREAM OF S. MILL RD.    85.5Ac
BA0.1147
PB
* PI
BF -38.7
LU  0.10  0.1800   8.480
UK  1600  0.0340   0.600  100.00
RD   600  0.0400   0.060   .0100    TRAP    10.0    40.0
RD  3000  0.0010   0.040            TRAP    40.0    20.0     YES
ZW C=FLOW
*
KK  E40B
KM    LARGE SHED DOWNSTREAM OF S. MILL RD.    85.5Ac
BA0.0190
PB
* PI
BF -38.7
LU  0.10  0.2480  10.920
UK   600  0.0100   0.600  100.00
RD   600  0.0400   0.060   .0100    TRAP    10.0    40.0
RD  1000  0.0010   0.040            TRAP    40.0    20.0
ZW C=FLOW
*
KKYE40BC
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK  E14C
KM    OFF-SITE SHED WEST OF S. MILL RD.    3.6AC
BA0.0059
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   600  0.0800   0.600  100.00
RD   500  0.0070   0.060   .0030    TRAP     2.0    25.0
RD   500  0.0010   0.040            TRAP     2.0    10.0      NO
ZW C=FLOW
*
KK VE60R
KM    ROUTE TO MAIN CHANNEL OF E64
RD  1100  0.0700   0.060            TRAP    40.0    40.0
ZW C=FLOW
*
KK  E64A
KM    EAST OF S. MILL RD.      16.1AC
BA0.0248
PB
* PI
BF -38.7
LU  0.10  0.1590  14.000    0.10  0.1590  90.000
UK  1000  0.0500   0.600      94
UK    18  0.0200   0.110       6
RD  1000  0.0700   0.060   .0140    TRAP    40.0    40.0
RD   500  0.0010   0.040            TRAP    20.0    10.0
ZW C=FLOW
*
KK YE64A
KM  0
HC     2
ZW C=FLOW
*
KK  E64B
KM    EAST OF S. MILL RD.      12.1AC
BA0.0190
PB
* PI
BF -38.7
LU  0.10  0.1750  15.000    0.10  0.1750  90.000
UK   800  0.0700   0.600      97
UK    18  0.0200   0.110       3
RD  1000  0.0700   0.060   .0140    TRAP    40.0    40.0
RD   500  0.0010   0.040            TRAP    20.0    10.0
ZW C=FLOW
*
KK YE64B
KM  0
HC     2
ZW C=FLOW
*
KK VE64R
KM    ROUTE TO MAIN CHANNEL OF E75
RD  1000  0.0350   0.040            TRAP    40.0    10.0
ZW C=FLOW
*
* - - - - - -
*
*
KK   E70
KM    OFF-SITE- LAHONTAN UNITS 7&8 AND LAHONTAN II    78.6AC
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```
BA0.1255
PB
* PI
BF -38.7
LU  0.10  0.1710   8.000    0.10  0.1710  90.000
UK  1200  0.0410   0.600      95
UK    18  0.0200   0.110       5
RD   450  0.0140   0.060   .0100    TRAP     2.0    25.0
RD  1800  0.0010   0.040            TRAP    20.0    10.0      NO
ZW C=FLOW
*
KK   E71
KM    OFF-SITE PORTION OF LAHONTAN II    17.8Ac
BA0.0279
PB
* PI
BF -38.7
LU  0.10  0.2270  19.100
UK  1400  0.0500   0.600  100.00
RD   700  0.0300   0.060   .0070    TRAP     2.0    25.0
RD   400  0.0010   0.040   .0150    TRAP     2.0     5.0
ZW C=FLOW
*
KK   E72
KM    OFF-SITE PORTION OF LAHONTAN II   12.1Ac
BA0.0178
PB
* PI
BF -38.7
LU  0.10  0.1980   9.600
UK  1700  0.0370   0.600  100.00
RD   850  0.0530   0.060   .0100    TRAP    20.0    20.0
RD   700  0.0010   0.040            TRAP    10.0    20.0      NO
ZW C=FLOW
*
KKYE7012
KM  0
HC     2
ZW C=FLOW
*
KK VE72R
KM    ROUTE TO MAIN CHANNEL OF E75
RD   750  0.0300   0.040            TRAP    40.0    10.0
ZW C=FLOW
*
KKY72&64
KM    ROUTE TO MAIN CHANNEL OF E75
HC     2
ZW C=FLOW
*
KK   E75
KM    MOSTLY OFF-SITE AND DOWNSTREAM SHED  57.9Ac
BA0.0905
PB
* PI
BF -38.7
LU  0.10  0.1910   3.200
UK  1200  0.0580   0.600  100.00
RD   600  0.0500   0.060   .0050    TRAP    20.0    20.0
RD  1400  0.0010   0.040            TRAP    10.0    50.0     YES
ZW C=FLOW
*
KK  YE75
KM  0
HC     2
ZW C=FLOW
*
*
KKUE75CR
KM  0
RS     1    FLOW      -1
SV  0.00    0.33    0.45    0.52    0.61    0.67    0.73    0.79    0.87    2.95
SQ   0.0    24.0    35.0    42.0    51.0    58.0    66.0    73.0    83.0   400.0
ZW C=FLOW
*
* - - - - - -
*
*
KK  E14B
KM    OFF-SITE SHED WEST OF S. MILL RD.
BA0.0397
PB
* PI
BF -38.7
LU  0.10  0.1920   2.000
UK   800  0.0800   0.600  100.00
RD   800  0.0300   0.060   .0200    TRAP    40.0    40.0
RD   400  0.0010   0.040            TRAP     2.0     6.0      NO
ZW C=FLOW
*
KK VE50R
KM    ROUTE TO MAIN CHANNEL OF E55
RD   850  0.0700   0.060            TRAP    40.0    40.0
ZW C=FLOW
```

```
*
KK  E55A
KM    EAST OF S. MILL RD.   16.7AC
BA0.0261
PB
* PI
BF -38.7
LU  0.10  0.1360  20.000
UK   500  0.0400   0.600  100.00
RD   400  0.0700   0.060   .0070    TRAP    40.0    40.0
RD   500  0.0010   0.040            TRAP    10.0     5.0
ZW C=FLOW
*
KK YE55A
KM  0
HC     2
ZW C=FLOW
*
*
KKUE55AR
KM  0
RS     1    FLOW      -1
SV  0.00    0.08    0.10    0.12    0.14    0.15    0.16    0.17    0.30
SQ   0.0    18.0    25.0    30.0    36.0    41.0    45.0    49.0    80.0
ZW C=FLOW
*
KK  E58D
KM    EAST OF S. MILL RD.   23.7AC
BA0.0229
PB
* PI
BF -38.7
LU  0.10  0.2500   9.500
UK   800  0.0400   0.600  100.00
RD   400  0.0700   0.060   .0070    TRAP    40.0    40.0
RD  1400  0.0010   0.040            TRAP    10.0     5.0
ZW C=FLOW
*
KK YE58D
KM  0
HC     2
ZW C=FLOW
*
KK  E55B
KM    EAST OF S. MILL RD.   3.2AC
BA0.0050
PB
* PI
BF -38.7
LU  0.10  0.1920  40.000
UK   200  0.0500   0.600  100.00
RD   400  0.0700   0.060   .0070    TRAP    40.0    40.0
RD   500  0.0010   0.040            TRAP    10.0     5.0
ZW C=FLOW
*
KK  E55C
KM    EAST OF S. MILL RD.   7.7AC
BA0.0120
PB
* PI
BF -38.7
LU  0.10  0.2470  22.000
UK   200  0.0500   0.600  100.00
RD   400  0.0700   0.060   .0070    TRAP    40.0    40.0
RD   500  0.0010   0.040            TRAP    10.0     5.0
ZW C=FLOW
*
KK YE55C
KM  0
HC     2
ZW C=FLOW
*
*
KKU55CCR
KM  0
RS     1    FLOW      -1
SV  0.00    0.55    0.76    0.91    1.13    1.28    1.62    2.09    2.89
SQ   0.0    20.0    28.0    34.0    42.0    47.0    53.0    59.0    80.0
ZW C=FLOW
*
KK  E55E
KM    EAST OF S. MILL RD.   3.6AC
BA0.0056
PB
* PI
BF -38.7
LU  0.10  0.2500  25.000
UK   300  0.0200   0.600  100.00
RD   400  0.0700   0.060   .0070    TRAP    40.0    40.0
RD   500  0.0010   0.040            TRAP    10.0     5.0
ZW C=FLOW
*
KK YE55E
KM  0
```

```
HC     2
ZW C=FLOW
*
KK  E55F
KM    EAST OF S. MILL RD.   1.8AC
BA0.0028
PB
* PI
BF -38.7
LU  0.10  0.2500  25.000
UK   250  0.0300   0.600  100.00
RD   200  0.0700   0.060   .0070    TRAP    40.0    40.0
RD   300  0.0010   0.040            TRAP    10.0     5.0
ZW C=FLOW
*
KK  E55G
KM    EAST OF S. MILL RD.   1AC
BA0.0015
PB
* PI
BF -38.7
LU  0.10  0.2500  11.000
UK   150  0.0200   0.600  100.00
RD   200  0.0700   0.060   .0070    TRAP    40.0    40.0
RD   300  0.0010   0.040            TRAP    10.0     5.0
ZW C=FLOW
*
KKYE55GC
KM  0
HC     2
ZW C=FLOW
*
KK YE55G
KM  0
HC     2
ZW C=FLOW
*
*
KKUE55CR
KM  0
RS     1    FLOW      -1
SV  0.00    0.55    0.76    0.91    1.13    1.28    1.62    2.09    2.89
SQ   0.0    20.0    28.0    34.0    42.0    47.0    53.0    59.0    80.0
ZW C=FLOW
*
KK  E58C
KM    EAST OF S. MILL RD.   5.6AC
BA0.0088
PB
* PI
BF -38.7
LU  0.10  0.2500  36.000
UK   250  0.0600   0.600  100.00
RD   200  0.0700   0.060   .0070    TRAP    40.0    40.0
RD   500  0.0010   0.040            TRAP    10.0     5.0
ZW C=FLOW
*
KK YE58C
KM  0
HC     2
ZW C=FLOW
*
KK  E55H
KM    EAST OF S. MILL RD.                               44.1AC
BA0.0057
PB
* PI
BF -38.7
LU  0.10  0.2500   2.400
UK   400  0.0200   0.600  100.00
RD   400  0.0700   0.060   .0300    TRAP    40.0    40.0
RD  1000  0.0010   0.040            TRAP    10.0     5.0
ZW C=FLOW
*
KK YE55H
KM  0
HC     2
ZW C=FLOW
*
KK  E58A
KM    EAST OF S. MILL RD.   5.3AC
BA0.0083
PB
* PI
BF -38.7
LU  0.10  0.2500  22.000
UK   300  0.0400   0.600  100.00
RD   200  0.0700   0.060   .0070    TRAP    40.0    40.0
RD   500  0.0010   0.040            TRAP    10.0     5.0
ZW C=FLOW
*
KK YE58A
KM  0
HC     2
```

```
ZW C=FLOW
*
KK  E58E
KM    EAST OF S. MILL RD.   3.7AC
BA0.0370
PB
* PI
BF -38.7
LU  0.10  0.2250  22.000
UK   300  0.0200   0.600  100.00
RD   200  0.0700   0.060   .0070    TRAP    40.0    40.0
RD   500  0.0010   0.040            TRAP    10.0     5.0
ZW C=FLOW
*
KK YE58E
KM  0
HC     2
ZW C=FLOW
*
KK   E80
KM    LAST DOWNSTREAM SHED
BA0.0452
PB
* PI
BF -38.7
LU  0.10  0.1310   2.000
UK  1300  0.0400   0.600  100.00
RD  1000  0.0250   0.060   .0200    TRAP    20.0    20.0
RD  1100  0.0010   0.040            TRAP    10.0    50.0     YES
ZW C=FLOW
*
KKYE5875
KM  0
HC     3
ZW C=FLOW
*
KK YE80C
KM    COMBINE WITH E40 FOR TOTAL AT LAST DOWNSTREAM POINT
HC     2
ZW C=FLOW
*
KK  E40C
KM    LARGE SHED DOWNSTREAM OF S. MILL RD.    85.5Ac
BA0.0344
PB
* PI
BF -38.7
LU  0.10  0.1660   9.310
UK  1200  0.0100   0.600  100.00
RD   600  0.0400   0.060   .0100    TRAP    10.0    40.0
RD  1000  0.0010   0.040            TRAP    40.0    20.0
ZW C=FLOW
*
KK  E40E
KM    LARGE SHED DOWNSTREAM OF S. MILL RD.    85.5Ac
BA0.0058
PB
* PI
BF -38.7
LU  0.10  0.2500  10.510
UK   600  0.0100   0.600  100.00
RD   600  0.0400   0.060   .0100    TRAP    10.0    40.0
RD  1000  0.0010   0.040            TRAP    40.0    20.0
ZW C=FLOW
*
KK  E40D
KM    LARGE SHED DOWNSTREAM OF S. MILL RD.    85.5Ac
BA0.0074
PB
* PI
BF -38.7
LU  0.10  0.1940   8.270
UK   600  0.0100   0.600  100.00
RD   600  0.0400   0.060   .0100    TRAP    10.0    40.0
RD  1000  0.0010   0.040            TRAP    40.0    20.0
ZW C=FLOW
*
KK YE40D
KM  0
HC     3
ZW C=FLOW
*
KKYE40DC
KM  0
HC     2
ZW C=FLOW
*
KK   E85
KM    OFFSITE DOWNSTREAM SHED     313.9
BA0.4599
PB
* PI
BF -38.7
LU  0.10  0.1750   2.150
```

```
UK  2500  0.0625   0.600  100.00
RD  2000  0.0250   0.060   .1000    TRAP    20.0    20.0
RD  5000  0.0010   0.040            TRAP    10.0    50.0
ZW C=FLOW
*
KK  YE85
KM  0
HC     2
ZW C=FLOW
*
KK  E85B
KM  E85B
BA0.0312
PB
* PI
BF -38.7
LU  0.10  0.2300   3.350
UK   400  0.0200   0.600  100.00
RD   500  0.0500   0.060            TRAP    20.0    10.0
ZW C=FLOW
*
KK YE85B
KM  0
HC     2
ZW C=FLOW
*
*
KKUW3END
KM  ROUTE FOR BACKWATER AT NW3
RS     1    FLOW      -1
SV  0.00    0.01    0.03   20.60  247.00  250.00
SQ   0.0    40.0   243.0   508.0   637.0   800.0
ZW C=FLOW
*
KK  E85C
KM  E85C
BA0.0079
PB
* PI
BF -38.7
LU  0.10  0.2380   2.430
UK   400  0.0200   0.600  100.00
RD   500  0.0500   0.060            TRAP    20.0    10.0
ZW C=FLOW
*
KKYE85CC
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK  E5A1
KM    E5A1 Drop Inlet
BA0.0730
PB
* PI
BF -38.7
LU  0.10  0.2040   2.000    0.10  0.2040  95.000
UK  1350  0.1330   0.600      98
UK   200  0.0200   0.110       3
RD  2000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK   E5B
KM    E5B
BA0.0139
PB
* PI
BF -38.7
LU  0.10  0.2450   2.000    0.10  0.2450  95.000
UK   600  0.0800   0.600      91
UK   200  0.0200   0.110       9
RD  2000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  YE5B
KM  0
HC     2
ZW C=FLOW
*
KK   E5C
KM    E5C
BA0.0051
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   600  0.0700   0.600      92
UK   200  0.0200   0.110       8
RD   500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
```

```
KK  YE5C
KM  0
HC     2
ZW C=FLOW
*
*
KKUE5ADT
KM  0
RS     1    FLOW      -1
SV  0.00    0.10    0.20    0.30    0.40    1.70    2.40
SQ   0.0     0.0     0.1     2.0    50.0    80.0   200.0
ZW C=FLOW
*
KK   E5D
KM    E5D
BA0.0850
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1500  0.0500   0.600  100.00
RD  1500  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK YE5DC
KM  0
HC     2
ZW C=FLOW
*
KK  E6A1
KM    E6A1
BA0.0570
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1000  0.0680   0.600  100.00
RD  2700  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK  E6A2
KM    E6A2
BA0.0149
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   600  0.0680   0.600  100.00
RD   800  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYE6A1C
KM  0
HC     2
ZW C=FLOW
*
KK   E6C
KM    E6C
BA0.0939
PB
* PI
BF -38.7
LU  0.10  0.2460   2.000
UK  1600  0.0900   0.600  100.00
RD  1400  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK YE6CC
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK GS10D
KM    GS10D
BA0.0124
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   900  0.0700   0.600      79
UK   100  0.0200   0.110      21
RD   200  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK GS10C
KM    GS10C
BA0.0169
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
```

```
UK   300  0.0600   0.600      91
UK   100  0.0200   0.110       9
RD   400  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYS10CC
KM  0
HC     2
ZW C=FLOW
*
KK GS10B
KM    GS10B
BA0.0044
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   600  0.0800   0.600      86
UK   100  0.0200   0.110      14
RD   400  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKGS10A1
KM    GS10A1
BA0.0290
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   600  0.0800   0.600      96
UK   100  0.0200   0.110       4
RD   500  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK GS10F
KM    GS10F
BA0.0248
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   600  0.0800   0.600      92
UK   100  0.0200   0.110       8
RD   900  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKY10FCC
KM  0
HC     2
ZW C=FLOW
*
KK GS10E
KM    GS10E
BA0.0153
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   300  0.0800   0.600      78
UK   100  0.0200   0.110      22
RD   600  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYS10AC
KM   COMBINATION AT MEADOWS ROUTING AREA
HC     2
ZW C=FLOW
*
KKGS10A2
KM   GS10A2
BA0.0278
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK  1400  0.0800   0.600      96
UK   100  0.0200   0.110       4
RD  1400  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYGDTCC
KM  0
HC     2
ZW C=FLOW
*
*
KKUGS10R
KM   MEADOWS WQ AND DETENTION RESERVOIR AT GS10E
RS     1    FLOW      -1
SV 11.60   13.00   15.95
SQ  61.0   100.0   330.0
ZW C=FLOW
*
*
```

```
KKUS10ER
KM   Channel Attenuation downstream of GS10R
RS     1    FLOW      -1
SV  0.00    0.05    0.27    0.50    0.72    0.95    1.15
SQ   0.0     0.0     5.0    15.0    27.0    37.0    62.0
ZW C=FLOW
*
KK GS10J
KM    GS10J
BA0.0099
PB
* PI
BF -38.7
LU  0.10  0.2500  83.000    0.10  0.2500  95.000
UK   300  0.0800   0.600      92
UK   200  0.0200   0.110       8
RD   500  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKYS10JC
KM  0
HC     2
ZW C=FLOW
*
KK GS10G
KM    GS10G
BA0.0081
PB
* PI
BF -38.7
LU  0.10  0.2500  83.000    0.10  0.2500  95.000
UK   300  0.0800   0.600      90
UK   200  0.0200   0.110      10
RD   500  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
*
KKUS10JR
KM   Channel Attenuation From GS10J to GS10I
RS     1    FLOW      -1
SV  0.00    0.05    0.10    0.12    0.19    0.22    0.35
SQ   0.0     0.0     5.0    15.0    27.0    37.0    80.0
ZW C=FLOW
*
KK GS10H
KM    GS10H
BA0.0066
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   300  0.0800   0.600      81
UK   200  0.0200   0.110      19
RD   400  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KK GS10I
KM    GS10I
BA0.0071
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   300  0.0600   0.600      78
UK   200  0.0200   0.110      22
RD   400  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KK   E8A
KM    E8A
BA0.0049
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   200  0.1200   0.600      73
UK   100  0.0200   0.110      27
RD   300  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
*
KKUE8ASQ
KM  0
RS     1    FLOW      -1
SV  0.00    0.03    0.05    0.08    0.10    0.20    1.00
SQ   0.0     0.0     0.0     0.0     3.5    80.0   200.0
ZW C=FLOW
*
KK   E8B
KM    E8B
BA0.0122
PB
* PI
BF -38.7
```

```
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   400  0.0800   0.600      95
UK   100  0.0200   0.110       5
RD  1400  0.1000   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK   E8C
KM    E8C
BA0.0244
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   800  0.0800   0.600  100.00
RD  1400  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YE8CC
KM  0
HC     2
ZW C=FLOW
*
KKYGS10C
KM  0
HC     2
ZW C=FLOW
*
KKYS10IC
KM  0
HC     2
ZW C=FLOW
*
*
KKUS10IR
KM   Storage Upstream of Siller Ranch Road -  Channel Routing Meadow to Schaffer m
RS     1    FLOW      -1
SV  0.00    0.05    0.12    0.19    0.26    0.33    1.55
SQ   0.0     0.0     5.0    15.0    27.0    37.0   400.0
ZW C=FLOW
*
*
KK UGS9R
KM  0
RS     1    FLOW      -1
SV  0.00    0.09    0.17    0.24    0.41    0.59    0.83    0.94    4.03
SQ   0.0    33.0    55.0    76.0   114.0   145.0   177.0   206.0   644.0
ZW C=FLOW
*
KK    E9
KM    E9
BA0.0213
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   600  0.0800   0.600  100.00
RD  1000  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
*
KKUGS11R
KM  0
RS     1    FLOW      -1
SV  0.00    0.25    0.42    0.58    0.95    1.37    2.24    2.77    6.95
SQ   0.0    33.0    55.0    76.0   114.0   145.0   177.0   206.0   644.0
ZW C=FLOW
*
KK GS11B
KM    GS11B
BA0.0031
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   700  0.1000   0.600  100.00
RD   300  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK GS11A
KM    GS11A
BA0.0354
PB
* PI
BF -38.7
LU  0.10  0.2370   2.000
UK   700  0.1000   0.600  100.00
RD  1100  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKYGS11A
KM  0
HC     2
ZW C=FLOW
*
```

```
*
KKUS11RR
KM  0
RS     1    FLOW      -1
SV  0.00    1.25    1.51    1.75    2.27    2.78    3.53    4.26    4.67
SQ   0.0    33.0    55.0    76.0   114.0   145.0   177.0   206.0   244.0
ZW C=FLOW
*
KK GS13C
KM   GS13C
BA0.0066
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   300  0.0700   0.600  100.00
RD   300  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK GS13B
KM   GS13B
BA0.0168
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   300  0.0700   0.600  100.00
RD  1100  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK GS18A
KM   GS18A
BA0.0020
PB
* PI
BF -38.7
LU  0.10  0.2500   3.000
UK   800  0.0940   0.600  100.00
RD   300  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  GS18
KM    GS18
BA0.0248
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   800  0.0940   0.600  100.00
RD  1600  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKYGS18C
KM  0
HC     2
ZW C=FLOW
*
KK GS13A
KM   GS13A
BA0.0196
PB
* PI
BF -38.7
LU  0.10  0.1810   2.000
UK   600  0.0670   0.600  100.00
RD  1100  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYGS13A
KM  0
HC     2
ZW C=FLOW
*
KK YGS13
KM  0
HC     2
ZW C=FLOW
*
KK  GS19
KM    GS19
BA0.0617
PB
* PI
BF -38.7
LU  0.10  0.1920   2.000
UK   700  0.0860   0.600  100.00
RD  1000  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK  GS20
KM    GS20
BA0.0178
PB
* PI
```

```
BF -38.7
LU  0.10  0.1680   2.000
UK   600  0.1000   0.600  100.00
RD   600  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYGS20C
KM  0
HC     2
ZW C=FLOW
*
*
KKUOOSED
KM   GOOSENECK LAKE RESERVOIR _ CURRENT ROUTING/DISCHARGE RATING
RS     1    FLOW      -1
SV  0.00   43.30   90.10  144.10  173.90  205.40  238.90  274.10
SQ   0.0     2.0    84.8   360.0   670.8  1273.0  3585.0  8880.0
ZW C=FLOW
*
* - - - - - -
*
*
KKGS21B1
KM            4.2 AC.
BA0.0065
PB
* PI
BF -38.7
LU  0.10  0.2500  10.060
UK   300  0.0700   0.600  100.00
RD   800  0.1000   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KKVR21B1
KM   ROUTE GS21B1
RD   540  0.0704   0.015           CIRC     2.0     0.0
ZW C=FLOW
*
KKGS21B2
KM            3.2 AC.
BA0.0050
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   300  0.0700   0.600  100.00
RD   900  0.0800   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KKYQG21B
KM     COMBINE
HC     2
ZW C=FLOW
*
KK GS21A
KM   GS21A
BA0.0412
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK  1000  0.0700   0.600      80
UK   200  0.0200   0.240      20
RD  2500  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK  GS22
KM    GS22
BA0.0741
PB
* PI
BF -38.7
LU  0.10  0.2490   2.000
UK   700  0.0570   0.600  100.00
RD  1000  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKYGS21A
KM     COMBINE
HC     2
ZW C=FLOW
*
*
KKUGS22R
KM  0
RS     1    FLOW      -1
SV  0.00    0.67    0.84    0.97    1.28    1.45    1.87    2.23    5.29
SQ   0.0    65.0    85.0   102.0   144.0   184.0   232.0   291.0   575.0
ZW C=FLOW
*
KK  GS23
KM    GS23
BA0.0596
PB
```

```
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  2000  0.0400   0.600  100.00
RD  1100  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK  GS24
KM    GS24
BA0.0352
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   500  0.1000   0.600  100.00
RD   900  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYGS24C
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KKGS25B3
KM           1.2 AC.
BA0.0019
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   300  0.0700   0.600  100.00
RD   310  0.0500   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KKGS25B4
KM            1.8 AC.
BA0.0029
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   300  0.0700   0.600  100.00
RD   440  0.1200   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KKYC25B4
KM     COMBINE
HC     2
ZW C=FLOW
*
KKGS25C4
KM            4.4 AC.
BA0.0069
PB
* PI
BF -38.7
LU  0.10  0.2500  11.750
UK   300  0.0700   0.600  100.00
RD   550  0.1000   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KKGS25C5
KM            1.7 AC.
BA0.0026
PB
* PI
BF -38.7
LU  0.10  0.2500   9.800
UK   300  0.0700   0.600  100.00
RD   450  0.1100   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KKYC25C5
KM     COMBINE
HC     2
ZW C=FLOW
*
KKGS25C6
KM            1.6 AC.
BA0.0023
PB
* PI
BF -38.7
LU  0.10  0.2500   4.600
UK   300  0.0700   0.600  100.00
RD   240  0.1080   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KKYC25C6
KM     COMBINE
HC     3
```

```
ZW C=FLOW
*
KKGS25C9
KM           3.0 AC.
BA0.0047
PB
* PI
BF -38.7
LU  0.10  0.2500  11.360
UK   300  0.0700   0.600  100.00
RD   550  0.0509   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KKGS21A2
KM           1.3 AC.
BA0.0020
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   300  0.0700   0.600  100.00
RD   750  0.0825   0.060            CIRC     2.0     0.0
ZW C=FLOW
*
KKGS25C1
KM           .4 AC.
BA0.0006
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   300  0.0700   0.600  100.00
RD   290  0.0621   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KKYC25C1
KM   COMBINE
HC     2
ZW C=FLOW
*
KKVR25C1
KM     ROUTR COMBINED GS25C1
RD   312  0.0401   0.015          CIRC       2.0     0.0
ZW C=FLOW
*
KKYC25C9
KM     COMBINE
HC     3
ZW C=FLOW
*
KKGS25C3
KM           3.9 AC.
BA0.0060
PB
* PI
BF -38.7
LU  0.10  0.2500  11.230
UK   300  0.0700   0.600  100.00
RD  1045  0.0670   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KKGS25C7
KM           3.8 AC.
BA0.0060
PB
* PI
BF -38.7
LU  0.10  0.2500  13.180
UK   300  0.0700   0.600  100.00
RD   620  0.0452   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KKYC25C7
KM     COMBINE
HC     3
ZW C=FLOW
*
KK GS27C
KM           2.8 AC.
BA0.0044
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   300  0.0700   0.600  100.00
RD   220  0.0636   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KK GS23B
KM  0
BA0.0061
PB
* PI
BF -38.7
```

```
LU  0.10  0.2500  15.000
UK   300  0.0700   0.600  100.00
RD   470  0.0638   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KKYWQ25C
KM     COMBINE
HC     3
ZW C=FLOW
*
KK GS25E
KM    GS25E
BA0.0340
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   900  0.1000   0.600  100.00
RD  1000  0.1000   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKY25ECC
KM  0
HC     2
ZW C=FLOW
*
KKGS25A2
KM            1.9 AC.
BA0.0029
PB
* PI
BF -38.7
LU  0.10  0.2500   8.500
UK   300  0.0700   0.600  100.00
RD   700  0.0500   0.060            TRAP     2.0     3.0
ZW C=FLOW
*
KKGS25A1
KM            .4 AC.
BA0.0007
PB
* PI
BF -38.7
LU  0.10  0.2500   8.500
UK   300  0.0700   0.600  100.00
RD  1400  0.0660   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KKGS25A3
KM            1.2 AC.
BA0.0018
PB
* PI
BF -38.7
LU  0.10  0.2500   8.500
UK   300  0.0700   0.600  100.00
RD  1010  0.0620   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KKYC25A3
KM     COMBINE
HC     3
ZW C=FLOW
*
KKVR25A3
KM       ROUTE COMBINED GS25A3
RD   561  0.0238   0.015            CIRC     2.0     0.0
ZW C=FLOW
*
KKGS25D3
KM            1.3 AC.
BA0.0022
PB
* PI
BF -38.7
LU  0.10  0.2500  11.100
UK   300  0.0700   0.600  100.00
RD   900  0.0650   0.060            TRAP    10.0     1.0
ZW C=FLOW
*
KKYC25D3
KM     COMBINE
HC     2
ZW C=FLOW
*
KKGS25D2
KM            2.9 AC.
BA0.0045
PB
* PI
BF -38.7
LU  0.10  0.2500   8.500
UK   300  0.0700   0.600  100.00
RD   840  0.0710   0.060            TRAP    10.0     1.0
```

```
ZW C=FLOW
*
KKYC25D2
KM     COMBINE
HC     2
ZW C=FLOW
*
KKGS25D1
KM            4.1 AC
BA0.0062
PB
* PI
BF -38.7
LU  0.10  0.2500   8.500
UK   300  0.0700   0.600  100.00
RD  1520  0.0700   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KKYC25D1
KM     COMBINE
HC     2
ZW C=FLOW
*
KKVR25D1
KM     ROUTE COMBINED GS25D1
RD   923  0.0368   0.015           CIRC     2.0     0.0
ZW C=FLOW
*
KKGS28B2
KM           6.7 AC.
BA0.0105
PB
* PI
BF -38.7
LU  0.10  0.2500   5.250
UK   300  0.0700   0.600  100.00
RD  1780  0.0625   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KKGS27B1
KM        5.5 AC.
BA0.0087
PB
* PI
BF -38.7
LU  0.10  0.2500   8.500
UK   300  0.0700   0.600  100.00
RD  1040  0.0557   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KK YC27B
KM     COMBINE
HC     3
ZW C=FLOW
*
KKGS25C2
KM           3.0 AC
BA0.0047
PB
* PI
BF -38.7
LU  0.10  0.2500   9.930
UK   300  0.0700   0.600  100.00
RD  1800  0.0566   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KKYC25C2
KM     COMBINE
HC     2
ZW C=FLOW
*
KKGS27B3
KM           3.3 AC.
BA0.0052
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   300  0.0700   0.600  100.00
RD   660  0.0720   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KKGS27B2
KM  0
BA0.0053
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   300  0.0700   0.600  100.00
RD   560  0.0640   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KKYQG27B
```

```
KM     COMBINE
HC     3
ZW C=FLOW
*
KKGS25E1
KM    GS25E
BA0.0131
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   900  0.1000   0.600  100.00
RD  1000  0.1000   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYGS25E
KM  0
HC     2
ZW C=FLOW
*
KK GS30B
KM            1.1 AC
BA0.0018
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   300  0.0700   0.600  100.00
RD   800  0.0350   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KKGS28B1
KM            1.6 AC.
BA0.0025
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   300  0.0700   0.600  100.00
RD  1000  0.0437   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KKYC28B1
KM     COMBINE
HC     2
ZW C=FLOW
*
KKGS28B3
KM            .09 AC.
BA0.0015
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   300  0.0700   0.600  100.00
RD   830  0.0554   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KKYC28B3
KM     COMBINE
HC     2
ZW C=FLOW
*
KKGS28A1
KM            7.6 AC.
BA0.0120
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   300  0.0700   0.600  100.00
RD  1000  0.0690   0.060           TRAP    10.0     1.0
ZW C=FLOW
*
KKYQG28B
KM     COMBINE
HC     2
ZW C=FLOW
*
KKGS28A2
KM   GS28A
BA0.0154
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   500  0.0710   0.600      50
UK   200  0.0200   0.240      50
RD   500  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYGS28A
KM  0
HC     2
```

```
ZW C=FLOW
*
KKYGS29C
KM  0
HC     2
ZW C=FLOW
*
KK GS30A
KM    GS30
BA0.0427
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   900  0.0560   0.600      89
UK    50  0.0200   0.110      11
RD  1400  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK GS31A
KM   GS31A
BA0.0843
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK  1000  0.0500   0.600      90
UK   200  0.0200   0.400      10
RD  1100  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKYGS31C
KM  0
HC     2
ZW C=FLOW
*
KKYS31CC
KM  0
HC     2
ZW C=FLOW
*
KK  GS32
KM    GS32
BA0.0320
PB
* PI
BF -38.7
LU  0.10  0.2300   2.000
UK   500  0.1000   0.600  100.00
RD  1800  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
* - - - - - -
*
*
KK MD1H3
KM   MD1H3
BA0.0040
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   300  0.1200   0.600      75
UK    50  0.0200   0.110      25
RD   400  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK MD1H2
KM   MD1H2
BA0.0027
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   300  0.1200   0.600      75
UK    50  0.0200   0.110      25
RD   300  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKYD1H2C
KM  0
HC     2
ZW C=FLOW
*
KK MD1E4
KM   MD1E4
BA0.0132
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   300  0.1000   0.600      87
UK    50  0.0200   0.110      13
RD   600  0.0500   0.060            TRAP     2.0     2.0
```

```
ZW C=FLOW
*
KKYD1H2D
KM  0
HC     2
ZW C=FLOW
*
KK MD1E3
KM   MD1E3
BA0.0039
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   300  0.1000   0.600      78
UK    50  0.0200   0.110      22
RD   500  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKYD1E3C
KM  0
HC     2
ZW C=FLOW
*
KK MD1E2
KM   MD1E2
BA0.0031
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   300  0.1000   0.600      84
UK    50  0.0200   0.110      16
RD   600  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYD1E2C
KM  0
HC     2
ZW C=FLOW
*
KKMD1E1E
KM   MD1E1-2
BA0.0042
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1200  0.1070   0.600  100.00
RD   800  0.0640   0.060            TRAP    10.0     0.0
ZW C=FLOW
*
KK YMD1E
KM  0
HC     2
ZW C=FLOW
*
KKMD1E1C
KM   MD1E1-3
BA0.0686
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1000  0.0800   0.600  100.00
RD  1858  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKMD1E1B
KM   MD1E1-2
BA0.0141
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1200  0.1070   0.600  100.00
RD   800  0.0640   0.060            TRAP    10.0     0.0
ZW C=FLOW
*
KKYM1E1B
KM  0
HC     2
ZW C=FLOW
*
KK MD1H1
KM    MD1H1-1
BA0.0073
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   400  0.0600   0.600  100.00
RD   200  0.0080   0.060            TRAP    10.0    10.0
ZW C=FLOW
```

```
*
KK MD1H4
KM    MD1H1-2
BA0.0049
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   650  0.0600   0.600  100.00
RD   100  0.0030   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKMD1I_1
KM    MD1I-1
BA0.0242
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1000  0.1000   0.600  100.00
RD   350  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYD1H1C
KM  0
HC     3
ZW C=FLOW
*
KK MD1G3
KM   MD1G3
BA0.0096
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   300  0.0800   0.600      90
UK    50  0.0200   0.110      10
RD   600  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYD1G3C
KM  0
HC     2
ZW C=FLOW
*
KKVD1G3R
KM  0
RD  1600  0.0500   0.040            TRAP    10.0    10.0
ZW C=FLOW
*
KK MD1G2
KM   MD1G2
BA0.0033
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   200  0.0800   0.600      72
UK    50  0.0200   0.110      28
RD   300  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKMD1G2B
KM   MD1G2B
BA0.0055
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   200  0.0850   0.600  100.00
RD   300  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKYM1G2B
KM  0
HC     2
ZW C=FLOW
*
KKMD1G1B
KM   MD1G1-2
BA0.0195
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1300  0.0600   0.600  100.00
RD  1568  0.1070   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYM1G1B
KM  0
HC     2
ZW C=FLOW
*
```

```
KKY26OUP
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK GS26A
KM    GS26A
BA0.0074
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   600  0.1000   0.600      85
UK    50  0.0200   0.110      15
RD   400  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KK GS26B
KM    GS26B
BA0.0139
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   600  0.2000   0.600      89
UK    50  0.0200   0.110      11
RD   800  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KK GS26C
KM    GS26C
BA0.0126
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   600  0.2000   0.600      90
UK    50  0.0200   0.110      10
RD   800  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KK GS26D
KM    GS26D
BA0.0144
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   600  0.1000   0.600      89
UK    50  0.0200   0.110      11
RD   400  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKYS26DC
KM  0
HC     2
ZW C=FLOW
*
KK GS26E
KM    GS26E
BA0.0028
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   300  0.0800   0.600      75
UK    50  0.0200   0.110      25
RD   600  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KK GS26F
KM    GS26F
BA0.0074
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   400  0.1000   0.600      87
UK    50  0.0200   0.110      13
RD   400  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KKGS26N1
KM    GS26N-1
BA0.0046
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   335  0.0200   0.110  100.00
RD   500  0.0500   0.060            TRAP     2.0     2.0
```

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ZW C=FLOW
*
KK GS26G
KM    GS26G
BA0.0231
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   600  0.1000   0.600      91
UK    50  0.0200   0.110       9
RD   400  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KKYS26NC
KM  0
HC     2
ZW C=FLOW
*
KK GS26H
KM    GS26H
BA0.0026
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   100  0.0800   0.600      75
UK    50  0.0200   0.110      25
RD   500  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KK GS15C
KM    GS15C
BA0.0106
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   600  0.1500   0.600      91
UK    50  0.0200   0.110       9
RD   400  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KK GS15D
KM    GS15D
BA0.0133
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   300  0.1350   0.600      91
UK    50  0.0200   0.110       9
RD   400  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KK GS15A
KM    GS15A
BA0.0913
PB
* PI
BF -38.7
LU  0.10  0.2370   2.000    0.10  0.2370  95.000
UK  1800  0.1200   0.600      97
UK    50  0.0200   0.110       3
RD   600  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KK GS15B
KM    GS15B
BA0.0151
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   400  0.1000   0.600      94
UK    50  0.0200   0.110       6
RD   600  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KKYS15BC
KM  0
HC     2
ZW C=FLOW
*
KKGS16A1
KM    GS16A1
BA0.0190
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   400  0.1000   0.600      96
UK    50  0.0200   0.110       4
RD   500  0.0500   0.060            TRAP     2.0     2.0     YES
```

```
ZW C=FLOW
*
KKGS16A2
KM    GS16A2
BA0.0137
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   400  0.1000   0.600      91
UK    50  0.0200   0.110       9
RD   600  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KK GS16B
KM    GS16B
BA0.0260
PB
* PI
BF -38.7
LU  0.10  0.2330   2.000    0.10  0.2330  95.000
UK  1800  0.1500   0.600      93
UK    50  0.0200   0.110       7
RD   500  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KK GS16C
KM    GS16C
BA0.0141
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   400  0.1500   0.600      89
UK    50  0.0200   0.110      11
RD   400  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KK GS17C
KM    GS17C
BA0.0147
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   600  0.1200   0.600      91
UK    50  0.0200   0.110       9
RD   600  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KK  E6A3
KM    E6A3
BA0.0421
PB
* PI
BF -38.7
LU  0.10  0.1800   2.000    0.10  0.1800  95.000
UK  1800  0.2000   0.600      94
UK    50  0.0200   0.110       6
RD   800  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KK GS12B
KM    GS12B
BA0.0089
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   600  0.1200   0.600      89
UK    50  0.0200   0.110      11
RD   600  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KK GS12C
KM    GS12C
BA0.0068
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   300  0.1200   0.600      70
UK    50  0.0200   0.110      30
RD  1600  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKY12CCC
KM  0
HC     2
ZW C=FLOW
*
KK GS12F
KM    GS12F
BA0.0082
```

```
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   400  0.1000   0.600      94
UK    50  0.0200   0.110       6
RD   400  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKYS12FC
KM  0
HC     2
ZW C=FLOW
*
KK GS12H
KM    GS12H
BA0.0082
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   800  0.1000   0.600      94
UK    50  0.0200   0.110       6
RD   600  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KK GS12D
KM    GS12D
BA0.0044
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   400  0.1500   0.600      84
UK    50  0.0200   0.110      16
RD   300  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KK GS12E
KM    GS12E
BA0.0044
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   400  0.1500   0.600      90
UK    50  0.0200   0.110      10
RD   400  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KKY12ECC
KM  0
HC     2
ZW C=FLOW
*
KK GS12I
KM    GS12I
BA0.0177
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   800  0.1000   0.600      95
UK    50  0.0200   0.110       5
RD  1000  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKYS12IC
KM  0
HC     2
ZW C=FLOW
*
KKVNTOLK
KM  0
RD  1000  0.0500   0.040            TRAP     2.0     2.0
ZW C=FLOW
*
KKYGS17C
KM  0
HC     2
ZW C=FLOW
*
KKYGS16A
KM  0
HC     2
ZW C=FLOW
*
KK GS17A
KM    GS17A
BA0.0226
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
```

```
UK   800  0.1000   0.600      90
UK    50  0.0200   0.110      10
RD  1000  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKYAKCOM
KM  0
HC     3
ZW C=FLOW
*
*
KKULFDT2
KM   DETENTION AT GS17A
RS     1    FLOW      -1
SV  0.00    0.55    1.91    3.69    7.81
SQ   0.0    60.0   170.0   311.0   630.0
ZW C=FLOW
*
KK GS26N
KM   GS26N-2
BA0.0299
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1419  0.0660   0.600  100.00
RD  1800  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
*
KKUSTDET
KM GOLF LAKE/WET MEADOW AT SOUTH SIDE OF B STREET
* NEW 10-11-04
* NEW 12-04 for 30ft weir @ 6177.2 and low swq below
KO     1
RS     1    ELEV    6176
* SV     0    6.92   8.320   9.821  11.439   13.17
*  sv Revised by BAT 2/15/05 TO REFLECT NORMAL POOL ELEV AT 6176
SA     0    0.01    1.34    1.67    2.15
SE  6166  6175.9    6176    6178    6180
SQ     0    .001    0.50    64.0   217.0   421.0
SE  6166    6176    6177    6178    6179    6180
ZW C=FLOW
*
KKGS26OA
KM    AREA=20.2 AC
BA0.0321
PB
* PI
BF -38.7
LU  0.10  0.2500  86.000    0.10  0.2500  90.000
UK   800  0.0500   0.600      95
UK    50  0.0200   0.110       5
RD   800  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKGS26OB
KM    AREA=3.3 AC UNIT 4A
BA0.0047
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  90.000
UK   600  0.0500   0.600      95
UK    50  0.0200   0.110       5
RD   600  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKYS26OC
KM  0
HC     4
ZW C=FLOW
*
*
KKUPLAKE
KM   CONCERT PARK LAKE
KO     1
RS     1    ELEV    6149
SA  0.01    0.25    0.32    0.36
SE  6140    6148    6149    6150
*  LOW FLOW PIPE (SL RECORD) IS A DUMMY
SL  6146   0.001    0.62     0.5
SS  6148      20     2.6     1.5
ZW C=FLOW
*
KK MD1C2
KM    MD1C2
BA0.0063
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  90.000
UK   250  0.0500   0.600      90
UK    50  0.0200   0.110      10
```

```
RD   300  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKYMD1C2
KM  0
HC     2
ZW C=FLOW
*
KKGS26L3
KM    AREA=0.7 AC   UNIT 4A
BA0.0012
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  90.000
UK   500  0.0580   0.600      90
UK    50  0.0200   0.110      10
RD   500  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKYNIT4A
KM  0
HC     2
ZW C=FLOW
*
KKMD1F-1
KM    MD1F-1
BA0.0069
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   600  0.0800   0.600      90
UK    50  0.0200   0.110      10
RD  1000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  MD1F
KM    MD1F-2
BA0.0035
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   500  0.0800   0.600      90
UK    50  0.0200   0.110      10
RD  1000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD1F
KM  0
HC     2
ZW C=FLOW
*
KKMD1D1D
KM    MD1D1D
BA0.0124
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   800  0.0600   0.600  100.00
RD   400  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYD1D1D
KM  0
HC     2
ZW C=FLOW
*
KKMD1D1C
KM    MD1D1C
BA0.0074
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   500  0.0500   0.600  100.00
RD   200  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYD1D1C
KM  0
HC     2
ZW C=FLOW
*
KK  MD1E
KM    MD1E
BA0.0160
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   600  0.0800   0.600      95
```

```
UK    50  0.0200   0.110       5
RD  1000  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
*
KKUD1EWQ
KM  0
RS     1    FLOW      -1
SV  0.00    0.25    0.50    0.75
SQ   0.0     0.1    30.0    60.0
ZW C=FLOW
*
KKMD1D1A
KM    MD1D1A
BA0.0059
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   400  0.1200   0.600  100.00
RD   500  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKMD1D1B
KM    MD1D1B
BA0.0028
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   400  0.1200   0.600  100.00
RD   500  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYD1D1B
KM  0
HC     2
ZW C=FLOW
*
KK MD1D2
KM    MD1D2
BA0.0077
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   600  0.2000   0.600  100.00
RD  1000  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYD1D2D
KM  0
HC     3
ZW C=FLOW
*
KKYD1C2C
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK GS26J
KM    GS26J
BA0.0023
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   230  0.0780   0.600  100.00
RD   250  0.0770   0.060           TRAP     2.0     2.0
ZW C=FLOW
*
KK GS26K
KM    GS26K
BA0.0032
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   194  0.0920   0.600  100.00
RD   200  0.0830   0.060           TRAP     2.0     2.0
ZW C=FLOW
*
KKYGS26K
KM  0
HC     2
ZW C=FLOW
*
KK GS26L
KM    GS26L REVISED AREA = 5.8 AC UNIT 4A
BA0.0091
PB
```

```
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  90.000
UK   500  0.0580   0.600      90
UK    50  0.0200   0.110      10
RD   500  0.0500   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KKYGS26L
KM  0
HC     2
ZW C=FLOW
*
KKGS26L2
KM    GS26L2
BA0.0029
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  90.000
UK   250  0.0470   0.600      90
UK    50  0.0200   0.110      10
RD   250  0.0300   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KK MD1C1
KM    MD1C1
BA0.0155
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  90.000
UK   400  0.0500   0.600      85
UK    50  0.0200   0.110      15
RD  1800  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
KKYD1C1C
KM  0
HC     2
ZW C=FLOW
*
*
KKUWLAKE
KM CULTURAL CENTER LAKE LOWER LAKE
* CULTURAL LAKE HAS BEEN RELOCATED AND THE THE GRADING REVISED.
* THE LAKE NOW CONSISTS OF AN UPPER LAKE AND A LOWER LAKE.
* THE UPPER LAKE IS UPLAKE. THIS IS LOWER LAKE.  UPPER LAKE IS
* DESIGNATED UPLAKE
* REVISION DATE 7/7/2006
KO     1
RS     1    ELEV    6133
SA  0.98    2.89    3.08    3.34    3.65    4.01
SE  6119    6133    6134    6136    6138    6140
SQ     0     1.8    10.5    54.1   116.9   194.2   283.6   383.6   493.2
SE  6133  6133.6    6134    6135    6136    6137    6138    6139    6140
ZW C=FLOW
*
*
KKUAINWQ
KM   AT MD1C1
RS     1    FLOW      -1
SV  0.00    0.34    0.69    1.03    1.38    1.83    2.29    2.86    3.44
SQ   0.0     0.5     1.0     8.5    30.0    60.0   100.0   150.0   600.0
ZW C=FLOW
*
KK MD1C4
KM    MD1C4
BA0.0169
PB
* PI
BF -38.7
LU  0.10  0.2240   2.000    0.10  0.2240  90.000
UK   400  0.0500   0.600      95
UK    50  0.0200   0.110       5
RD  1800  0.0500   0.060            TRAP     2.0     2.0     YES
ZW C=FLOW
*
*
KKU1C4WQ
KM   AT MD1C4
RS     1    FLOW      -1
SV  0.00    0.23    0.51    0.92    1.24    1.60    1.95    2.30
SQ   0.0     0.3     0.5     0.8     1.0     1.5    45.0   500.0
ZW C=FLOW
*
* - - - - - -
*
*
KK   MA1
KM     MA1
BA0.2995
PB
* PI
```

```
BF -38.7
LU  0.10  0.1910   2.000
UK  1600  0.2340   0.600  100.00
RD  3500  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK   MA2
KM     MA2
BA0.5483
PB
* PI
BF -38.7
LU  0.10  0.2000   2.000
UK  2200  0.2840   0.600  100.00
RD  4300  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK   MA3
KM     MA3
BA0.6259
PB
* PI
BF -38.7
LU  0.10  0.2290   2.000
UK  2300  0.2720   0.600  100.00
RD  7500  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK   MA4
KM     MA4
BA0.2870
PB
* PI
BF -38.7
LU  0.10  0.2270   2.000
UK  2000  0.3000   0.600  100.00
RD  3300  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK   MA5
KM     MA5
BA0.2025
PB
* PI
BF -38.7
LU  0.10  0.2140   2.000
UK  1500  0.1830   0.600  100.00
RD  2500  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK   MA6
KM     MA6
BA0.4152
PB
* PI
BF -38.7
LU  0.10  0.2280   2.000
UK  1800  0.0970   0.600  100.00
RD  3000  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK YMA6C
KM  0
HC     2
ZW C=FLOW
*
KK   MA7
KM     MA7
BA0.2326
PB
* PI
BF -38.7
LU  0.10  0.2330   2.000
UK  3300  0.2270   0.600  100.00
RD  1500  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK YMA7C
KM  0
HC     2
ZW C=FLOW
*
KK   MA8
KM     MA8
BA0.4308
PB
* PI
BF -38.7
LU  0.10  0.1650   2.000
UK  1250  0.3200   0.600  100.00
RD  5500  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK YMA8C
```

```
KM  0
HC     2
ZW C=FLOW
*
KK   MA9
KM     MA9
BA0.0913
PB
* PI
BF -38.7
LU  0.10  0.2370   2.000
UK   600  0.2080   0.600  100.00
RD  1500  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK MA10A
KM    MA10A
BA0.2885
PB
* PI
BF -38.7
LU  0.10  0.2410   2.000    0.10  0.2410  15.000
UK  1600  0.0380   0.600      85
UK   200  0.0200   0.240      15
RD  2800  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK MA10B
KM    MA10B
BA0.0100
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   900  0.0900   0.600      90
UK    50  0.0200   0.110      10
RD   200  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYA10BC
KM  0
HC     2
ZW C=FLOW
*
*
KKU0DCUL
KM  0
RS     1    FLOW      -1
SV  0.00    2.50    5.00    8.50   12.50
SQ   0.0   500.0  1200.0  2300.0  3500.0
ZW C=FLOW
*
* - - - - - -
*
*
KKMB7B3A
KM    MB7B3A
BA0.0051
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   500  0.0800   0.600      95
UK    50  0.0200   0.110       5
RD   550  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKMB7B4A
KM    MB7B4A
BA0.0156
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   500  0.0900   0.600      95
UK    50  0.0200   0.110       5
RD   570  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKMB7B3B
KM    MB7B3B
BA0.0064
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   600  0.0800   0.600      95
UK    50  0.0200   0.110       5
RD   600  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKMB7B4B
KM    MB7B4B
BA0.0044
```

```
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   400  0.0700   0.600      95
UK    50  0.0200   0.110       5
RD   500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYB7B34
KM  0
HC     3
ZW C=FLOW
*
KKMB7B4C
KM    MB7B4C
BA0.0023
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   170  0.0530   0.600      95
UK    50  0.0200   0.110       5
RD   300  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
*
KKUA10EQ
KM  0
RS     1    FLOW      -1
SV  0.00    0.05    0.10    0.15    0.20    0.25
SQ   0.0     0.0     0.0     0.0    30.0    60.0
ZW C=FLOW
*
KKYA10EC
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KKMB7B1A
KM    MB7B1A
BA0.0709
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1300  0.1920   0.600  100.00
RD  3000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKMB7B1C
KM    MB7B1C
BA0.0041
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   400  0.0800   0.600      95
UK    50  0.0200   0.110       5
RD   200  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKMB7B1B
KM    MB7B1B
BA0.0107
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   500  0.0800   0.600      95
UK    50  0.0200   0.110       5
RD   600  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKYMB7B1
KM  0
HC     2
ZW C=FLOW
*
KKMB7B1D
KM    MB7B1D
BA0.0146
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   500  0.0700   0.600      95
UK    50  0.0200   0.110       5
RD   650  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
```

```
KKMB7B1E
KM    MB7B1E
BA0.0054
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   500  0.0500   0.600      95
UK    50  0.0200   0.110       5
RD   350  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
*
KKUB7B1Q
KM  0
RS     1    FLOW      -1
SV  0.00    0.10    0.20    0.30    0.40    0.50
SQ   0.0     0.1     0.1     0.7    20.0    80.0
ZW C=FLOW
*
KK MB7B2
KM    MB7B2
BA0.0216
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK  1300  0.1920   0.600      95
UK    50  0.0200   0.110       5
RD   600  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
*
KKUB7B2Q
KM  0
RS     1    FLOW      -1
SV  0.00    0.33    0.66    1.00    1.33
SQ   0.0     0.2     0.3     0.3   150.0
ZW C=FLOW
*
KKYMB7BC
KM  0
HC     2
ZW C=FLOW
*
*
KKUPONDD
KM  0
RS     1    FLOW      -1
SV  0.00    1.00    2.00    3.00    4.00    5.00    6.00    7.00    8.00
SQ   0.0    50.0   100.0   200.0   400.0   600.0  1000.0  2000.0  4000.0
ZW C=FLOW
*
* - - - - - -
*
*
KK   MB1
KM     MB1
BA0.5333
PB
* PI
BF -38.7
LU  0.10  0.1880   2.000
UK  4000  0.2750   0.600  100.00
RD  2700  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK   MB2
KM     MB2
BA1.2667
PB
* PI
BF -38.7
LU  0.10  0.1920   2.000
UK  2800  0.3390   0.600  100.00
RD  3400  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK   MB3
KM     MB3
BA0.5006
PB
* PI
BF -38.7
LU  0.10  0.2180   2.000
UK  1800  0.2780   0.600  100.00
RD  1600  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK   MB4
KM     MB4
BA0.6535
PB
* PI
```

```
BF -38.7
LU  0.10  0.2450   2.000
UK  1900  0.1840   0.600  100.00
RD  4000  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK   MB5
KM     MB5
BA0.1602
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1800  0.2780   0.600  100.00
RD  1500  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK  MB6A
KM   AREA = 7.0 AC
BA0.0073
PB
* PI
BF -38.7
LU  0.10  0.2500   6.600
UK  1335  0.1543   0.600  100.00
RD   625  0.0800   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
*
KKUB6ADT
KM  0
RS     1    FLOW      -1
SV  0.00    0.15    0.30    0.45
SQ   0.0   100.0   200.0   300.0
ZW C=FLOW
*
KKYMB6AC
KM  0
HC     2
ZW C=FLOW
*
*
KKUB6CUL
KM  0
RS     1    FLOW      -1
SV  0.00    2.50    5.00    8.50   12.50
SQ   0.0   500.0  1100.0  2000.0  3000.0
ZW C=FLOW
*
KK  MB6B
KM   AREA = 3.9 AC
BA0.0061
PB
* PI
BF -38.7
LU  0.10  0.2500  11.800
UK   240  0.0708   0.600  100.00
RD   520  0.0800   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
*
KKUB6BDT
KM  0
RS     1    FLOW      -1
SV  0.00    0.15    0.30    0.45
SQ   0.0   100.0   200.0   300.0
ZW C=FLOW
*
KKYMB6BC
KM  0
HC     2
ZW C=FLOW
*
KK  MB6C
KM   AREA = 3.2 AC
BA0.0039
PB
* PI
BF -38.7
LU  0.10  0.2500   7.600
UK   370  0.1081   0.600  100.00
RD   490  0.0683   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
*
KKUB6CDT
KM  0
RS     1    FLOW      -1
SV  0.00    0.15    0.30    0.45
SQ   0.0   100.0   200.0   300.0
ZW C=FLOW
*
KKYMB6CC
KM  0
```

```
HC     2
ZW C=FLOW
*
KK  MB6D
KM    MB6D
BA0.0223
PB
* PI
BF -38.7
LU  0.10  0.2460   2.000    0.10  0.2460  15.000
UK   200  0.1250   0.600      65
UK   200  0.0200   0.240      35
RD  1500  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK  MB6G
KM  MB6G
BA0.0109
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   500  0.1250   0.600      30
UK   200  0.0200   0.240      70
RD   500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  MB6F
KM  MB6F
BA0.0062
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   500  0.1250   0.600      30
UK   200  0.0200   0.240      70
RD   500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK MB6D1
KM  MB6D1
BA0.0036
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   500  0.1250   0.600      30
UK   200  0.0200   0.240      70
RD   500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMB6D1
KM  0
HC     3
ZW C=FLOW
*
KK  MB6E
KM    MB6E
BA0.0050
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   500  0.1250   0.600      30
UK   200  0.0200   0.240      70
RD   500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMB6E
KM  0
HC     2
ZW C=FLOW
*
*
KKUB6EDT
KM  0
RS     1    FLOW      -1
SV  0.00    0.15    0.30    0.45
SQ   0.0   100.0   200.0   300.0
ZW C=FLOW
*
KKYMB6EC
KM  0
HC     2
ZW C=FLOW
*
KKYMB6DD
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
```

```
KK MB7A1
KM     MB7A1
BA0.1465
PB
* PI
BF -38.7
LU  0.10  0.2080   2.000    0.10  0.2080  95.000
UK  1300  0.1920   0.600      97
UK    50  0.0200   0.110       3
RD  2500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKMB7A2A
KM     MB7A2A
BA0.0247
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   550  0.1920   0.600      92
UK    50  0.0200   0.110       8
RD   580  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKMB7A2B
KM     MB7A2B
BA0.0059
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   300  0.1920   0.600  100.00
RD   500  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
*
KKUB7A2Q
KM  0
RS     1    FLOW      -1
SV  0.00    0.12    0.25    0.38    0.50    0.62
SQ   0.0     0.1     0.1     0.1    20.0   120.0
ZW C=FLOW
*
KK  MB7C
KM     MB7C
BA0.0236
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   200  0.1000   0.600      92
UK    50  0.0200   0.110       8
RD   500  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKMB7D1A
KM     MB7D1A
BA0.0044
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   500  0.1000   0.600      79
UK    50  0.0200   0.110      21
RD   200  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKMB7D1B
KM     MB7D1B
BA0.0025
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   300  0.1000   0.600      79
UK    50  0.0200   0.110      21
RD   400  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYB7D1C
KM  0
HC     2
ZW C=FLOW
*
KK MB7D1
KM     MB7D1
BA0.0011
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   100  0.1000   0.600  100.00
RD   300  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
```

```
*
KK MB7D2
KM     MB7D2
BA0.0215
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   200  0.1000   0.600      95
UK    50  0.0200   0.110       5
RD   500  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKYMB7CC
KM  0
HC     2
ZW C=FLOW
*
KK  MB7E
KM     MB7E
BA0.0585
PB
* PI
BF -38.7
LU  0.10  0.2470   2.000    0.10  0.2470  95.000
UK   200  0.1000   0.600      96
UK    50  0.0200   0.110       4
RD  1500  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
*
KKUB8SWQ
KM  0
RS     1    FLOW      -1
SV  0.00    0.25    0.50    0.75    1.00
SQ   0.0     0.2     0.2     0.2   200.0
ZW C=FLOW
*
KKYMB7EC
KM  0
HC     2
ZW C=FLOW
*
KK   MB8
KM     MB8
BA0.0545
PB
* PI
BF -38.7
LU  0.10  0.2140   2.000    0.10  0.2140  15.000
UK  1000  0.1000   0.600      85
UK   200  0.0200   0.240      15
RD  2500  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
* - - - - - -
*
*
KK   MC1
KM   AREA = 258.6 AC
BA0.4041
PB
* PI
BF -38.7
LU  0.10  0.2390   2.000
UK  1530  0.4281   0.600  100.00
RD  5300  0.2394   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  MC2A
KM   AREA = 59.1 AC
BA0.0923
PB
* PI
BF -38.7
LU  0.10  0.2500   2.200
UK  1035  0.4010   0.600  100.00
RD  2590  0.3421   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMC2AC
KM  0
HC     2
ZW C=FLOW
*
KK  MC2B
KM   AREA = 0.9 AC
BA0.0014
PB
* PI
BF -38.7
LU  0.10  0.2500  10.300
UK   550  0.0764   0.600  100.00
RD   200  0.0800   0.060            TRAP     0.1     1.0
```

```
ZW C=FLOW
*
KK  MC2K
KM  MC2K
BA0.0001
PB
* PI
BF -38.7
LU  0.10  0.2500   4.700
UK  1225  0.1551   0.600  100.00
RD   565  0.0800   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
KK YMC2K
KM  0
HC     2
ZW C=FLOW
*
*
KKUC2BDT
KM  0
RS     1    FLOW      -1
SV  0.00    0.15    0.30    0.45
SQ   0.0   100.0   200.0   300.0
ZW C=FLOW
*
KKYMC2BC
KM  0
HC     2
ZW C=FLOW
*
KK  MD1D
KM     MD1d AREA = 5.9 AC
BA0.0092
PB
* PI
BF -38.7
LU  0.10  0.2500   3.400
UK   800  0.2375   0.600  100.00
RD   190  0.0414   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
KK  MD1B
KM     MD1b AREA = 5.9 AC
BA0.0092
PB
* PI
BF -38.7
LU  0.10  0.2500   3.600
UK   800  0.2375   0.600  100.00
RD   260  0.0414   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
KK YMD1B
KM  0
HC     2
ZW C=FLOW
*
KK MC2A2
KM  MC2A2
BA0.0061
PB
* PI
BF -38.7
LU  0.10  0.2500   4.700
UK  1225  0.1551   0.600  100.00
RD   565  0.0800   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
KKYMC2A2
KM  0
HC     3
ZW C=FLOW
*
KK  MD1C
KM    MD1c AREA = 2.9 AC
BA0.0045
PB
* PI
BF -38.7
LU  0.10  0.2500   7.900
UK   500  0.2178   0.600  100.00
RD   364  0.2178   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK MC2A3
KM  MC2A3
BA0.0044
PB
* PI
BF -38.7
LU  0.10  0.2500   4.700
UK  1225  0.1551   0.600  100.00
RD   565  0.0800   0.060            TRAP     0.1     1.0
```

```
ZW C=FLOW
*
KKYMC2A3
KM  0
HC     3
ZW C=FLOW
*
KK  MC2D
KM   AREA = 7.8 AC
BA0.0122
PB
* PI
BF -38.7
LU  0.10  0.2500   4.700
UK  1225  0.1551   0.600  100.00
RD   565  0.0800   0.060           TRAP     0.1     1.0
ZW C=FLOW
*
*
KKUC2DDT
KM  0
RS     1    FLOW      -1
SV  0.00    0.15    0.30    0.45
SQ   0.0   100.0   200.0   300.0
ZW C=FLOW
*
KK  MC2E
KM   AREA = 3.9 AC
BA0.0060
PB
* PI
BF -38.7
LU  0.10  0.2500   8.500
UK   895  0.1777   0.600  100.00
RD   565  0.0800   0.060           TRAP     0.1     1.0
ZW C=FLOW
*
*
KKUC2EDT
KM  0
RS     1    FLOW      -1
SV  0.00    0.15    0.30    0.45
SQ   0.0   100.0   200.0   300.0
ZW C=FLOW
*
KKYMC2EC
KM  0
HC     2
ZW C=FLOW
*
KK  MC2G
KM   AREA = 9.7 AC
BA0.0151
PB
* PI
BF -38.7
LU  0.10  0.2500  90.000
UK   395  0.2051   0.600  100.00
RD   360  0.0800   0.060           TRAP     0.1     1.0
ZW C=FLOW
*
KK YMC2G
KM  0
HC     2
ZW C=FLOW
*
KK  MC2H
KM   AREA = 2.4 AC
BA0.0038
PB
* PI
BF -38.7
LU  0.10  0.2500   9.500
UK   365  0.1096   0.600  100.00
RD   530  0.0800   0.060           TRAP     0.1     1.0
ZW C=FLOW
*
KKYMC2HC
KM  0
HC     2
ZW C=FLOW
*
KK  MC2L
KM  MC2L
BA0.0519
PB
* PI
BF -38.7
LU  0.10  0.2500  10.300
UK   550  0.0764   0.600  100.00
RD   200  0.0800   0.060           TRAP     0.1     1.0
ZW C=FLOW
*
KK YMC2L
```

```
KM  0
HC     3
ZW C=FLOW
*
KK  MC2I
KM   AREA = 0.7 AC
BA0.0011
PB
* PI
BF -38.7
LU  0.10  0.2500  24.300
UK   225  0.1289   0.600  100.00
RD   100  0.0800   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
KK  MC2J
KM   AREA = 0.6 AC
BA0.0011
PB
* PI
BF -38.7
LU  0.10  0.2500  19.200
UK   225  0.1600   0.600  100.00
RD   310  0.0800   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
KKYMC2IC
KM  0
HC     2
ZW C=FLOW
*
KK YMC2I
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK  MD4A
KM     MD4A
BA0.1163
PB
* PI
BF -38.7
LU  0.10  0.2500   2.500
UK   500  0.4140   0.600  100.00
RD  2399  0.3040   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  MD3C
KM     MD3c AREA = 6.9 AC = 0.01078 SQ MI % IMPERV = 4.6
BA0.0108
PB
* PI
BF -38.7
LU  0.10  0.2500   4.400
UK   500  0.3184   0.600  100.00
RD   737  0.3184   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD3C
KM  0
HC     2
ZW C=FLOW
*
KK  MD3B
KM     MD3b AREA = 8.5 AC = 0.01328 SQ MI % IMPERV = 3.8
BA0.0133
PB
* PI
BF -38.7
LU  0.10  0.2500   3.600
UK   500  0.3073   0.600  100.00
RD  1173  0.3073   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMD3BC
KM  0
HC     2
ZW C=FLOW
*
KK MD3A1
KM     MD3a AREA = 25.4 AC = 0.03969 SQ MI % IMPERV = 2.6
BA0.0397
PB
* PI
BF -38.7
LU  0.10  0.2500   2.500
UK   500  0.3458   0.600  100.00
RD  2530  0.3458   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMD3A1
```

```
KM  0
HC     2
ZW C=FLOW
*
KK MD1A1
KM     MD1a  AREA = 3.0 AC = 0.00469 SQ MI % IMPERV = 7.1
BA0.0047
PB
* PI
BF -38.7
LU  0.10  0.2500   6.400
UK   500  0.2420   0.600  100.00
RD   135  0.2420   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMD1A1
KM  0
HC     2
ZW C=FLOW
*
KK MC2A4
KM   AREA = 59.1 AC
BA0.0022
PB
* PI
BF -38.7
LU  0.10  0.2500   2.200
UK  1035  0.4010   0.600  100.00
RD  2590  0.3421   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMC2A4
KM  0
HC     2
ZW C=FLOW
*
KKYC2A4C
KM  0
HC     2
ZW C=FLOW
*
KK YMD8C
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK MD1B1
KM   MD1B1
BA0.0157
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   800  0.0500   0.600      51
UK    50  0.0200   0.110      49
RD  1000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK MD1B2
KM   MD1B2
BA0.0392
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   800  0.0800   0.600      94
UK    50  0.0200   0.110       6
RD  1000  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKYMD1B2
KM  0
HC     2
ZW C=FLOW
*
KK  MD1A
KM     MD1a  AREA = 3.0 AC = 0.00469 SQ MI % IMPERV = 7.1
BA0.0581
PB
* PI
BF -38.7
LU  0.10  0.1940   6.400
UK   500  0.2420   0.600  100.00
RD   135  0.2420   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD1A
KM  0
HC     2
ZW C=FLOW
*
```

```
KKYMD1C4
KM  0
HC     2
ZW C=FLOW
*
KK  MD2D
KM     MD2D
BA0.0040
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   550  0.0350   0.600      90
UK    50  0.0200   0.110      10
RD   350  0.0300   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KK YMD2D
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK  MD3D
KM     MD3d
BA0.0094
PB
* PI
BF -38.7
LU  0.10  0.2500   8.000
UK   682  0.1610   0.600  100.00
RD   200  0.2350   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKMD1E1A
KM  MD1E1A
BA0.0018
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   600  0.0800   0.600      95
UK    50  0.0200   0.110       5
RD  1000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYD1E1A
KM  0
HC     2
ZW C=FLOW
*
KK   MD6
KM     MD6
BA0.0072
PB
* PI
BF -38.7
LU  0.10  0.2500   7.500
UK   635  0.1560   0.600  100.00
RD   300  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  YMD6
KM  0
HC     2
ZW C=FLOW
*
KK   MD1
KM     MD1  AREA = 5.7 AC = 0.00891 SQ MI % IMPERV = 14.0
BA0.0088
PB
* PI
BF -38.7
LU  0.10  0.2500  13.000
UK   483  0.1451   0.600  100.00
RD   100  0.1451   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  MD2A
KM  MD2A
BA0.0026
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   250  0.0350   0.600      90
UK    50  0.0200   0.110      10
RD   300  0.0400   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KK YMD2A
KM  0
```

```
HC     2
ZW C=FLOW
*
KKYMD6CC
KM  0
HC     2
ZW C=FLOW
*
KK  MD27
KM     MD27
BA0.0048
PB
* PI
BF -38.7
LU  0.10  0.2500  11.000
UK   559  0.0500   0.600  100.00
RD   123  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD27
KM  0
HC     2
ZW C=FLOW
*
KK MD28A
KM     MD28A
BA0.0043
PB
* PI
BF -38.7
LU  0.10  0.2500  15.200
UK   559  0.0500   0.600  100.00
RD   123  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMD28A
KM  0
HC     2
ZW C=FLOW
*
KK MD28B
KM     MD28B
BA0.0092
PB
* PI
BF -38.7
LU  0.10  0.2500   4.800
UK   559  0.0500   0.600  100.00
RD   123  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  MD3A
KM     MD3a AREA = 25.4 AC = 0.03969 SQ MI % IMPERV = 2.6
BA0.0076
PB
* PI
BF -38.7
LU  0.10  0.2500   2.500
UK   500  0.3458   0.600  100.00
RD  2530  0.3458   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMD28B
KM  0
HC     3
ZW C=FLOW
*
KK YMD3A
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK  MD7B
KM     MD7B
BA0.0042
PB
* PI
BF -38.7
LU  0.10  0.2500   9.000
UK   760  0.0500   0.600  100.00
RD   160  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
*
KKUD7BDT
KM  0
RS     1    FLOW      -1
SV  0.00    0.15    0.30    0.45
SQ   0.0   100.0   200.0   300.0
ZW C=FLOW
*
```

```
KK  MD4C
KM     MD4c
BA0.0056
PB
* PI
BF -38.7
LU  0.10  0.2500   8.800
UK   626  0.0500   0.600  100.00
RD   200  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD4C
KM  0
HC     2
ZW C=FLOW
*
KK  MD4E
KM  MD4E
BA0.0016
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1500  0.2830   0.600  100.00
RD  1100  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD4E
KM  0
HC     2
ZW C=FLOW
*
KK  MD4D
KM     MD4d
BA0.0062
PB
* PI
BF -38.7
LU  0.10  0.2500   7.500
UK   895  0.1010   0.600  100.00
RD   350  0.2980   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD4D
KM  0
HC     2
ZW C=FLOW
*
KK   MD9
KM     MD9
BA0.0106
PB
* PI
BF -38.7
LU  0.10  0.2500   7.900
UK   824  0.2530   0.600  100.00
RD   572  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK   MD8
KM     MD8
BA0.0047
PB
* PI
BF -38.7
LU  0.10  0.2500   4.800
UK   519  0.1260   0.600  100.00
RD   354  0.2350   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  YMD8
KM  0
HC     3
ZW C=FLOW
*
KK  YMD9
KM  0
HC     2
ZW C=FLOW
*
KK  MD6A
KM  MD6A
BA0.1279
PB
* PI
BF -38.7
LU  0.10  0.2190   7.500
UK   635  0.1560   0.600  100.00
RD   300  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD6A
KM  0
HC     2
```

```
ZW C=FLOW
*
* - - - - - -
*
*
KK  MD7D
KM     MD7d
BA0.0051
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   500  0.1060   0.600  100.00
RD   723  0.0640   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  MD7C
KM     MD7c
BA0.0061
PB
* PI
BF -38.7
LU  0.10  0.2500   3.200
UK   500  0.1060   0.600  100.00
RD   741  0.0640   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD7C
KM  0
HC     2
ZW C=FLOW
*
KK  MD7E
KM  MD7E
BA0.0094
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK  1200  0.3130   0.600      90
UK  1200  0.3000   0.240      10
RD  2000  0.0200   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD7E
KM  0
HC     2
ZW C=FLOW
*
KK  MD7F
KM  MD7F
BA0.0067
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK  1200  0.3130   0.600      90
UK  1200  0.3000   0.240      10
RD  2000  0.0200   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD7F
KM  0
HC     2
ZW C=FLOW
*
KK  MD11
KM     MD11
BA0.0056
PB
* PI
BF -38.7
LU  0.10  0.2500   4.800
UK   595  0.0500   0.600  100.00
RD   200  0.3330   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD11
KM  0
HC     2
ZW C=FLOW
*
KKYMD7FC
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK  MD2B
KM     MD2B
BA0.0056
PB
```

```
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   690  0.0460   0.600      90
UK    50  0.0200   0.110      10
RD   130  0.0100   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KK  ME3A
KM     ME3A
BA0.0040
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   420  0.0380   0.600      90
UK    50  0.0200   0.110      10
RD   200  0.0300   0.060            TRAP     2.0     2.0
ZW C=FLOW
*
KK YME3A
KM  0
HC     2
ZW C=FLOW
*
*
KKUE3CUL
KM  0
RS     1    FLOW      -1
SV  0.00    2.50    5.00    8.50   12.50   17.50
SQ   0.0   500.0  1200.0  2300.0  3500.0  5500.0
ZW C=FLOW
*
KKYME3AC
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK  MD17
KM     MD17
BA0.0075
PB
* PI
BF -38.7
LU  0.10  0.2500   5.700
UK   830  0.1260   0.600  100.00
RD   150  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  MD18
KM    MD18
BA0.0051
PB
* PI
BF -38.7
LU  0.10  0.2500   6.000
UK   930  0.1480   0.600  100.00
RD   200  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  MD19
KM     MD19
BA0.0056
PB
* PI
BF -38.7
LU  0.10  0.2500   6.100
UK  1055  0.2100   0.600  100.00
RD   150  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD19
KM  0
HC     3
ZW C=FLOW
*
KKYMD19C
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK MD2A1
KM     MD2A
BA0.0019
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
```

```
UK   250  0.0350   0.600      90
UK    50  0.0200   0.110      10
RD   300  0.0400   0.060           TRAP     2.0     2.0
ZW C=FLOW
*
KK   MD2
KM     MD2
BA0.0059
PB
* PI
BF -38.7
LU  0.10  0.2500  16.800
UK   295  0.1250   0.600  100.00
RD   200  0.3210   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK  YMD2
KM  0
HC     2
ZW C=FLOW
*
KK ME3A2
KM    ME3A2
BA0.0062
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   500  0.0440   0.600      90
UK    50  0.0200   0.110      10
RD   300  0.0500   0.060           TRAP     2.0     2.0
ZW C=FLOW
*
KK YMD2C
KM  0
HC     2
ZW C=FLOW
*
KKYME3A2
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK  MD13
KM     MD13
BA0.4368
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   500  0.4770   0.600  100.00
RD  5450  0.3010   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKME6_19
KM  ME6_19
BA0.0236
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   330  0.0530   0.600  100.00
RD   522  0.0880   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKME6_14
KM  ME6_14
BA0.0063
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   330  0.0530   0.600  100.00
RD   522  0.0880   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYME614
KM  0
HC     2
ZW C=FLOW
*
KK YMD13
KM  0
HC     2
ZW C=FLOW
*
KK  MD12
KM     MD12
BA0.0428
PB
* PI
```

```
BF -38.7
LU  0.10  0.2500   2.500
UK   500  0.1060   0.600  100.00
RD  2855  0.0640   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD12
KM  0
HC     2
ZW C=FLOW
*
KK MD12B
KM     MD12b
BA0.0024
PB
* PI
BF -38.7
LU  0.10  0.2500  24.700
UK   352  0.2560   0.600  100.00
RD   190  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK MD12C
KM     MD12c
BA0.0084
PB
* PI
BF -38.7
LU  0.10  0.2500   6.500
UK   500  0.2050   0.600  100.00
RD   498  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMD12C
KM  0
HC     2
ZW C=FLOW
*
KK MD14B
KM     MD14b
BA0.0016
PB
* PI
BF -38.7
LU  0.10  0.2500  12.600
UK   500  0.1060   0.600  100.00
RD    42  0.0640   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMD14B
KM  0
HC     2
ZW C=FLOW
*
KK MD14C
KM     MD14c
BA0.0060
PB
* PI
BF -38.7
LU  0.10  0.2500   4.300
UK   500  0.1060   0.600  100.00
RD   406  0.0640   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMD14C
KM  0
HC     3
ZW C=FLOW
*
KKME6_13
KM   1.17 AC
BA0.0022
PB
* PI
BF -38.7
LU  0.10  0.2500   2.900
UK   525  0.1750   0.600  100.00
RD   345  0.0800   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK ME8_3
KM   3.07 AC
BA0.0048
PB
* PI
BF -38.7
LU  0.10  0.2500   7.400
UK   675  0.1640   0.600  100.00
RD   100  0.1700   0.060            TRAP     0.1     2.0
ZW C=FLOW
*
KKYME8_3
KM  0
```

```
HC     2
ZW C=FLOW
*
KK YME83
KM  0
HC     2
ZW C=FLOW
*
KK MD13B
KM  MD13B
BA0.0392
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   500  0.4770   0.600  100.00
RD  5450  0.3010   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMD13B
KM  0
HC     2
ZW C=FLOW
*
KK  MD14
KM     MD14
BA0.0060
PB
* PI
BF -38.7
LU  0.10  0.2500   9.300
UK   663  0.1650   0.600  100.00
RD   280  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK MD14A
KM  MD14A
BA0.0009
PB
* PI
BF -38.7
LU  0.10  0.2500   9.300
UK   663  0.1650   0.600  100.00
RD   280  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMD14A
KM  0
HC     2
ZW C=FLOW
*
KKYD14AC
KM  0
HC     2
ZW C=FLOW
*
KK ME3_5
KM  ME3_5
BA0.0007
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   300  0.1000   0.600      65
UK   300  0.1000   0.240      35
RD  1500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME3_5
KM  0
HC     2
ZW C=FLOW
*
KK  MD15
KM    MD15
BA0.0073
PB
* PI
BF -38.7
LU  0.10  0.2500   9.200
UK   870  0.1590   0.600  100.00
RD   140  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK MD15A
KM  MD15A
BA0.0002
PB
* PI
BF -38.7
LU  0.10  0.2500   9.200
UK   870  0.1590   0.600  100.00
RD   140  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
```

```
*
KKYMD15A
KM  0
HC     2
ZW C=FLOW
*
KK MD16A
KM  MD16A
BA0.0036
PB
* PI
BF -38.7
LU  0.10  0.2500  10.000
UK   772  0.1250   0.600  100.00
RD   150  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMD16A
KM  0
HC     2
ZW C=FLOW
*
KK  MD16
KM     MD16
BA0.0063
PB
* PI
BF -38.7
LU  0.10  0.2500  10.000
UK   772  0.1250   0.600  100.00
RD   150  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD16
KM  0
HC     2
ZW C=FLOW
*
KKYMD16C
KM  0
HC     2
ZW C=FLOW
*
KK MD13C
KM  MD13C
BA0.0068
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   500  0.4770   0.600  100.00
RD  5450  0.3010   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMD13C
KM  0
HC     2
ZW C=FLOW
*
KK  MD20
KM     MD20
BA0.0020
PB
* PI
BF -38.7
LU  0.10  0.2500   9.000
UK   740  0.0500   0.600  100.00
RD   180  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD20
KM  0
HC     2
ZW C=FLOW
*
KKYD13CC
KM  0
HC     2
ZW C=FLOW
*
KK  ME3B
KM     ME3B
BA0.0182
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   300  0.1000   0.600      65
UK   300  0.1000   0.240      35
RD  1500  0.1000   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
* - - - - - -
*
```

```
*
KKGS31B1
KM    GS31B1
BA0.0029
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   580  0.0380   0.600      90
UK    50  0.0200   0.110      10
RD   275  0.0500   0.060            TRAP     2.0      2.0
ZW C=FLOW
*
KKGS31B2
KM    GS31B2
BA0.0047
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   690  0.0570   0.600      90
UK    50  0.0200   0.110      10
RD   340  0.0500   0.060            TRAP     2.0      2.0
ZW C=FLOW
*
KKGS31B3
KM    GS31B3
BA0.0056
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   530  0.0600   0.600      90
UK    50  0.0200   0.110      10
RD   250  0.0400   0.060            TRAP     2.0      2.0
ZW C=FLOW
*
KKYGS311
KM  0
HC     3
ZW C=FLOW
*
KKGS31B4
KM    GS31B4
BA0.0012
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   250  0.0480   0.600      90
UK    50  0.0200   0.110      10
RD   150  0.0400   0.060            TRAP     2.0      2.0
ZW C=FLOW
*
KKGS31B5
KM    GS31B5
BA0.0056
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  95.000
UK   500  0.0500   0.600      90
UK    50  0.0200   0.110      10
RD   350  0.0400   0.060            TRAP     2.0      2.0
ZW C=FLOW
*
KKYGS312
KM  0
HC     3
ZW C=FLOW
*
KKYS31BC
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK ME8_1
KM   0.48 AC
BA0.0007
PB
* PI
BF -38.7
LU  0.10  0.2500  26.000
UK   180  0.0660   0.600  100.00
RD    80  0.0600   0.060            TRAP     0.1      2.0
ZW C=FLOW
*
KK ME3_1
KM  ME3_1
BA0.0009
PB
```

```
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   300  0.1000   0.600      65
UK   300  0.1000   0.240      35
RD  1500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME3_1
KM  0
HC     2
ZW C=FLOW
*
KK ME3_2
KM  ME3_2
BA0.0024
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   300  0.1000   0.600      65
UK   300  0.1000   0.240      35
RD  1500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME3_2
KM  0
HC     2
ZW C=FLOW
*
KK ME3_3
KM  ME3_3
BA0.0031
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   300  0.1000   0.600      65
UK   300  0.1000   0.240      35
RD  1500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME3_3
KM  0
HC     2
ZW C=FLOW
*
KK ME3_4
KM  ME3_4
BA0.0024
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   300  0.1000   0.600      65
UK   300  0.1000   0.240      35
RD  1500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME3_4
KM  0
HC     2
ZW C=FLOW
*
KK  MD21
KM     MD21
BA0.0033
PB
* PI
BF -38.7
LU  0.10  0.2500   7.200
UK   640  0.0500   0.600  100.00
RD   150  0.3210   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMD21
KM  0
HC     2
ZW C=FLOW
*
KK ME3C3
KM  ME3C3
BA0.0066
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   300  0.1000   0.600      65
UK   300  0.1000   0.240      35
RD  1500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME3C3
KM  0
```

```
HC     2
ZW C=FLOW
*
KK ME3C1
KM  ME3C1
BA0.0016
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   300  0.1000   0.600      65
UK   300  0.1000   0.240      35
RD  1500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME3C1
KM  0
HC     2
ZW C=FLOW
*
KKYME3CC
KM  0
HC     2
ZW C=FLOW
*
KK  ME4A
KM     ME4A
BA0.0939
PB
* PI
BF -38.7
LU  0.10  0.2320   2.000    0.10  0.2320  15.000
UK   500  0.1200   0.600      90
UK   300  0.1200   0.240      10
RD  2500  0.1000   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
* - - - - - -
*
*
KKME6_11
KM   0.13 AC
BA0.0002
PB
* PI
BF -38.7
LU  0.10  0.2500  49.100
UK    30  0.0200   0.110  100.00
RD    95  0.0600   0.060            TRAP     0.1    50.0
ZW C=FLOW
*
KKME6_10
KM   0.21 AC
BA0.0003
PB
* PI
BF -38.7
LU  0.10  0.2500  67.300
UK    30  0.0200   0.110  100.00
RD   235  0.0600   0.060            TRAP     0.1    50.0
ZW C=FLOW
*
KKYME610
KM  CME610
HC     2
ZW C=FLOW
*
KKME6_25
KM   7.81 AC
BA0.0094
PB
* PI
BF -38.7
LU  0.10  0.2500   7.100
UK   125  0.1600   0.600  100.00
RD   235  0.1149   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME625
KM  0
HC     2
ZW C=FLOW
*
KKME6_33
KM  ME6_33
BA0.0026
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   330  0.0530   0.600  100.00
RD   522  0.0880   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
```

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KKYME633
KM  0
HC     2
ZW C=FLOW
*
KKME6_26
KM   0.43 AC
BA0.0008
PB
* PI
BF -38.7
LU  0.10  0.2500   3.000
UK   200  0.1300   0.600  100.00
RD   205  0.1268   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME626
KM  0
HC     2
ZW C=FLOW
*
KK ME7_1
KM   8.34 AC
BA0.0127
PB
* PI
BF -38.7
LU  0.10  0.2500   4.600
UK   470  0.2468   0.600  100.00
RD   340  0.1471   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME7_1
KM  CME7_1
HC     2
ZW C=FLOW
*
KK ME7_2
KM   0.25 AC
BA0.0004
PB
* PI
BF -38.7
LU  0.10  0.2500  83.600
UK    30  0.0200   0.110  100.00
RD   620  0.0800   0.060            TRAP     0.1    50.0
ZW C=FLOW
*
KKYME7_2
KM  0
HC     2
ZW C=FLOW
*
KK ME7D6
KM  ME7D6
BA0.0060
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   500  0.1800   0.600      75
UK   300  0.1800   0.240      25
RD  1000  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME7D6
KM  0
HC     2
ZW C=FLOW
*
KKME7D14
KM  ME7D14
BA0.0037
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   150  0.1300   0.600  100.00
RD   300  0.1200   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKME7D16
KM  ME7D16
BA0.0018
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   177  0.0450   0.600  100.00
RD   430  0.1200   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKME7D15
KM  ME7D15
```

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BA0.0031
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   175  0.0570   0.600  100.00
RD   570  0.1100   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKYM7D14
KM  0
HC     2
ZW C=FLOW
*
KKME7D24
KM  ME7D24
BA0.0022
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   144  0.0900   0.600  100.00
RD   270  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYM7D24
KM  0
HC     2
ZW C=FLOW
*
KKME4B13
KM  ME4B13
BA0.0056
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   270  0.0200   0.600  100.00
RD   515  0.0540   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYM4B13
KM  0
HC     2
ZW C=FLOW
*
KK ME7C4
KM  ME7C4
BA0.0054
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   500  0.1500   0.600       5
UK   300  0.1500   0.240      95
RD  1000  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK ME7C5
KM  ME7C5
BA0.0061
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   500  0.1500   0.600       5
UK   300  0.1500   0.240      95
RD  1000  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME7C5
KM  0
HC     2
ZW C=FLOW
*
KK ME4B3
KM  ME4B3
BA0.0029
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   300  0.0500   0.600      15
UK   300  0.0500   0.240      85
RD  2000  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME4B3
KM  0
HC     2
ZW C=FLOW
*
*
KKUE4BDT
```

```
KM  0
RS     1    FLOW      -1
SV  0.00    0.15    0.30    0.45
SQ   0.0   100.0   200.0   300.0
ZW C=FLOW
*
KKME4B12
KM  ME4B12
BA0.0065
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   430  0.0180   0.600  100.00
RD   720  0.0700   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME4BC
KM  0
HC     2
ZW C=FLOW
*
KKYM4BCC
KM  0
HC     2
ZW C=FLOW
*
KKME4B23
KM  ME4B23
BA0.0088
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   210  0.0700   0.600  100.00
RD   400  0.0600   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKME4B22
KM  ME4B22
BA0.0074
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   220  0.1000   0.600  100.00
RD   720  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK ME3C2
KM  ME3C2
BA0.0032
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   300  0.1600   0.600      60
UK   300  0.1600   0.240      40
RD  1500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKME4B11
KM  ME4B11
BA0.0049
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   340  0.0530   0.600  100.00
RD   530  0.0750   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKME4B21
KM  ME4B21
BA0.0024
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   220  0.1000   0.600  100.00
RD   720  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKME4B10
KM  ME4B-10
BA0.0027
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   150  0.0800   0.600  100.00
RD   275  0.0700   0.060           TRAP     10.0    10.0
ZW C=FLOW
*
```

```
KK  ME4B
KM     ME4B
BA0.0055
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   300  0.0500   0.600      15
UK   300  0.0500   0.240      85
RD  2000  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YME4B
KM  0
HC     2
ZW C=FLOW
*
KKYME4CC
KM  0
HC     3
ZW C=FLOW
*
KKYM4CCC
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KKMG3_3B
KM  MG3_3B
BA0.1460
PB
* PI
BF -38.7
LU  0.10  0.2500   2.900
UK   575  0.2250   0.600  100.00
RD   925  0.2260   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKMG3_3C
KM  MG3_3C
BA0.0127
PB
* PI
BF -38.7
LU  0.10  0.2500   2.900
UK   575  0.2250   0.600  100.00
RD   925  0.2260   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMG_3C
KM  0
HC     2
ZW C=FLOW
*
KKME6_12
KM   14.48 AC
BA0.0096
PB
* PI
BF -38.7
LU  0.10  0.2500   3.400
UK   600  0.2950   0.600  100.00
RD  1920  0.2495   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME_12
KM  0
HC     2
ZW C=FLOW
*
KKME6_16
KM   10.41 AC
BA0.0002
PB
* PI
BF -38.7
LU  0.10  0.2500   4.400
UK   600  0.2950   0.600  100.00
RD  1595  0.3003   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME_16
KM  0
HC     2
ZW C=FLOW
*
KKME6_18
KM   2.92 AC
BA0.0046
PB
* PI
```

```
BF -38.7
LU  0.10  0.2500  10.200
UK   150  0.2133   0.600  100.00
RD   155  0.1032   0.060          TRAP    10.0    10.0
ZW C=FLOW
*
KKYME_18
KM  0
HC     2
ZW C=FLOW
*
KKME6_20
KM   3.75 AC
BA0.0060
PB
* PI
BF -38.7
LU  0.10  0.2500   6.300
UK   200  0.2100   0.600  100.00
RD   155  0.2330   0.060          TRAP    10.0    10.0
ZW C=FLOW
*
KKME6_24
KM   0.70 AC
BA0.0026
PB
* PI
BF -38.7
LU  0.10  0.2500  18.600
UK   305  0.0910   0.600  100.00
RD   120  0.0300   0.060          TRAP     0.1    50.0
ZW C=FLOW
*
KKYME_24
KM  0
HC     3
ZW C=FLOW
*
KKME6_23
KM   4.19 AC
BA0.0065
PB
* PI
BF -38.7
LU  0.10  0.2500   8.200
UK   200  0.1700   0.600  100.00
RD   265  0.1060   0.060          TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKME6_32
KM   0.39 AC
BA0.0006
PB
* PI
BF -38.7
LU  0.10  0.2500  33.900
UK    24  0.0200   0.110  100.00
RD   415  0.0800   0.060          TRAP     0.1    50.0
ZW C=FLOW
*
KKYME_32
KM  0
HC     2
ZW C=FLOW
*
KKME6_28
KM   4.93 AC
BA0.0077
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   355  0.1130   0.600  100.00
RD   590  0.1010   0.060          TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK ME627
KM   1.77 AC
BA0.0027
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   120  0.1070   0.600  100.00
RD   400  0.1057   0.060          TRAP    10.0    10.0
ZW C=FLOW
*
KKYME627
KM  0
HC     2
ZW C=FLOW
*
KKME6_29
KM   1.37 AC
```

```
BA0.0021
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   370  0.1140   0.600  100.00
RD   335  0.0930   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYME_29
KM  0
HC     2
ZW C=FLOW
*
KKME6_30
KM   1.27 AC
BA0.0020
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   295  0.0880   0.600  100.00
RD   195  0.0790   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKME6A25
KM  ME6A25
BA0.0029
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   330  0.0530   0.600  100.00
RD   522  0.0880   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYM6A25
KM  0
HC     2
ZW C=FLOW
*
KK  ME7B
KM     ME7B
BA0.0270
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   400  0.0500   0.600      75
UK   300  0.0500   0.240      25
RD  1500  0.1000   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
*
KKUE7BDT
KM  0
RS     1    FLOW      -1
SV  0.00    0.15    0.30    0.45
SQ   0.0   100.0   200.0   300.0
ZW C=FLOW
*
KK  ME7A
KM     ME7A
BA0.1404
PB
* PI
BF -38.7
LU  0.10  0.2270   2.000    0.10  0.2270  15.000
UK  1300  0.1920   0.600      10
UK   300  0.1900   0.240      90
RD  3000  0.1000   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKYME7AC
KM  0
HC     2
ZW C=FLOW
*
KK YGSMC
KM  0
HC     2
ZW C=FLOW
*
KKVGSMCR
KM  0
RD  2000  0.0100   0.040           TRAP    10.0    10.0
ZW C=FLOW
*
KK   MF1
KM     MF1
BA0.3780
PB
* PI
BF -38.7
```

```
LU  0.10  0.2050   2.000
UK  1500  0.0870   0.600  100.00
RD  2000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMF1C
KM  0
HC     2
ZW C=FLOW
*
KKVMF1CR
KM  0
RD  2000  0.0100   0.040            TRAP    10.0    10.0
ZW C=FLOW
*
KK   MF2
KM     MF2
BA0.0582
PB
* PI
BF -38.7
LU  0.10  0.2470   2.000
UK  1000  0.0700   0.600  100.00
RD  2000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMF2C
KM  0
HC     2
ZW C=FLOW
*
KKVMF2CR
KM  0
RD  3000  0.0100   0.040            TRAP    10.0    10.0
ZW C=FLOW
*
* - - - - - -
*
*
KKMD4_1A
KM     MD4
BA0.1899
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1500  0.2830   0.600  100.00
RD  1100  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKMG4_1B
KM     6.35 AC
BA0.0100
PB
* PI
BF -38.7
LU  0.10  0.2500   2.100
UK   500  0.3500   0.600  100.00
RD   491  0.4296   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKMG5_2A
KM   8.61 AC
BA0.0134
PB
* PI
BF -38.7
LU  0.10  0.2500   3.200
UK   600  0.2033   0.600  100.00
RD  1065  0.3014   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMG52A
KM  0
HC     3
ZW C=FLOW
*
KK MG3_1
KM   1.78 AC
BA0.0028
PB
* PI
BF -38.7
LU  0.10  0.2500   5.400
UK   500  0.2800   0.600  100.00
RD  1070  0.3293   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKMG3_1A
KM   1.00 AC
BA0.0016
PB
* PI
BF -38.7
```

```
LU  0.10  0.2500   5.400
UK   498  0.2800   0.600  100.00
RD   575  0.3270   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMG31A
KM  0
HC     2
ZW C=FLOW
*
KKMG3_1C
KM   1.47 AC
BA0.0023
PB
* PI
BF -38.7
LU  0.10  0.2500   5.400
UK   498  0.2811   0.600  100.00
RD   567  0.3422   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMG31C
KM  0
HC     2
ZW C=FLOW
*
KK MG3_6
KM   0.09 AC
BA0.0002
PB
* PI
BF -38.7
LU  0.10  0.2500  90.000
UK    30  0.0200   0.110  100.00
RD   360  0.0120   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
KK YMG36
KM  0
HC     2
ZW C=FLOW
*
KK MG4_2
KM   4.61 AC
BA0.0072
PB
* PI
BF -38.7
LU  0.10  0.2500   3.100
UK   500  0.2840   0.600  100.00
RD   535  0.3551   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMG42
KM  0
HC     2
ZW C=FLOW
*
KKMG4_3B
KM  MG4_3B
BA0.0002
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK  2300  0.3260   0.600      95
UK   600  0.2500   0.240       5
RD  2500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMG43B
KM  0
HC     2
ZW C=FLOW
*
KKMG4_3A
KM   0.07 AC
BA0.0001
PB
* PI
BF -38.7
LU  0.10  0.2500  90.000
UK    30  0.0200   0.110  100.00
RD   250  0.0098   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
KKYMG43A
KM  0
HC     2
ZW C=FLOW
*
KKMG5_2B
KM   0.06 AC
BA0.0001
```

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PB
* PI
BF -38.7
LU  0.10  0.2500  90.000
UK    12  0.0100   0.600  100.00
RD   400  0.0500   0.060            TRAP    10.0    50.0
ZW C=FLOW
*
KK MG4_4
KM   0.10 AC
BA0.0002
PB
* PI
BF -38.7
LU  0.10  0.2500  90.000
UK    30  0.0200   0.110  100.00
RD   350  0.0098   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
KK YMG44
KM  0
HC     2
ZW C=FLOW
*
KKMG4_5C
KM  MG4_5C
BA0.0078
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK  2300  0.3260   0.600      95
UK   600  0.2500   0.240       5
RD  2500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMG45C
KM  0
HC     4
ZW C=FLOW
*
KKMG5_1A
KM   18.98 AC
BA0.0296
PB
* PI
BF -38.7
LU  0.10  0.2500   2.800
UK   600  0.1550   0.600  100.00
RD  1820  0.2357   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKMG5_1B
KM  MG5_1B
BA0.0090
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   200  0.1000   0.600       5
UK   200  0.1000   0.240      95
RD   500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMG51B
KM  0
HC     2
ZW C=FLOW
*
KK MG5_3
KM   0.04 AC
BA0.0001
PB
* PI
BF -38.7
LU  0.10  0.2500  90.000
UK    30  0.0200   0.110  100.00
RD   300  0.0775   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
KK MG5_4
KM   0.15 AC
BA0.0003
PB
* PI
BF -38.7
LU  0.10  0.2500  90.000
UK    30  0.0200   0.110  100.00
RD   300  0.0775   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
KK YMG54
KM  0
HC     3
```

```
ZW C=FLOW
*
KK MG5_5
KM  MG5_5
BA0.0024
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   200  0.1000   0.600       5
UK   200  0.1000   0.240      95
RD   500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMG55
KM  0
HC     2
ZW C=FLOW
*
KKYMG55C
KM  0
HC     2
ZW C=FLOW
*
KKMG3_3A
KM   8.25 AC
BA0.0129
PB
* PI
BF -38.7
LU  0.10  0.2500   2.900
UK   575  0.2250   0.600  100.00
RD   925  0.2260   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK MG3_2
KM   2.58 AC
BA0.0040
PB
* PI
BF -38.7
LU  0.10  0.2500   6.100
UK   390  0.2051   0.600  100.00
RD   370  0.3000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK MG3_4
KM   014 AC
BA0.0002
PB
* PI
BF -38.7
LU  0.10  0.2500  88.800
UK    30  0.0200   0.110  100.00
RD   300  0.0691   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
KK YMG34
KM  0
HC     3
ZW C=FLOW
*
KKMG3_1B
KM   0.87 AC
BA0.0014
PB
* PI
BF -38.7
LU  0.10  0.2500   5.400
UK   500  0.2800   0.600  100.00
RD   300  0.3467   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKMG3_1D
KM   0.57 AC
BA0.0009
PB
* PI
BF -38.7
LU  0.10  0.2500   5.400
UK   504  0.2778   0.600  100.00
RD   360  0.3083   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK MG3_5
KM   0.07 AC
BA0.0001
PB
* PI
BF -38.7
LU  0.10  0.2500  90.000
UK    30  0.0200   0.110  100.00
RD   350  0.0094   0.060            TRAP     0.1     1.0
ZW C=FLOW
```

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*
KK YMG35
KM  0
HC     3
ZW C=FLOW
*
KKMG3_5A
KM  MG3_5A
BA0.0073
PB
* PI
BF -38.7
LU  0.10  0.2500   2.900
UK   575  0.2250   0.600  100.00
RD   925  0.2260   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYMG35A
KM  0
HC     3
ZW C=FLOW
*
KK ME6_1
KM   10.24 AC
BA0.0082
PB
* PI
BF -38.7
LU  0.10  0.2500   3.900
UK   310  0.1740   0.600  100.00
RD   250  0.1640   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK ME6_2
KM   1.28 AC
BA0.0099
PB
* PI
BF -38.7
LU  0.10  0.2500   6.900
UK   505  0.1940   0.600  100.00
RD   235  0.0800   0.060           TRAP     0.1    50.0
ZW C=FLOW
*
KK ME6_3
KM   0.02 AC
BA0.0003
PB
* PI
BF -38.7
LU  0.10  0.2500  86.500
UK    15  0.0200   0.600  100.00
RD   235  0.0800   0.060           TRAP     0.1    50.0
ZW C=FLOW
*
KKYM6123
KM  0
HC     3
ZW C=FLOW
*
KK ME6_5
KM   1.40 AC
BA0.0022
PB
* PI
BF -38.7
LU  0.10  0.2500  16.500
UK   160  0.1500   0.600  100.00
RD   365  0.0800   0.060           TRAP     0.1    50.0
ZW C=FLOW
*
KK YME65
KM  0
HC     2
ZW C=FLOW
*
KK ME6_7
KM   0.81 AC
BA0.0013
PB
* PI
BF -38.7
LU  0.10  0.2500  16.200
UK   190  0.1680   0.600  100.00
RD   145  0.1100   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK YME67
KM  0
HC     2
ZW C=FLOW
*
KK ME6_8
KM    .44 AC
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BA0.0007
PB
* PI
BF -38.7
LU  0.10  0.2500  87.800
UK    20  0.0200   0.600  100.00
RD   555  0.0560   0.060            TRAP    10.0    50.0
ZW C=FLOW
*
KK YME68
KM  0
HC     2
ZW C=FLOW
*
KK MG1_2
KM   0.67 AC
BA0.0010
PB
* PI
BF -38.7
LU  0.10  0.2500  11.100
UK   100  0.1400   0.600  100.00
RD   255  0.1686   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK MG1_3
KM   1.89 AC
BA0.0025
PB
* PI
BF -38.7
LU  0.10  0.2500   9.500
UK   300  0.0700   0.600  100.00
RD   205  0.2293   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK MG1_1
KM   1.38 AC
BA0.0026
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   185  0.1946   0.600  100.00
RD   205  0.0600   0.060            TRAP     0.1     2.0
ZW C=FLOW
*
KK MG1_4
KM   0.18 AC
BA0.0003
PB
* PI
BF -38.7
LU  0.10  0.2500  46.900
UK    30  0.0200   0.110  100.00
RD   295  0.0800   0.060            TRAP     0.1     1.0
ZW C=FLOW
*
KKYG1234
KM  0
HC     5
ZW C=FLOW
*
KKMG3_33
KM  MG3_33
BA0.0087
PB
* PI
BF -38.7
LU  0.10  0.2500   2.900
UK   575  0.2250   0.600  100.00
RD   925  0.2260   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMG33
KM  0
HC     2
ZW C=FLOW
*
KKME6_8A
KM  ME6_8A
BA0.0006
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   330  0.0530   0.600  100.00
RD   522  0.0880   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYME68A
KM  0
HC     3
ZW C=FLOW
```

```
*
KK   MG2
KM     MG2
BA0.1195
PB
* PI
BF -38.7
LU  0.10  0.2450   2.000    0.10  0.2450  15.000
UK   700  0.1430   0.600      90
UK   700  0.1400   0.240      10
RD  1500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  YMG2
KM  0
HC     3
ZW C=FLOW
*
* - - - - - -
*
*
KK ME6_6
KM   0.16 AC
BA0.0003
PB
* PI
BF -38.7
LU  0.10  0.2500  73.000
UK    30  0.0200   0.110  100.00
RD   340  0.0800   0.060            TRAP     0.1    50.0
ZW C=FLOW
*
KKME6_21
KM   2.50 AC
BA0.0039
PB
* PI
BF -38.7
LU  0.10  0.2500  12.000
UK   200  0.1250   0.600  100.00
RD   235  0.1490   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKME6_31
KM   0.44 AC
BA0.0007
PB
* PI
BF -38.7
LU  0.10  0.2500  42.900
UK    24  0.0200   0.110  100.00
RD   480  0.0800   0.060            TRAP     0.1    50.0
ZW C=FLOW
*
KKYME631
KM  0
HC     3
ZW C=FLOW
*
KKMG1B19
KM  MG1B19
BA0.0072
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   150  0.0400   0.600  100.00
RD   780  0.1300   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKMG1B20
KM  MG1B20
BA0.0039
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   240  0.0800   0.600  100.00
RD   710  0.1200   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  ME6A
KM     ME6A
BA0.0030
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   300  0.1200   0.600      50
UK   300  0.1200   0.240      50
RD  1500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YME6A
```

```
KM  0
HC     3
ZW C=FLOW
*
KKMG1B26
KM  MG1B26
BA0.0038
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   250  0.0960   0.600  100.00
RD   550  0.0910   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK  MG1B
KM     MG1B
BA0.0119
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   300  0.1000   0.600      50
UK   200  0.1000   0.240      50
RD   800  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKME6A27
KM  ME6A27
BA0.0094
PB
* PI
BF -38.7
LU  0.10  0.2500  15.000
UK   230  0.0950   0.600  100.00
RD   520  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMG1B
KM  0
HC     3
ZW C=FLOW
*
KK  MG1A
KM     MG1A
BA0.0185
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   200  0.1000   0.600      50
UK   200  0.1000   0.240      50
RD  1000  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMG1A
KM  0
HC     2
ZW C=FLOW
*
KK YMGCC
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK MG5B1
KM  MG5B1
BA0.1242
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   200  0.1000   0.600       5
UK   200  0.1000   0.240      95
RD   500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK MG5A2
KM  MG5A2
BA0.0613
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   200  0.1000   0.600       5
UK   200  0.1000   0.240      95
RD   500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMG5A2
KM  0
```

```
HC     2
ZW C=FLOW
*
KK  MG6B
KM     MG6B
BA0.0479
PB
* PI
BF -38.7
LU  0.10  0.2010   2.000    0.10  0.2010  15.000
UK  1000  0.2500   0.600      85
UK   400  0.2500   0.240      15
RD  1500  0.1000   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK MG5A1
KM  MG5A1
BA0.0134
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500  15.000
UK   200  0.1000   0.600       5
UK   200  0.1000   0.240      95
RD   500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMG5A1
KM  0
HC     2
ZW C=FLOW
*
KK YMGCC
KM  0
HC     2
ZW C=FLOW
*
KK   MG7
KM     MG7
BA0.1439
PB
* PI
BF -38.7
LU  0.10  0.2070   2.000
UK   600  0.2500   0.600  100.00
RD  3500  0.0100   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK NS24A
KM  NS24A
BA0.0297
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   900  0.1000   0.600  100.00
RD  1000  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK NS24B
KM  NS24B
BA0.0120
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   300  0.1000   0.600  100.00
RD   500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS24B
KM  0
HC     2
ZW C=FLOW
*
KK NS24C
KM  NS24C
BA0.0400
PB
* PI
BF -38.7
LU  0.10  0.1820   2.000
UK   800  0.1000   0.600  100.00
RD  1000  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS24C
KM  0
HC     3
ZW C=FLOW
*
KK  NS25
KM  NS25
BA0.0370
```

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PB
* PI
BF -38.7
LU  0.10  0.2490   2.000
UK   800  0.0500   0.600  100.00
RD  1200  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YNS25
KM  0
HC     2
ZW C=FLOW
*
KK  NS26
KM  NS26
BA0.1102
PB
* PI
BF -38.7
LU  0.10  0.1220   2.000
UK  1000  0.0500   0.600  100.00
RD  1500  0.0200   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YNS26
KM  0
HC     3
ZW C=FLOW
*
*
KKUW4END
KM  ROUTE FOR BACKWATER AT NW4
RS     1    FLOW      -1
SV  0.00    0.46    1.70    6.66   46.30  520.00
SQ   0.0   178.0  1833.0  2500.0  4382.0  8550.0
ZW C=FLOW
*
* - - - - - -
*
*
KK NS22A
KM  NS22A
BA0.0103
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   750  0.1000   0.600  100.00
RD  1000  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK NS22C
KM  NS22C
BA0.0063
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   300  0.1000   0.600  100.00
RD   500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS22C
KM  0
HC     2
ZW C=FLOW
*
KK NS23A
KM  NS23A
BA0.0374
PB
* PI
BF -38.7
LU  0.10  0.1900   2.000
UK   950  0.0700   0.600  100.00
RD  1100  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS23A
KM  0
HC     2
ZW C=FLOW
*
KK  NS27
KM  NS27
BA0.0574
PB
* PI
BF -38.7
LU  0.10  0.1000   2.000
UK   830  0.0300   0.600  100.00
RD  1000  0.0200   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
```

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KK YNS27
KM  0
HC     4
ZW C=FLOW
*
KK NS28B
KM  NS28B
BA0.0417
PB
* PI
BF -38.7
LU  0.10  0.1000   2.850
UK   500  0.0100   0.600  100.00
RD  1000  0.0100   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  E85Z
KM  E85Z
BA0.0291
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   400  0.0200   0.600  100.00
RD   500  0.0500   0.060            TRAP    20.0    10.0
ZW C=FLOW
*
KKYNS28B
KM  0
HC     3
ZW C=FLOW
*
KK NS28A
KM  NS28A
BA0.0415
PB
* PI
BF -38.7
LU  0.10  0.1000   2.000
UK   500  0.0100   0.600  100.00
RD  1000  0.0100   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS28A
KM  0
HC     2
ZW C=FLOW
*
* - - - - - -
*
*
KK  NS22
KM  NS22
BA0.2037
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  2100  0.0800   0.600  100.00
RD  2500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  NS31
KM  NS31
BA0.0592
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1250  0.1000   0.600  100.00
RD  1300  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YNS31
KM  0
HC     2
ZW C=FLOW
*
KK NS22B
KM  NS22B
BA0.0098
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   500  0.1000   0.600  100.00
RD   500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS22B
KM  0
HC     2
ZW C=FLOW
*
```

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KK NS23B
KM  NS23B
BA0.1061
PB
* PI
BF -38.7
LU  0.10  0.1910   2.000
UK  1350  0.0500   0.600  100.00
RD  1500  0.0200   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS23B
KM  0
HC     2
ZW C=FLOW
*
KK NS32A
KM  NS32A
BA0.0191
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   500  0.1000   0.600  100.00
RD  1000  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK NS32B
KM  NS32B
BA0.1481
PB
* PI
BF -38.7
LU  0.10  0.1650   2.000
UK  1500  0.0800   0.600  100.00
RD  2500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS32B
KM  0
HC     3
ZW C=FLOW
*
KK   NS1
KM   BASIN 1 - 330 Ac
BA0.5174
PB
* PI
BF -38.7
LU  0.10  0.1780   2.000    0.10  0.1780   2.000
UK  3300  0.2400   0.800      57
UK  3300  0.2400   0.600      43
RD  2800  0.1800   0.060            TRAP     5.0     3.0
RD  2800  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
*
KKUR-NS1
KM   ROUTE NS-1
RS     1    FLOW      -1
SV  0.70    1.10    1.50    1.90    2.20    2.80    3.90    4.90
SQ 100.0   200.0   300.0   400.0   500.0   700.0  1100.0  1500.0
ZW C=FLOW
*
KK   NS2
KM   BASIN 2 - 267 Ac
BA0.4184
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000    0.10  0.2500   2.000
UK  2800  0.2500   0.800      54
UK  2800  0.2500   0.600      46
RD  2200  0.1600   0.060            TRAP     5.0     3.0
RD  2200  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KKYCMB-2
KM   COMBINE NS-1 & 2
HC     2
ZW C=FLOW
*
*
KKUCMB-2
KM   ROUTE CMB-2
RS     1    FLOW      -1
SV  0.70    1.00    1.40    1.70    2.00    2.50    3.40    4.30
SQ 100.0   200.0   300.0   400.0   500.0   700.0  1100.0  1500.0
ZW C=FLOW
*
KK   NS3
KM   BASIN 3 - 331 Ac
BA0.5218
PB
```

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* PI
BF -38.7
LU  0.10  0.2500  65.000    0.10  0.2500   2.000
UK  2950  0.1800   0.240       3
UK  2950  0.1800   0.600      98
RD  3000  0.2000   0.060            TRAP     5.0     3.0
RD  3000  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KKYCMB-3
KM   COMBINE NS-1 THRU 3
HC     2
ZW C=FLOW
*
*
KKUCMB-3
KM   ROUTE CMB-3
RS     1    FLOW      -1
SV  1.40    2.30    3.00    3.70    4.20    5.70    7.70    9.20
SQ 100.0   200.0   300.0   400.0   500.0   700.0  1100.0  1500.0
ZW C=FLOW
*
KK   NS4
KM   BASIN 4 - 166 Ac
BA0.2602
PB
* PI
BF -38.7
LU  0.10  0.2500  65.000    0.10  0.2500   2.000
UK  2110  0.2200   0.240      29
UK  2110  0.2200   0.600      71
RD  2500  0.1000   0.060            TRAP     5.0     3.0
RD  2500  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KKYCMB-4
KM   COMBINE NS-1 THRU 4
HC     2
ZW C=FLOW
*
*
KKUCMB-4
KM   ROUTE CMB-4
RS     1    FLOW      -1
SV  0.20    0.30    0.40    0.40    0.50    0.60    2.20    2.90
SQ 100.0   200.0   300.0   400.0   500.0   700.0  1100.0  1500.0
ZW C=FLOW
*
KK   NS5
KM   BASIN 5 - 21 Ac
BA0.0319
PB
* PI
BF -38.7
LU  0.10  0.2500  65.000    0.10  0.2500   2.000
UK  1400  0.2500   0.240      36
UK  1400  0.2500   0.600      64
RD   700  0.1400   0.060            TRAP     5.0     3.0
RD   700  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KKYCMB-5
KM   COMBINE NS-1 THRU 5
HC     2
ZW C=FLOW
*
*
KKUCMB-5
KM   ROUTE CMB-5
RS     1    FLOW      -1
SV  0.40    0.60    0.80    1.10    1.30    1.60    2.30    2.90
SQ 100.0   200.0   300.0   400.0   500.0   700.0  1100.0  1500.0
ZW C=FLOW
*
KK   NS6
KM   BASIN 6 - 178 Ac
BA0.2162
PB
* PI
BF -38.7
LU  0.10  0.2500  65.000    0.10  0.2500   2.000
UK  3100  0.2700   0.240      71
UK  3100  0.2700   0.600      29
RD  3100  0.1600   0.060            TRAP     5.0     3.0
RD  3100  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KKVR-NS6
KM   ROUTE NS-6
RD   970  0.0700   0.015            TRAP     1.0     1.0
ZW C=FLOW
*
KK   NS7
KM   BASIN 7 - 38 Ac
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BA0.0602
PB
* PI
BF -38.7
LU  0.10  0.2500  65.790    0.10  0.2500   2.000
UK  1570  0.1900   0.240      69
UK  1570  0.1900   0.600      31
RD   800  0.0800   0.060            TRAP     2.0     1.0
RD   800  0.0010   0.060            TRAP     2.0     1.0
ZW C=FLOW
*
KKYCMB-7
KM   COMBINE NS-6 & 7
HC     2
ZW C=FLOW
*
KKYMB-7A
KM   COMBINE NS-1 THRU 7
HC     2
ZW C=FLOW
*
*
KKUCMB7A
KM   ROUTE CMB-7A
RS     1    FLOW      -1
SV  0.60    1.10    1.40    1.70    2.10    2.60    3.60    4.60
SQ 100.0   200.0   300.0   400.0   500.0   700.0  1100.0  1500.0
ZW C=FLOW
*
KK   NS8
KM   BASIN 8 - 673 Ac
BA1.1304
PB
* PI
BF -38.7
LU  0.10  0.2390   2.000    0.10  0.2390   2.000
UK  4200  0.2100   0.800      92
UK  4200  0.2100   0.600       9
RD  1900  0.0800   0.060            TRAP     5.0     3.0
RD  1900  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
*
KKURES-A
KM   RESERVOIR A
RS     1    FLOW      -1
SV  0.00    3.40    6.80   10.20   13.60   17.00   20.40   23.80   27.20   34.00
SQ   0.0    23.9    67.5   124.0   190.0   266.0   350.0   441.0   540.0   754.0
ZW C=FLOW
*
KKV-RESA
KM   ROUTE RES-A
RD  1400  0.1100   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KK   NS9
KM   BASIN 9 - 144 Ac
BA0.1855
PB
* PI
BF -38.7
LU  0.10  0.2490   2.000
UK  4400  0.2000   0.600  100.00
RD  1200  0.1100   0.060            TRAP     5.0     3.0
RD  1200  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KKYCMB-9
KM   COMBINE NS-8 & 9
HC     2
ZW C=FLOW
*
KKVCMB-9
KM   ROUTE CMB-9
RD  2800  0.1100   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KK  NS10
KM   BASIN 10 - 214 Ac
BA0.3581
PB
* PI
BF -38.7
LU  0.10  0.2230   2.000
UK  3905  0.2000   0.600  100.00
RD  2200  0.0900   0.060            TRAP     5.0     3.0
RD  2200  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KKYMB-10
KM   COMBINE NS-8 THRU 10
HC     2
ZW C=FLOW
*
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KKVCMB10
KM   ROUTE CMB-10
RD  3600  0.0800   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KK  NS11
KM   BASIN 11 - 60 Ac
BA0.0389
PB
* PI
BF -38.7
LU  0.10  0.2490  65.070    0.10  0.2490   2.000
UK  1600  0.3400   0.240       6
UK  1600  0.3400   0.600      95
RD  3600  0.0800   0.060            TRAP     5.0     3.0
RD  3600  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KKYMB-11
KM   COMBINE NS-8 THRU 11
HC     2
ZW C=FLOW
*
KKYMB11A
KM   COMBINE NS-1 THRU 11
HC     2
ZW C=FLOW
*
*
KKUCM11A
KM   ROUTE CMB11A
RS     1    FLOW      -1
SV  0.20    0.30    0.50    0.60    0.70    0.90    1.20    1.60
SQ 100.0   200.0   300.0   400.0   500.0   700.0  1100.0  1500.0
ZW C=FLOW
*
KK NS11B
KM   BASIN 11 - 60 Ac
BA0.0546
PB
* PI
BF -38.7
LU  0.10  0.2500  72.440    0.10  0.2500   2.000
UK  1600  0.3400   0.240       6
UK  1600  0.3400   0.600      95
RD  3600  0.0800   0.060            TRAP     5.0     3.0
RD  3600  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KKYNS11B
KM  0
HC     2
ZW C=FLOW
*
KK  NS12
KM   BASIN 12 - 40 Ac
BA0.0619
PB
* PI
BF -38.7
LU  0.10  0.2500  65.000    0.10  0.2500   2.000
UK   400  0.1000   0.240      71
UK   400  0.1000   0.800      30
RD  1500  0.0700   0.060            TRAP     5.0     3.0
RD  1500  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KKYMB-12
KM   COMBINE NS-1 THRU 12
HC     2
ZW C=FLOW
*
KK  NS13
KM   BASIN 13 - 15 Ac
BA0.1459
PB
* PI
BF -38.7
LU  0.10  0.2500  65.000    0.10  0.2500  98.000
UK   500  0.1600   0.240      86
UK   500  0.1600   0.110      14
RD   900  0.1300   0.060            TRAP     5.0     3.0
RD   900  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KKV-NS13
KM   ROUTE NS-13
RD  1400  0.0800   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KK  NS14
KM   BASIN 14 - 47 Ac
BA0.0434
PB
```

```
* PI
BF -38.7
LU  0.10  0.2500  65.000    0.10  0.2500  98.000
UK   775  0.3500   0.240      90
UK   775  0.3500   0.110      10
RD   800  0.0600   0.060            TRAP     5.0     3.0
RD   800  0.0010   0.060            TRAP     5.0     3.0
ZW C=FLOW
*
KKYMB-14
KM   COMBINE NS-13 & 14
HC     2
ZW C=FLOW
*
KK NS14B
KM  NS14B
BA0.0204
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   500  0.1000   0.600  100.00
RD   500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMB14A
KM   COMBINE NS-1 THRU 14
HC     3
ZW C=FLOW
*
KK NS20B
KM  NS20B
BA0.0322
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   640  0.1000   0.600  100.00
RD  1000  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  NS15
KM  NS15
BA0.0860
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1000  0.0800   0.600  100.00
RD  1500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YNS15
KM  0
HC     2
ZW C=FLOW
*
KKYNS15C
KM  0
HC     2
ZW C=FLOW
*
KK  NS16
KM  NS16
BA0.1019
PB
* PI
BF -38.7
LU  0.10  0.2460   2.130
UK  1600  0.1000   0.600  100.00
RD  2100  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  NS17
KM  NS17
BA0.0811
PB
* PI
BF -38.7
LU  0.10  0.2500   3.470
UK  1500  0.0800   0.600  100.00
RD  1200  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YNS17
KM  0
HC     2
ZW C=FLOW
*
KK  NS18
KM  NS18
BA0.1877
PB
* PI
```

```
BF -38.7
LU  0.10  0.2500   2.610
UK  3200  0.1000   0.600  100.00
RD  3000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  NS19
KM  NS19
BA0.0434
PB
* PI
BF -38.7
LU  0.10  0.2500   3.070
UK  1600  0.0500   0.600  100.00
RD  1000  0.0400   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YNS19
KM  0
HC     2
ZW C=FLOW
*
KKYNS19C
KM  0
HC     2
ZW C=FLOW
*
KK  NS20
KM  NS20
BA0.0548
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   600  0.0800   0.600  100.00
RD  1200  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YNS20
KM  0
HC     2
ZW C=FLOW
*
KKYNS20C
KM  0
HC     2
ZW C=FLOW
*
KK  NS21
KM  NS21
BA0.1390
PB
* PI
BF -38.7
LU  0.10  0.2480   2.050
UK  1450  0.0500   0.600  100.00
RD  2500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YNS21
KM  0
HC     2
ZW C=FLOW
*
KK NS30D
KM  NS30D
BA0.0577
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   900  0.0800   0.600  100.00
RD  1400  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK NS30A
KM  NS30A
BA0.0266
PB
* PI
BF -38.7
LU  0.10  0.2440   2.000
UK   800  0.0800   0.600  100.00
RD  1600  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS30A
KM  0
HC     2
ZW C=FLOW
*
KKYS30CC
KM  0
HC     2
```

```
ZW C=FLOW
*
KK NS30B
KM  NS30B
BA0.1400
PB
* PI
BF -38.7
LU  0.10  0.2360   2.000
UK  1600  0.1000   0.600  100.00
RD  2000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS30B
KM  0
HC     2
ZW C=FLOW
*
KK NS30E
KM  NS30E
BA0.0022
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   200  0.1000   0.600  100.00
RD   500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS30E
KM  0
HC     2
ZW C=FLOW
*
KK NS30F
KM  NS30F
BA0.0023
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   200  0.1000   0.600  100.00
RD   500  0.1000   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS30F
KM  0
HC     2
ZW C=FLOW
*
KK NS30C
KM  NS30C
BA0.1237
PB
* PI
BF -38.7
LU  0.10  0.1510   2.000
UK  1600  0.0800   0.600  100.00
RD  2000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS30C
KM  0
HC     2
ZW C=FLOW
*
KKY30CCC
KM  0
HC     2
ZW C=FLOW
*
KK NS33B
KM  NS33B
BA0.0301
PB
* PI
BF -38.7
LU  0.10  0.1000   2.490
UK  1000  0.0500   0.600  100.00
RD  1000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS33B
KM  0
HC     2
ZW C=FLOW
*
KKYNSALL
KM  0
HC     2
ZW C=FLOW
*
*
KKUW5END
```

```
KM  ROUTE FOR BACKWATER AT NW5
RS      1     FLOW      -1
SV  0.00    0.75   54.40  131.20  377.00 1086.00
SQ   0.0   267.0  2853.0  3500.0  6287.0  9653.0
ZW C=FLOW
*
* - - - - - -
*
*
KK  NS34
KM  NS34
BA0.0437
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK   900  0.0800   0.600  100.00
RD   900  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK  NS35
KM  NS35
BA0.1517
PB
* PI
BF -38.7
LU  0.10  0.1850   2.150
UK  1900  0.0500   0.600  100.00
RD  2500  0.0400   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YNS35
KM  0
HC     2
ZW C=FLOW
*
KK XMAR1
KM  XMAR1
BA0.2922
PB
* PI
BF -38.7
LU  0.10  0.2440   2.000
UK  1900  0.1000   0.600  100.00
RD  2000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK XMAR2
KM  XMAR2
BA0.4066
PB
* PI
BF -38.7
LU  0.10  0.2410   2.000
UK  2200  0.1000   0.600  100.00
RD  3100  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK XMAR3
KM  XMAR3
BA0.6221
PB
* PI
BF -38.7
LU  0.10  0.2480   2.000
UK  3500  0.1000   0.600  100.00
RD  3400  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK XMAR4
KM  XMAR4
BA0.2489
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  2300  0.1000   0.600  100.00
RD  1100  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK XMAR5
KM  XMAR5
BA0.3335
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1700  0.1000   0.600  100.00
RD  2600  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMAR5
KM  0
HC     2
```

```
ZW C=FLOW
*
KK XMAR6
KM  XMAR6
BA0.1147
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  1500  0.1000   0.600  100.00
RD  1650  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK XMAR7
KM  XMAR7
BA0.3439
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  2800  0.1000   0.600  100.00
RD  1400  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMAR7
KM  0
HC     2
ZW C=FLOW
*
KK XMAR8
KM  XMAR8
BA0.2218
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  2200  0.1000   0.600  100.00
RD  3500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KK YMAR8
KM  0
HC     2
ZW C=FLOW
*
KK XMAR9
KM  XMAR9
BA0.2500
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  2100  0.1000   0.600  100.00
RD  3400  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKXMAR10
KM  XMAR10
BA0.2272
PB
* PI
BF -38.7
LU  0.10  0.2500   2.000
UK  2300  0.1000   0.600  100.00
RD  2400  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKXMAR11
KM  XMAR11
BA0.1037
PB
* PI
BF -38.7
LU  0.10  0.1850   2.000
UK  1100  0.1000   0.600  100.00
RD  1500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMAR11
KM  0
HC     2
ZW C=FLOW
*
KKXMAR12
KM  XMAR12
BA0.1361
PB
* PI
BF -38.7
LU  0.10  0.2060   2.000
UK  1250  0.1000   0.600  100.00
RD  2200  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
```

```
KKXMAR13
KM  XMAR13
BA0.2679
PB
* PI
BF -38.7
LU  0.10  0.2490   2.000
UK  1800  0.1000   0.600  100.00
RD  4000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMAR13
KM  0
HC     2
ZW C=FLOW
*
KKYMARC1
KM  0
HC     2
ZW C=FLOW
*
KKXMAR14
KM  XMAR14
BA0.0483
PB
* PI
BF -38.7
LU  0.10  0.2500   3.520
UK   500  0.1000   0.600  100.00
RD   500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKXMAR15
KM  XMAR15
BA0.0140
PB
* PI
BF -38.7
LU  0.10  0.2500   2.230
UK   500  0.1000   0.600  100.00
RD   500  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMAR15
KM  0
HC     3
ZW C=FLOW
*
KKXMAR17
KM  XMAR17
BA0.2288
PB
* PI
BF -38.7
LU  0.10  0.2200   2.000
UK  1300  0.1000   0.600  100.00
RD  2700  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKYMAR17
KM  0
HC     2
ZW C=FLOW
*
KKMAR19A
KM  MAR19A
BA0.0295
PB
* PI
BF -38.7
LU  0.10  0.2500   2.480
UK  1000  0.1000   0.600  100.00
RD  1000  0.0500   0.060            TRAP    10.0    10.0
ZW C=FLOW
*
KKMAR19B
KM  MAR19B
BA0.0074
PB
* PI
BF -38.7
LU  0.10  0.2500   4.110
UK   500  0.1000   0.600  100.00
RD  1000  0.0500   0.060            TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKXMAR18
KM  XMAR18
BA0.1517
PB
* PI
BF -38.7
LU  0.10  0.2480   2.000
UK  1600  0.1000   0.600  100.00
```

```
RD  2500  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYMAR18
KM  0
HC     3
ZW C=FLOW
*
KKXMAR20
KM  XMAR20
BA0.2009
PB
* PI
BF -38.7
LU  0.10  0.2440   2.000
UK  1700  0.1000   0.600  100.00
RD  2700  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKMAR21A
KM  MAR21A
BA0.0602
PB
* PI
BF -38.7
LU  0.10  0.2500   2.470
UK   500  0.1000   0.600  100.00
RD   500  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKMAR21B
KM  MAR21B
BA0.0241
PB
* PI
BF -38.7
LU  0.10  0.2450   4.750
UK   500  0.1000   0.600  100.00
RD  1000  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KK YR21B
KM  0
HC     2
ZW C=FLOW
*
* SA Note: Use New Overflow analysis instead
* DIVERT At Upstream Highway Crossing, where water can't cross under roadway
KK N11DV
DTN11DIV
DI     0     190     200     800    1600    5000
DQ     0       1       5     604    1403    4802
ZW C=FLOW
*
KKMAR22B
KM  MAR22B
BA0.0266
PB
* PI
BF -38.7
LU  0.10  0.2300   3.020
UK   500  0.1000   0.600  100.00
RD  1000  0.0500   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKMAR22A
KM  MAR22A
BA0.0165
PB
* PI
BF -38.7
LU  0.10  0.2500   3.400
UK   500  0.1000   0.600  100.00
RD   500  0.0500   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KK YR22A
KM  0
HC     2
ZW C=FLOW
*
KKXMAR23
KM  XMAR23
BA0.0439
PB
* PI
BF -38.7
LU  0.10  0.1380   2.690
UK   500  0.0500   0.600  100.00
RD  2000  0.0200   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKYMAR23
KM  0
```

```
HC     2
ZW C=FLOW
*
*
KK UWEND
KM  ROUTE FOR BACKWATER AT W1
RS     1    FLOW      -1
SV  0.00   10.00   49.20  292.00  859.70  867.00
SQ   0.0    18.0   239.0   244.0   250.0  1034.0
ZW C=FLOW
*
KKXMAR24
KM  XMAR24
BA0.0055
PB
* PI
BF -38.7
LU  0.10  0.1000   2.430
UK   200  0.0200   0.600  100.00
RD   500  0.0100   0.060           TRAP    10.0    10.0     YES
ZW C=FLOW
*
KKXMAR25
KM  XMAR25
BA0.0147
PB
* PI
BF -38.7
LU  0.10  0.1260   7.950
UK  1000  0.0200   0.600  100.00
RD  1000  0.0100   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYMAR25
KM  0
HC     3
ZW C=FLOW
*
KK NS33A
KM  NS33A
BA0.0118
PB
* PI
BF -38.7
LU  0.10  0.1970   2.000
UK  1000  0.0200   0.600  100.00
RD  1000  0.0200   0.060           TRAP    10.0    10.0
ZW C=FLOW
*
KKYNS33A
KM  0
HC     2
ZW C=FLOW
*
*
KK  UHWY
KM  ROUTE FOR BACKWATER AT HWY
RS     1    FLOW      -1
SV  0.00    0.13    0.60   32.40   61.60  114.60  266.00  330.00
SQ   0.0   200.0   491.0  3074.0  4293.0  5718.0  8410.0  9000.0
* SV  0.00    0.13    0.60   32.40   61.60  114.60  265.30  266.00  330.00
* SQ   0.0   200.0   491.0  3074.0  4293.0  5718.0  5847.0  8410.0  9000.0
ZW C=FLOW
*
KKN11DIV
DRN11DIV
ZW C=FLOW
*
*
KK  E30A
KM  Drains Away
BA0.0064
PB
* PI
BF -38.7
LU  0.10  0.2500   8.000
UK   600  0.0380   0.600  100.00
RD  1900  0.0140   0.060           TRAP    15.0    10.0
ZW C=FLOW
*
* ----------END---------------
*
*
ZZ
```

C-1. HEC-RAS Pre-Project Warm Condition SUMMARY TABLE

Reach	River Sta	Profile	Q Total	Min Ch El		W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope		Vel Chnl	Flow Area
	Top Width		Froude # Chl									
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
NW	100.0000	500YR	477.00	5912.01	5913.54	5913.54	5914.15	0.020066	6.74	86.61	80.79	0.99
NW	100.0000	100YR	345.50	5912.01	5913.30	5913.30	5913.80	0.020600	6.05	67.92	74.01	0.97
NW	100.0000	10YR	179.40	5912.01	5912.89	5912.89	5913.24	0.023971	4.96	40.61	61.00	0.98
NW	100.0000	2YR	62.60	5912.01	5912.49	5912.48	5912.68	0.027273	3.54	18.97	49.41	0.94
NW	99.5000	500YR	477.00	5909.28	5910.87	5910.87	5911.34	0.023380	7.50	106.96	108.59	1.07
NW	99.5000	100YR	345.50	5909.28	5910.64	5910.64	5911.04	0.024331	6.86	83.21	98.75	1.06
NW	99.5000	10YR	179.40	5909.28	5910.27	5910.27	5910.57	0.026234	5.68	49.99	81.32	1.04
NW	99.5000	2YR	62.60	5909.28	5909.91	5909.91	5910.08	0.024875	3.98	23.55	63.70	0.94
NW	99.0000	500YR	477.00	5906.01	5907.77		5908.18	0.014233	5.54	100.84	83.83	0.83
NW	99.0000	100YR	345.50	5906.01	5907.49		5907.85	0.014892	5.12	78.31	76.49	0.82
NW	99.0000	10YR	179.40	5906.01	5907.06		5907.31	0.014978	4.19	48.52	65.11	0.78
NW	99.0000	2YR	62.60	5906.01	5906.62	5906.52	5906.75	0.014721	2.95	22.78	50.43	0.71
NW	98.5000	500YR	477.00	5903.51	5905.45	5905.32	5905.85	0.015446	7.09	121.06	112.07	0.91
NW	98.5000	100YR	345.50	5903.51	5905.23		5905.55	0.014235	6.26	97.06	100.52	0.85
NW	98.5000	10YR	179.40	5903.51	5904.79		5905.03	0.014055	5.10	58.40	78.35	0.80
NW	98.5000	2YR	62.60	5903.51	5904.30		5904.45	0.014425	3.69	25.63	54.60	0.75
NW	98.0000	500YR	477.00	5900.13	5902.87	5902.87	5903.44	0.013258	7.95	112.72	102.35	0.88
NW	98.0000	100YR	345.50	5900.13	5902.49	5902.49	5903.06	0.015200	7.64	78.87	76.93	0.92
NW	98.0000	10YR	179.40	5900.13	5901.87	5901.87	5902.36	0.017833	6.60	41.25	46.33	0.94
NW	98.0000	2YR	62.60	5900.13	5901.20	5901.20	5901.52	0.021121	4.92	16.43	28.74	0.93
NW	97.5000	500YR	477.00	5898.01	5900.70		5901.05	0.007105	5.57	136.22	127.54	0.64
NW	97.5000	100YR	345.50	5898.01	5900.44		5900.72	0.006390	4.88	105.08	109.90	0.59
NW	97.5000	10YR	179.40	5898.01	5899.90		5900.08	0.005490	3.73	61.98	56.57	0.52
NW	97.5000	2YR	62.60	5898.01	5899.25		5899.33	0.004629	2.40	30.53	39.45	0.44
NW	97.0000	500YR	477.00	5896.81	5898.60	5898.56	5899.01	0.027339	8.95	109.99	113.13	1.19
NW	97.0000	100YR	345.50	5896.81	5898.34	5898.33	5898.74	0.031336	8.62	82.43	99.78	1.24
NW	97.0000	10YR	179.40	5896.81	5897.94	5897.94	5898.26	0.033508	7.23	46.87	70.55	1.22
NW	97.0000	2YR	62.60	5896.81	5897.55	5897.55	5897.73	0.031993	5.25	22.37	54.58	1.10
NW	96.5000	500YR	477.00	5894.01	5896.24		5896.55	0.006812	5.09	132.59	98.63	0.61
NW	96.5000	100YR	345.50	5894.01	5895.94		5896.19	0.006662	4.54	104.23	86.72	0.59
NW	96.5000	10YR	179.40	5894.01	5895.43		5895.60	0.006160	3.53	64.92	69.39	0.54
NW	96.5000	2YR	62.60	5894.01	5894.85		5894.93	0.006173	2.43	29.90	50.53	0.49
NW	96.0000	500YR	548.60	5892.01	5894.11	5894.11	5894.69	0.016476	7.58	118.11	103.36	0.94
NW	96.0000	100YR	399.10	5892.01	5893.84	5893.84	5894.35	0.016541	6.90	91.63	92.96	0.92
NW	96.0000	10YR	208.00	5892.01	5893.35	5893.35	5893.75	0.018452	5.84	51.52	69.74	0.92
NW	96.0000	2YR	72.90	5892.01	5892.83	5892.80	5893.07	0.019269	4.17	21.76	45.47	0.86
NW	95.5000	500YR	548.60	5890.01	5891.46		5891.63	0.005285	3.41	171.14	134.12	0.50
NW	95.5000	100YR	399.10	5890.01	5891.20		5891.34	0.005465	3.05	137.93	128.98	0.50
NW	95.5000	10YR	208.00	5890.01	5890.81		5890.90	0.005926	2.43	88.50	119.92	0.48
NW	95.5000	2YR	72.90	5890.01	5890.41		5890.46	0.007581	1.74	42.40	111.35	0.49
NW	95.0000	500YR	548.60	5888.01	5889.96	5889.88	5890.41	0.013271	6.04	123.98	110.07	0.82
NW	95.0000	100YR	399.10	5888.01	5889.71	5889.62	5890.10	0.013286	5.49	97.22	103.94	0.80
NW	95.0000	10YR	208.00	5888.01	5889.28	5889.19	5889.56	0.013676	4.48	56.98	81.53	0.77
NW	95.0000	2YR	72.90	5888.01	5888.83		5888.97	0.012562	3.04	24.68	48.66	0.68
NW	94.5000	500YR	548.60	5886.01	5887.76		5888.10	0.009995	5.25	138.18	110.54	0.71
NW	94.5000	100YR	399.10	5886.01	5887.50		5887.78	0.010072	4.71	110.06	104.14	0.69
NW	94.5000	10YR	208.00	5886.01	5887.09		5887.27	0.009561	3.72	69.92	91.13	0.64
NW	94.5000	2YR	72.90	5886.01	5886.61	5886.46	5886.71	0.010240	2.62	31.79	67.03	0.60
NW	94.0000	500YR	548.60	5884.01	5886.31		5886.65	0.012555	6.87	145.04	112.99	0.83
NW	94.0000	100YR	399.10	5884.01	5886.06		5886.35	0.012264	6.24	116.99	107.56	0.80
NW	94.0000	10YR	208.00	5884.01	5885.54		5885.78	0.014368	5.43	66.81	83.89	0.82
NW	94.0000	2YR	72.90	5884.01	5884.99		5885.14	0.014964	3.93	29.10	55.13	0.77
NW	93.5000	500YR	548.60	5882.01	5884.30	5884.10	5884.58	0.009416	6.23	170.35	142.71	0.73

NW	93.5000	100YR	399.10	5882.01	5884.06	5883.68	5884.31	0.009296	5.75	136.37	138.53	0.71
NW	93.5000	10YR	208.00	5882.01	5883.56	5883.18	5883.73	0.008207	4.47	80.27	89.16	0.64
NW	93.5000	2YR	72.90	5882.01	5882.96	5882.76	5883.07	0.008235	3.23	35.35	60.48	0.59
NW	93.0000	500YR	548.60	5880.01	5881.77	5881.63	5882.13	0.012134	5.77	147.69	150.56	0.79
NW	93.0000	100YR	399.10	5880.01	5881.53	5881.40	5881.84	0.012619	5.29	112.70	132.24	0.78
NW	93.0000	10YR	208.00	5880.01	5881.13	5880.97	5881.36	0.013281	4.36	65.54	102.95	0.76
NW	93.0000	2YR	72.90	5880.01	5880.69		5880.80	0.012173	2.92	29.96	63.39	0.66
NW	92.5000	500YR	548.60	5878.01	5879.66		5879.77	0.006286	3.83	217.37	156.91	0.55
NW	92.5000	100YR	399.10	5878.01	5879.40		5879.49	0.006077	3.31	177.87	149.12	0.53
NW	92.5000	10YR	208.00	5878.01	5878.98		5879.03	0.005824	2.45	117.55	135.77	0.48
NW	92.5000	2YR	72.90	5878.01	5878.54		5878.56	0.005910	1.48	60.26	122.41	0.43
NW	92.0000	500YR	548.60	5875.73	5876.81	5876.64	5876.98	0.020540	5.46	177.59	233.26	0.94
NW	92.0000	100YR	399.10	5875.73	5876.68		5876.81	0.019563	4.87	146.99	227.03	0.90
NW	92.0000	10YR	208.00	5875.73	5876.47		5876.55	0.017122	3.83	100.78	215.42	0.81
NW	92.0000	2YR	72.90	5875.73	5876.25	5876.19	5876.29	0.013380	2.64	55.56	203.23	0.67
NW	91.5000	500YR	548.60	5874.01	5875.14		5875.24	0.004821	2.74	230.81	246.97	0.46
NW	91.5000	100YR	399.10	5874.01	5874.94		5875.03	0.005125	2.48	183.56	239.26	0.46
NW	91.5000	10YR	208.00	5874.01	5874.63		5874.70	0.005839	2.04	113.27	219.60	0.46
NW	91.5000	2YR	72.90	5874.01	5874.34		5874.37	0.007145	1.47	52.24	186.06	0.46
NW	91.0000	500YR	632.10	5872.01	5873.47		5873.72	0.008739	4.40	187.22	190.31	0.65
NW	91.0000	100YR	463.40	5872.01	5873.25		5873.46	0.008750	3.95	147.99	172.18	0.63
NW	91.0000	10YR	243.50	5872.01	5872.91		5873.04	0.008385	3.09	93.28	141.56	0.59
NW	91.0000	2YR	85.40	5872.01	5872.53		5872.59	0.007885	2.06	45.59	111.19	0.52
NW	90.5000	500YR	632.10	5868.01	5869.44	5869.44	5870.00	0.020469	6.46	117.18	107.40	0.98
NW	90.5000	100YR	463.40	5868.01	5869.20	5869.20	5869.67	0.021445	5.88	92.46	98.46	0.98
NW	90.5000	10YR	243.50	5868.01	5868.81	5868.81	5869.15	0.024743	4.89	56.44	85.70	0.98
NW	90.5000	2YR	85.40	5868.01	5868.43	5868.43	5868.62	0.029679	3.53	26.31	74.08	0.97
NW	90.0000	500YR	632.10	5864.61	5866.53	5865.89	5866.60	0.003405	3.33	362.97	317.93	0.43
NW	90.0000	100YR	463.40	5864.61	5866.32	5865.75	5866.38	0.003304	3.03	296.24	304.12	0.41
NW	90.0000	10YR	243.50	5864.61	5865.96	5865.54	5866.00	0.003139	2.52	191.55	274.12	0.38
NW	90.0000	2YR	85.40	5864.61	5865.48		5865.51	0.003225	1.90	82.30	180.43	0.36
NW	89.5000	500YR	632.10	5862.01	5862.90	5862.90	5863.21	0.054295	6.35	145.78	235.83	1.41
NW	89.5000	100YR	463.40	5862.01	5862.78	5862.78	5863.04	0.057958	6.02	116.28	224.75	1.43
NW	89.5000	10YR	243.50	5862.01	5862.58	5862.58	5862.77	0.062294	5.29	74.66	207.70	1.42
NW	89.5000	2YR	85.40	5862.01	5862.41	5862.41	5862.49	0.039777	3.42	39.54	149.07	1.08
NW	89.0000	500YR	1096.70	5856.01	5857.77		5857.90	0.003673	3.27	441.25	373.89	0.44
NW	89.0000	100YR	805.50	5856.01	5857.48		5857.60	0.003877	2.99	341.13	331.94	0.43
NW	89.0000	10YR	428.30	5856.01	5857.05		5857.13	0.004048	2.41	210.30	270.49	0.42
NW	89.0000	2YR	156.00	5856.01	5856.59		5856.63	0.004371	1.69	100.68	208.65	0.39
NW	88.5000	500YR	1096.70	5854.01	5855.95		5856.08	0.003344	3.33	474.97	393.18	0.42
NW	88.5000	100YR	805.50	5854.01	5855.69		5855.80	0.003141	2.94	380.42	347.76	0.40
NW	88.5000	10YR	428.30	5854.01	5855.23		5855.30	0.003136	2.36	234.07	275.97	0.38
NW	88.5000	2YR	156.00	5854.01	5854.72		5854.76	0.003109	1.63	111.87	206.70	0.34
NW	88.0000	500YR	1096.70	5852.01	5853.88	5853.88	5854.35	0.016742	7.18	266.83	273.39	0.94
NW	88.0000	100YR	805.50	5852.01	5853.57	5853.57	5854.04	0.020293	6.98	189.84	219.66	1.00
NW	88.0000	10YR	428.30	5852.01	5853.15	5853.15	5853.52	0.022146	5.87	110.20	160.84	0.99
NW	88.0000	2YR	156.00	5852.01	5852.68	5852.68	5852.93	0.027326	4.49	46.40	108.06	1.00
NW	87.5000	500YR	1096.70	5850.01	5852.39		5852.44	0.001563	2.60	829.95	708.23	0.30
NW	87.5000	100YR	805.50	5850.01	5852.16		5852.20	0.001520	2.40	669.73	689.68	0.29
NW	87.5000	10YR	428.30	5850.01	5851.67		5851.70	0.001358	1.91	394.71	444.22	0.26
NW	87.5000	2YR	156.00	5850.01	5851.11		5851.13	0.001262	1.39	177.88	314.43	0.24
NW	87.0000	500YR	1096.70	5847.98	5849.50	5849.50	5849.77	0.025988	7.72	335.75	543.71	1.12
NW	87.0000	100YR	805.50	5847.98	5849.23	5849.23	5849.53	0.030066	7.25	203.85	396.78	1.17
NW	87.0000	10YR	428.30	5847.98	5848.80	5848.80	5849.11	0.045299	6.62	105.53	174.00	1.33
NW	87.0000	2YR	156.00	5847.98	5848.45	5848.45	5848.63	0.054306	4.81	50.01	142.29	1.32

NW2	**110.0000**	**500YR**	**26.20**	**5864.01**	**5864.37**		**5864.39**	**0.003896**	**1.13**	**24.69**	**81.74**	**0.34**
NW2	**110.0000**	**100YR**	**19.10**	**5864.01**	**5864.31**		**5864.33**	**0.003866**	**1.01**	**19.99**	**78.24**	**0.33**
NW2	**110.0000**	**10YR**	**10.00**	**5864.01**	**5864.22**		**5864.23**	**0.003773**	**0.79**	**13.13**	**71.65**	**0.31**
NW2	**110.0000**	**2YR**	**3.20**	**5864.01**	**5864.12**		**5864.13**	**0.003477**	**0.49**	**6.49**	**63.26**	**0.27**
NW2	**109.5000**	**500YR**	**26.20**	**5861.97**	**5862.20**	**5862.20**	**5862.29**	**0.067496**	**3.16**	**11.45**	**63.03**	**1.29**
NW2	**109.5000**	**100YR**	**19.10**	**5861.97**	**5862.17**	**5862.17**	**5862.24**	**0.068286**	**2.84**	**9.35**	**61.72**	**1.26**
NW2	**109.5000**	**10YR**	**10.00**	**5861.97**	**5862.11**	**5862.11**	**5862.16**	**0.072688**	**2.32**	**6.12**	**59.71**	**1.22**
NW2	**109.5000**	**2YR**	**3.20**	**5861.97**	**5862.06**	**5862.06**	**5862.08**	**0.101468**	**1.86**	**2.67**	**56.87**	**1.31**
NW2	**109.0000**	**500YR**	**26.20**	**5858.01**	**5858.74**		**5858.78**	**0.002856**	**1.57**	**21.70**	**48.72**	**0.33**
NW2	**109.0000**	**100YR**	**19.10**	**5858.01**	**5858.65**		**5858.67**	**0.002726**	**1.38**	**17.16**	**43.10**	**0.31**
NW2	**109.0000**	**10YR**	**10.00**	**5858.01**	**5858.48**	**5858.24**	**5858.49**	**0.002541**	**1.07**	**10.70**	**33.27**	**0.29**
NW2	**109.0000**	**2YR**	**3.20**	**5858.01**	**5858.28**		**5858.28**	**0.002308**	**0.68**	**4.90**	**25.09**	**0.25**
NW2	**108.875***	**500YR**	**26.20**	**5857.51**	**5857.95**		**5858.06**	**0.020846**	**2.75**	**9.99**	**31.88**	**0.80**
NW2	**108.875***	**100YR**	**19.10**	**5857.51**	**5857.88**		**5857.98**	**0.020953**	**2.45**	**8.03**	**29.30**	**0.78**
NW2	**108.875***	**10YR**	**10.00**	**5857.51**	**5857.78**		**5857.84**	**0.021460**	**1.95**	**5.13**	**24.38**	**0.74**
NW2	**108.875***	**2YR**	**3.20**	**5857.51**	**5857.65**		**5857.68**	**0.021223**	**1.33**	**2.40**	**19.70**	**0.67**
NW2	**108.75***	**500YR**	**26.20**	**5857.01**	**5857.48**	**5857.39**	**5857.57**	**0.013549**	**2.30**	**11.76**	**34.10**	**0.65**
NW2	**108.75***	**100YR**	**19.10**	**5857.01**	**5857.42**	**5857.32**	**5857.48**	**0.013119**	**2.03**	**9.55**	**31.92**	**0.62**
NW2	**108.75***	**10YR**	**10.00**	**5857.01**	**5857.30**		**5857.34**	**0.013040**	**1.61**	**6.19**	**26.36**	**0.59**
NW2	**108.75***	**2YR**	**3.20**	**5857.01**	**5857.16**		**5857.18**	**0.013476**	**1.12**	**2.86**	**21.68**	**0.54**
NW2	**108.625***	**500YR**	**26.20**	**5856.51**	**5856.90**		**5857.02**	**0.026719**	**2.76**	**9.48**	**30.86**	**0.88**
NW2	**108.625***	**100YR**	**19.10**	**5856.51**	**5856.83**		**5856.93**	**0.028095**	**2.55**	**7.50**	**28.69**	**0.88**
NW2	**108.625***	**10YR**	**10.00**	**5856.51**	**5856.74**		**5856.80**	**0.027191**	**2.04**	**4.91**	**25.57**	**0.82**
NW2	**108.625***	**2YR**	**3.20**	**5856.51**	**5856.63**		**5856.66**	**0.024034**	**1.32**	**2.43**	**22.12**	**0.70**
NW2	**108.5000**	**500YR**	**26.20**	**5856.01**	**5856.50**		**5856.56**	**0.009629**	**1.94**	**13.57**	**37.37**	**0.55**
NW2	**108.5000**	**100YR**	**19.10**	**5856.01**	**5856.43**		**5856.48**	**0.009398**	**1.73**	**11.05**	**33.18**	**0.53**
NW2	**108.5000**	**10YR**	**10.00**	**5856.01**	**5856.29**		**5856.33**	**0.010358**	**1.45**	**6.89**	**28.95**	**0.52**
NW2	**108.5000**	**2YR**	**3.20**	**5856.01**	**5856.15**		**5856.17**	**0.012611**	**1.05**	**3.06**	**24.37**	**0.52**
NW2	**108.0000**	**500YR**	**37.90**	**5853.40**	**5854.14**	**5854.10**	**5854.23**	**0.010515**	**2.80**	**22.38**	**88.23**	**0.62**
NW2	**108.0000**	**100YR**	**27.50**	**5853.40**	**5854.07**	**5853.98**	**5854.16**	**0.010670**	**2.60**	**16.12**	**82.83**	**0.61**
NW2	**108.0000**	**10YR**	**14.30**	**5853.40**	**5853.92**		**5853.98**	**0.010156**	**2.05**	**8.25**	**31.47**	**0.57**
NW2	**108.0000**	**2YR**	**4.60**	**5853.40**	**5853.73**	**5853.64**	**5853.76**	**0.009362**	**1.31**	**3.57**	**18.55**	**0.49**
NW2	**107.5000**	**500YR**	**37.90**	**5852.01**	**5852.36**		**5852.41**	**0.009649**	**1.79**	**21.70**	**68.78**	**0.54**
NW2	**107.5000**	**100YR**	**27.50**	**5852.01**	**5852.30**	**5852.20**	**5852.34**	**0.009460**	**1.57**	**17.80**	**66.61**	**0.52**
NW2	**107.5000**	**10YR**	**14.30**	**5852.01**	**5852.21**		**5852.24**	**0.009141**	**1.20**	**11.97**	**62.50**	**0.48**
NW2	**107.5000**	**2YR**	**4.60**	**5852.01**	**5852.12**		**5852.13**	**0.008802**	**0.76**	**6.02**	**58.72**	**0.42**
NW2	**107.0000**	**500YR**	**37.90**	**5848.01**	**5848.77**	**5848.77**	**5848.97**	**0.021686**	**4.28**	**14.28**	**37.53**	**0.91**
NW2	**107.0000**	**100YR**	**27.50**	**5848.01**	**5848.67**	**5848.67**	**5848.84**	**0.023403**	**3.97**	**10.57**	**31.36**	**0.92**
NW2	**107.0000**	**10YR**	**14.30**	**5848.01**	**5848.49**	**5848.49**	**5848.64**	**0.026912**	**3.37**	**5.85**	**23.09**	**0.93**
NW2	**107.0000**	**2YR**	**4.60**	**5848.01**	**5848.30**	**5848.30**	**5848.38**	**0.032279**	**2.42**	**2.21**	**14.52**	**0.91**
NW3	**79.5000**	**500YR**	**1134.50**	**5846.01**	**5848.23**		**5848.36**	**0.004176**	**4.01**	**505.55**	**399.00**	**0.48**
NW3	**79.5000**	**100YR**	**833.00**	**5846.01**	**5847.94**		**5848.05**	**0.004190**	**3.65**	**396.64**	**353.26**	**0.47**
NW3	**79.5000**	**10YR**	**442.50**	**5846.01**	**5847.47**		**5847.57**	**0.004662**	**3.18**	**241.03**	**313.07**	**0.47**
NW3	**79.5000**	**2YR**	**160.50**	**5846.01**	**5846.97**		**5847.04**	**0.005084**	**2.46**	**98.47**	**211.62**	**0.46**
NW3	**79.0000**	**500YR**	**1134.50**	**5844.01**	**5846.94**		**5847.17**	**0.005210**	**5.04**	**382.50**	**272.07**	**0.55**
NW3	**79.0000**	**100YR**	**833.00**	**5844.01**	**5846.57**		**5846.79**	**0.005869**	**4.82**	**287.09**	**238.60**	**0.57**
NW3	**79.0000**	**10YR**	**442.50**	**5844.01**	**5845.94**		**5846.13**	**0.006866**	**4.18**	**156.57**	**150.15**	**0.58**
NW3	**79.0000**	**2YR**	**160.50**	**5844.01**	**5845.14**		**5845.29**	**0.009507**	**3.52**	**60.66**	**90.64**	**0.63**
NW3	**78.5000**	**500YR**	**1134.50**	**5842.01**	**5845.63**		**5845.87**	**0.003686**	**5.02**	**388.56**	**218.61**	**0.49**
NW3	**78.5000**	**100YR**	**833.00**	**5842.01**	**5845.26**		**5845.47**	**0.003438**	**4.49**	**312.67**	**200.71**	**0.46**
NW3	**78.5000**	**10YR**	**442.50**	**5842.01**	**5844.59**		**5844.75**	**0.003310**	**3.71**	**188.79**	**167.65**	**0.43**
NW3	**78.5000**	**2YR**	**160.50**	**5842.01**	**5843.76**		**5843.85**	**0.002833**	**2.55**	**78.98**	**81.89**	**0.37**
NW3	**78.0000**	**500YR**	**1468.40**	**5842.01**	**5844.69**		**5844.95**	**0.003943**	**4.45**	**426.81**	**259.33**	**0.48**
NW3	**78.0000**	**100YR**	**1075.30**	**5842.01**	**5844.01**		**5844.31**	**0.006499**	**4.67**	**274.22**	**188.65**	**0.59**
NW3	**78.0000**	**10YR**	**565.50**	**5842.01**	**5843.42**		**5843.62**	**0.006517**	**3.69**	**172.83**	**159.61**	**0.56**
NW3	**78.0000**	**2YR**	**191.80**	**5842.01**	**5842.83**		**5842.91**	**0.005394**	**2.30**	**87.92**	**129.03**	**0.46**

NW3	**77.5000**	**500YR**	**1468.40**	**5840.01**	**5844.44**		**5844.54**	**0.001079**	**3.19**	**769.24**	**396.85**	**0.27**
NW3	**77.5000**	**100YR**	**1075.30**	**5840.01**	**5842.40**		**5842.84**	**0.008794**	**5.88**	**238.95**	**166.26**	**0.70**
NW3	**77.5000**	**10YR**	**565.50**	**5840.01**	**5841.71**		**5842.04**	**0.010287**	**4.94**	**138.57**	**125.02**	**0.71**
NW3	**77.5000**	**2YR**	**191.80**	**5840.01**	**5840.85**	**5840.79**	**5841.11**	**0.019602**	**4.20**	**50.01**	**80.76**	**0.87**
NW3	**77.0000**	**500YR**	**1490.30**	**5838.01**	**5844.40**		**5844.43**	**0.000349**	**2.36**	**1262.12**	**383.20**	**0.17**
NW3	**77.0000**	**100YR**	**1090.90**	**5838.01**	**5841.61**		**5841.85**	**0.004040**	**5.44**	**367.15**	**202.85**	**0.51**
NW3	**77.0000**	**10YR**	**573.70**	**5838.01**	**5840.90**		**5841.08**	**0.003575**	**4.40**	**234.92**	**171.51**	**0.46**
NW3	**77.0000**	**2YR**	**195.00**	**5838.01**	**5839.96**		**5840.07**	**0.002964**	**3.05**	**92.92**	**80.43**	**0.39**
NW3	**76.5000**	**500YR**	**1490.30**	**5838.01**	**5844.36**		**5844.38**	**0.000194**	**1.77**	**1482.94**	**365.40**	**0.12**
NW3	**76.5000**	**100YR**	**1090.90**	**5838.01**	**5841.06**		**5841.20**	**0.002708**	**4.04**	**458.47**	**256.64**	**0.41**
NW3	**76.5000**	**10YR**	**573.70**	**5838.01**	**5840.32**		**5840.45**	**0.002968**	**3.51**	**275.57**	**240.23**	**0.41**
NW3	**76.5000**	**2YR**	**195.00**	**5838.01**	**5839.51**		**5839.57**	**0.002227**	**2.27**	**123.96**	**136.60**	**0.33**
NW3	**76.0000**	**500YR**	**1490.30**	**5838.01**	**5844.33**		**5844.35**	**0.000139**	**1.49**	**1629.74**	**444.58**	**0.10**
NW3	**76.0000**	**100YR**	**1090.90**	**5838.01**	**5839.73**	**5839.64**	**5840.27**	**0.014323**	**6.27**	**211.12**	**172.99**	**0.85**
NW3	**76.0000**	**10YR**	**573.70**	**5838.01**	**5839.53**		**5839.73**	**0.006406**	**3.85**	**176.80**	**161.29**	**0.56**
NW3	**76.0000**	**2YR**	**195.00**	**5838.01**	**5838.81**		**5838.92**	**0.007970**	**2.75**	**76.20**	**119.29**	**0.56**
NW3	**75.5000**	**500YR**	**1490.30**	**5835.60**	**5844.32**		**5844.33**	**0.000047**	**1.07**	**2588.66**	**418.04**	**0.06**
NW3	**75.5000**	**100YR**	**1090.90**	**5835.60**	**5838.57**		**5838.64**	**0.002751**	**4.02**	**534.05**	**283.95**	**0.41**
NW3	**75.5000**	**10YR**	**573.70**	**5835.60**	**5837.32**		**5837.46**	**0.010590**	**5.47**	**213.54**	**215.56**	**0.74**
NW3	**75.5000**	**2YR**	**195.00**	**5835.60**	**5836.77**		**5836.83**	**0.007077**	**3.46**	**111.94**	**156.33**	**0.56**
NW3	**75.0000**	**500YR**	**1490.30**	**5833.31**	**5844.32**		**5844.32**	**0.000018**	**0.79**	**3558.30**	**482.60**	**0.04**
NW3	**75.0000**	**100YR**	**1090.90**	**5833.31**	**5838.50**		**5838.51**	**0.000224**	**1.66**	**1183.90**	**326.52**	**0.13**
NW3	**75.0000**	**10YR**	**573.70**	**5833.31**	**5834.83**		**5835.03**	**0.013333**	**5.63**	**187.82**	**195.87**	**0.81**
NW3	**75.0000**	**2YR**	**195.00**	**5833.31**	**5834.18**	**5834.17**	**5834.37**	**0.024301**	**5.21**	**72.70**	**156.70**	**0.99**
NW3	**74.5000**	**500YR**	**1490.30**	**5831.30**	**5844.31**		**5844.32**	**0.000011**	**0.69**	**4161.50**	**485.90**	**0.03**
NW3	**74.5000**	**100YR**	**1090.90**	**5831.30**	**5838.48**		**5838.49**	**0.000064**	**1.10**	**1771.37**	**338.29**	**0.07**
NW3	**74.5000**	**10YR**	**573.70**	**5831.30**	**5833.07**		**5833.17**	**0.006085**	**4.21**	**248.01**	**205.17**	**0.56**
NW3	**74.5000**	**2YR**	**195.00**	**5831.30**	**5832.50**		**5832.54**	**0.004273**	**2.70**	**136.98**	**182.35**	**0.44**
NW3	**74.0000**	**500YR**	**1490.30**	**5828.71**	**5844.31**		**5844.31**	**0.000004**	**0.44**	**6889.16**	**716.49**	**0.02**
NW3	**74.0000**	**100YR**	**1090.90**	**5828.71**	**5838.48**		**5838.48**	**0.000015**	**0.65**	**3265.98**	**504.32**	**0.04**
NW3	**74.0000**	**10YR**	**573.70**	**5828.71**	**5830.31**		**5830.44**	**0.010713**	**5.22**	**218.87**	**227.14**	**0.73**
NW3	**74.0000**	**2YR**	**195.00**	**5828.71**	**5829.64**		**5829.77**	**0.020322**	**4.97**	**81.65**	**166.35**	**0.92**
NW3	**73.5000**	**500YR**	**1490.30**	**5828.01**	**5844.31**		**5844.31**	**0.000002**	**0.34**	**8508.87**	**820.62**	**0.01**
NW3	**73.5000**	**100YR**	**1090.90**	**5828.01**	**5838.48**		**5838.48**	**0.000007**	**0.48**	**4202.34**	**607.73**	**0.03**
NW3	**73.5000**	**10YR**	**573.70**	**5828.01**	**5829.80**		**5829.85**	**0.002362**	**2.66**	**365.20**	**286.06**	**0.35**
NW3	**73.5000**	**2YR**	**195.00**	**5828.01**	**5829.10**		**5829.12**	**0.002075**	**1.78**	**180.48**	**231.77**	**0.30**
NW3	**73.375***	**500YR**	**1490.30**	**5827.56**	**5844.31**		**5844.31**	**0.000002**	**0.35**	**8380.19**	**793.37**	**0.01**
NW3	**73.375***	**100YR**	**1090.90**	**5827.56**	**5838.47**		**5838.48**	**0.000008**	**0.50**	**4167.24**	**605.53**	**0.03**
NW3	**73.375***	**10YR**	**573.70**	**5827.56**	**5829.36**		**5829.47**	**0.005181**	**3.93**	**264.54**	**247.06**	**0.52**
NW3	**73.375***	**2YR**	**195.00**	**5827.56**	**5828.69**		**5828.77**	**0.005347**	**2.92**	**118.78**	**192.10**	**0.49**
NW3	**73.25***	**500YR**	**1490.30**	**5827.12**	**5844.31**		**5844.31**	**0.000002**	**0.35**	**8356.84**	**770.17**	**0.01**
NW3	**73.25***	**100YR**	**1090.90**	**5827.12**	**5838.47**		**5838.48**	**0.000008**	**0.52**	**4169.84**	**607.48**	**0.03**
NW3	**73.25***	**10YR**	**573.70**	**5827.12**	**5829.20**		**5829.33**	**0.005045**	**4.25**	**256.67**	**228.06**	**0.52**
NW3	**73.25***	**2YR**	**195.00**	**5827.12**	**5828.54**		**5828.63**	**0.004547**	**3.12**	**118.97**	**186.80**	**0.47**
NW3	**73.125***	**500YR**	**1490.30**	**5826.67**	**5844.31**		**5844.31**	**0.000002**	**0.36**	**8377.54**	**761.83**	**0.01**
NW3	**73.125***	**100YR**	**1090.90**	**5826.67**	**5838.47**		**5838.48**	**0.000008**	**0.54**	**4187.30**	**618.65**	**0.03**
NW3	**73.125***	**10YR**	**573.70**	**5826.67**	**5828.96**		**5829.16**	**0.006787**	**5.20**	**223.73**	**212.24**	**0.62**
NW3	**73.125***	**2YR**	**195.00**	**5826.67**	**5828.40**		**5828.51**	**0.004302**	**3.41**	**114.64**	**173.25**	**0.47**
NW3	**73.0000**	**500YR**	**604.50**	**5826.22**	**5844.31**		**5844.31**	**0.000000**	**0.15**	**8414.99**	**759.08**	**0.01**
NW3	**73.0000**	**100YR**	**557.00**	**5826.22**	**5838.47**		**5838.48**	**0.000002**	**0.28**	**4213.74**	**623.70**	**0.01**
NW3	**73.0000**	**10YR**	**499.70**	**5826.22**	**5828.73**		**5828.95**	**0.007438**	**5.67**	**188.74**	**185.89**	**0.65**
NW3	**73.0000**	**2YR**	**195.80**	**5826.22**	**5828.14**		**5828.35**	**0.007284**	**4.63**	**88.88**	**153.69**	**0.61**
NW3	**72.5000**	**500YR**	**604.50**	**5826.01**	**5844.31**		**5844.31**	**0.000000**	**0.11**	**10057.74**	**817.18**	**0.00**
NW3	**72.5000**	**100YR**	**557.00**	**5826.01**	**5838.48**		**5838.48**	**0.000001**	**0.20**	**5462.81**	**739.00**	**0.01**
NW3	**72.5000**	**10YR**	**499.70**	**5826.01**	**5828.07**	**5827.48**	**5828.23**	**0.004356**	**3.88**	**213.37**	**209.67**	**0.48**

NW3	**72.5000**	**2YR**	**195.80**	**5826.01**	**5827.12**		**5827.29**	**0.009710**	**3.75**	**70.33**	**106.46**	**0.65**
NW3	**72.0000**	**500YR**	**604.50**	**5824.01**	**5844.31**		**5844.31**	**0.000000**	**0.06**	**15601.29**	**962.53**	**0.00**
NW3	**72.0000**	**100YR**	**557.00**	**5824.01**	**5838.48**		**5838.48**	**0.000000**	**0.09**	**10079.40**	**926.22**	**0.00**
NW3	**72.0000**	**10YR**	**499.70**	**5824.01**	**5824.70**	**5824.67**	**5824.96**	**0.030566**	**5.05**	**135.07**	**224.45**	**1.07**
NW3	**72.0000**	**2YR**	**195.80**	**5824.01**	**5824.67**		**5824.72**	**0.005533**	**2.08**	**128.08**	**222.90**	**0.45**
NW3	**71.5000**	**500YR**	**604.50**	**5822.01**	**5844.31**		**5844.31**	**0.000000**	**0.04**	**24875.10**	**1362.90**	**0.00**
NW3	**71.5000**	**100YR**	**557.00**	**5822.01**	**5838.48**		**5838.48**	**0.000000**	**0.06**	**16996.87**	**1336.92**	**0.00**
NW3	**71.5000**	**10YR**	**499.70**	**5822.01**	**5824.74**		**5824.75**	**0.000229**	**1.06**	**991.35**	**851.08**	**0.12**
NW3	**71.5000**	**2YR**	**195.80**	**5822.01**	**5822.80**	**5822.80**	**5823.03**	**0.020772**	**4.22**	**60.63**	**142.90**	**0.89**
NW4	**69.5000**	**500YR**	**8564.10**	**5852.01**	**5860.45**		**5860.85**	**0.003641**	**8.97**	**2003.48**	**469.02**	**0.55**
NW4	**69.5000**	**100YR**	**6190.30**	**5852.01**	**5859.40**		**5859.78**	**0.004195**	**8.78**	**1523.31**	**437.79**	**0.58**
NW4	**69.5000**	**10YR**	**3077.90**	**5852.01**	**5857.59**		**5858.01**	**0.006067**	**8.69**	**798.98**	**343.98**	**0.66**
NW4	**69.5000**	**2YR**	**1100.30**	**5852.01**	**5856.22**	**5856.22**	**5856.66**	**0.006824**	**7.56**	**355.05**	**304.61**	**0.67**
NW4	**69.0000**	**500YR**	**8564.10**	**5852.01**	**5859.96**		**5860.25**	**0.002213**	**6.78**	**2255.45**	**441.58**	**0.43**
NW4	**69.0000**	**100YR**	**6190.30**	**5852.01**	**5858.87**		**5859.12**	**0.002309**	**6.26**	**1785.93**	**423.31**	**0.43**
NW4	**69.0000**	**10YR**	**3077.90**	**5852.01**	**5856.92**		**5857.13**	**0.002869**	**5.52**	**1016.90**	**363.44**	**0.45**
NW4	**69.0000**	**2YR**	**1100.30**	**5852.01**	**5854.99**		**5855.23**	**0.005703**	**5.44**	**376.25**	**279.47**	**0.58**
NW4	**68.5000**	**500YR**	**8610.70**	**5850.01**	**5859.12**		**5859.63**	**0.003405**	**9.42**	**1851.51**	**378.34**	**0.55**
NW4	**68.5000**	**100YR**	**6225.20**	**5850.01**	**5858.07**		**5858.50**	**0.003278**	**8.52**	**1471.31**	**343.53**	**0.53**
NW4	**68.5000**	**10YR**	**3097.80**	**5850.01**	**5856.24**		**5856.51**	**0.002648**	**6.44**	**927.15**	**267.31**	**0.46**
NW4	**68.5000**	**2YR**	**1106.00**	**5850.01**	**5854.29**		**5854.46**	**0.002267**	**4.64**	**458.09**	**216.29**	**0.40**
NW4	**68.4166***	**500YR**	**8610.70**	**5849.60**	**5856.93**		**5858.23**	**0.008904**	**13.18**	**1227.79**	**306.17**	**0.86**
NW4	**68.4166***	**100YR**	**6225.20**	**5849.60**	**5855.93**		**5857.11**	**0.009292**	**12.21**	**939.15**	**271.47**	**0.86**
NW4	**68.4166***	**10YR**	**3097.80**	**5849.60**	**5854.42**	**5853.54**	**5855.32**	**0.008982**	**9.99**	**560.58**	**230.30**	**0.80**
NW4	**68.4166***	**2YR**	**1106.00**	**5849.60**	**5852.53**	**5852.53**	**5853.29**	**0.011621**	**8.13**	**212.54**	**141.90**	**0.84**
NW4	**68.3333***	**500YR**	**8610.70**	**5849.20**	**5856.57**		**5857.87**	**0.007721**	**12.32**	**1251.07**	**310.48**	**0.80**
NW4	**68.3333***	**100YR**	**6225.20**	**5849.20**	**5855.47**	**5855.06**	**5856.73**	**0.008672**	**11.71**	**928.00**	**274.89**	**0.83**
NW4	**68.3333***	**10YR**	**3097.80**	**5849.20**	**5853.37**	**5853.04**	**5854.79**	**0.014056**	**11.34**	**434.39**	**197.86**	**0.98**
NW4	**68.3333***	**2YR**	**1106.00**	**5849.20**	**5851.81**	**5851.81**	**5852.64**	**0.013198**	**8.01**	**188.96**	**129.82**	**0.88**
NW4	**68.25***	**500YR**	**8610.70**	**5848.79**	**5856.45**		**5857.52**	**0.005549**	**10.71**	**1371.08**	**319.22**	**0.68**
NW4	**68.25***	**100YR**	**6225.20**	**5848.79**	**5855.38**		**5856.34**	**0.005737**	**9.85**	**1046.90**	**283.41**	**0.68**
NW4	**68.25***	**10YR**	**3097.80**	**5848.79**	**5853.35**		**5854.21**	**0.007289**	**8.66**	**543.73**	**213.52**	**0.72**
NW4	**68.25***	**2YR**	**1106.00**	**5848.79**	**5851.44**	**5851.04**	**5852.03**	**0.008757**	**6.59**	**217.34**	**137.16**	**0.72**
NW4	**68.1666***	**500YR**	**8610.70**	**5848.39**	**5856.43**		**5857.25**	**0.003794**	**9.15**	**1547.61**	**334.17**	**0.57**
NW4	**68.1666***	**100YR**	**6225.20**	**5848.39**	**5855.36**		**5856.07**	**0.003718**	**8.23**	**1209.82**	**301.67**	**0.55**
NW4	**68.1666***	**10YR**	**3097.80**	**5848.39**	**5853.34**		**5853.89**	**0.004046**	**6.82**	**668.93**	**231.08**	**0.54**
NW4	**68.1666***	**2YR**	**1106.00**	**5848.39**	**5851.40**		**5851.71**	**0.003926**	**4.80**	**296.29**	**157.68**	**0.49**
NW4	**68.0833***	**500YR**	**8610.70**	**5847.98**	**5856.43**		**5857.06**	**0.002602**	**7.83**	**1751.13**	**348.77**	**0.48**
NW4	**68.0833***	**100YR**	**6225.20**	**5847.98**	**5855.37**		**5855.88**	**0.002445**	**6.94**	**1395.54**	**319.61**	**0.45**
NW4	**68.0833***	**10YR**	**3097.80**	**5847.98**	**5853.34**		**5853.70**	**0.002397**	**5.53**	**808.57**	**253.29**	**0.42**
NW4	**68.0833***	**2YR**	**1106.00**	**5847.98**	**5851.38**		**5851.55**	**0.001890**	**3.62**	**390.69**	**176.57**	**0.35**
NW4	**68.0000**	**500YR**	**8610.70**	**5847.58**	**5856.44**		**5856.93**	**0.001841**	**6.80**	**1967.90**	**365.36**	**0.40**
NW4	**68.0000**	**100YR**	**6225.20**	**5847.58**	**5855.38**		**5855.76**	**0.001655**	**5.92**	**1596.29**	**336.24**	**0.37**
NW4	**68.0000**	**10YR**	**3097.80**	**5847.58**	**5853.33**		**5853.59**	**0.001493**	**4.58**	**963.64**	**277.84**	**0.34**
NW4	**68.0000**	**2YR**	**1106.00**	**5847.58**	**5851.37**		**5851.48**	**0.000995**	**2.82**	**498.34**	**197.41**	**0.26**
NW4	**67.875***	**500YR**	**8610.70**	**5847.30**	**5854.75**	**5854.75**	**5856.67**	**0.011445**	**12.92**	**973.98**	**266.32**	**0.94**
NW4	**67.875***	**100YR**	**6225.20**	**5847.30**	**5853.90**	**5853.90**	**5855.53**	**0.011419**	**11.63**	**757.87**	**241.92**	**0.91**
NW4	**67.875***	**10YR**	**3097.80**	**5847.30**	**5852.06**	**5852.06**	**5853.38**	**0.015572**	**10.04**	**385.84**	**161.12**	**0.99**
NW4	**67.875***	**2YR**	**1106.00**	**5847.30**	**5850.59**	**5850.59**	**5851.34**	**0.018367**	**7.26**	**175.93**	**126.97**	**0.97**
NW4	**67.75***	**500YR**	**8610.70**	**5845.86**	**5853.65**	**5853.65**	**5855.34**	**0.010241**	**11.39**	**1025.48**	**327.89**	**0.87**
NW4	**67.75***	**100YR**	**6225.20**	**5845.86**	**5852.79**	**5852.79**	**5854.31**	**0.011116**	**10.53**	**756.86**	**288.90**	**0.88**
NW4	**67.75***	**10YR**	**3097.80**	**5845.86**	**5851.16**	**5851.16**	**5852.38**	**0.015108**	**9.06**	**379.29**	**181.54**	**0.95**
NW4	**67.75***	**2YR**	**1106.00**	**5845.86**	**5849.56**	**5849.56**	**5850.41**	**0.020698**	**7.40**	**149.42**	**91.24**	**1.02**
NW4	**67.625***	**500YR**	**8610.70**	**5844.51**	**5851.38**	**5851.38**	**5853.06**	**0.014313**	**15.58**	**1060.32**	**303.70**	**1.07**
NW4	**67.625***	**100YR**	**6225.20**	**5844.51**	**5850.57**	**5850.57**	**5852.04**	**0.014287**	**14.26**	**826.46**	**271.02**	**1.04**

NW4	**67.625***	**10YR**	**3097.80**	**5844.51**	**5849.25**	**5849.25**	**5850.32**	**0.013014**	**11.46**	**501.79**	**221.67**	**0.95**
NW4	**67.625***	**2YR**	**1106.00**	**5844.51**	**5847.88**	**5847.85**	**5848.55**	**0.010914**	**8.23**	**235.38**	**163.86**	**0.82**
NW4	**67.5000**	**500YR**	**8610.70**	**5844.01**	**5850.85**	**5850.85**	**5852.46**	**0.014172**	**15.45**	**1099.16**	**325.44**	**1.06**
NW4	**67.5000**	**100YR**	**6225.20**	**5844.01**	**5850.11**	**5850.11**	**5851.49**	**0.013508**	**13.93**	**870.69**	**292.62**	**1.02**
NW4	**67.5000**	**10YR**	**3097.80**	**5844.01**	**5848.91**	**5848.83**	**5849.86**	**0.011313**	**10.93**	**547.09**	**246.85**	**0.89**
NW4	**67.5000**	**2YR**	**1106.00**	**5844.01**	**5847.77**		**5848.25**	**0.006885**	**7.05**	**291.91**	**197.43**	**0.67**
NW4	**67.0000**	**500YR**	**8610.70**	**5844.01**	**5849.25**		**5849.79**	**0.006633**	**9.05**	**1725.35**	**522.40**	**0.70**
NW4	**67.0000**	**100YR**	**6225.20**	**5844.01**	**5848.66**		**5849.09**	**0.006099**	**8.00**	**1421.37**	**502.52**	**0.66**
NW4	**67.0000**	**10YR**	**3097.80**	**5844.01**	**5847.54**		**5847.84**	**0.005867**	**6.51**	**883.29**	**451.64**	**0.62**
NW4	**67.0000**	**2YR**	**1106.00**	**5844.01**	**5846.32**		**5846.58**	**0.007135**	**5.39**	**384.76**	**362.15**	**0.63**
NW4	**66.5000**	**500YR**	**8610.70**	**5842.01**	**5846.38**		**5847.17**	**0.010399**	**10.08**	**1543.28**	**608.91**	**0.85**
NW4	**66.5000**	**100YR**	**6225.20**	**5842.01**	**5845.78**		**5846.51**	**0.011173**	**9.46**	**1186.98**	**565.99**	**0.86**
NW4	**66.5000**	**10YR**	**3097.80**	**5842.01**	**5844.71**		**5845.27**	**0.011799**	**7.77**	**668.24**	**420.72**	**0.84**
NW4	**66.5000**	**2YR**	**1106.00**	**5842.01**	**5843.55**		**5843.82**	**0.010796**	**5.08**	**295.96**	**232.27**	**0.73**
NW4	**66.0000**	**500YR**	**8610.70**	**5840.01**	**5845.18**		**5845.72**	**0.003815**	**6.85**	**1800.30**	**532.80**	**0.53**
NW4	**66.0000**	**100YR**	**6225.20**	**5840.01**	**5843.84**		**5844.51**	**0.006622**	**7.38**	**1139.81**	**450.96**	**0.67**
NW4	**66.0000**	**10YR**	**3097.80**	**5840.01**	**5842.63**		**5843.10**	**0.007244**	**5.98**	**651.59**	**357.19**	**0.65**
NW4	**66.0000**	**2YR**	**1106.00**	**5840.01**	**5841.50**		**5841.74**	**0.007327**	**4.12**	**306.72**	**257.24**	**0.60**
NW4	**65.5000**	**500YR**	**9600.30**	**5836.92**	**5844.73**		**5844.86**	**0.001330**	**5.32**	**3578.70**	**759.30**	**0.34**
NW4	**65.5000**	**100YR**	**6951.00**	**5836.92**	**5842.12**		**5842.39**	**0.004829**	**7.72**	**1817.77**	**603.27**	**0.60**
NW4	**65.5000**	**10YR**	**3461.10**	**5836.92**	**5840.80**		**5840.97**	**0.004667**	**6.24**	**1122.97**	**484.26**	**0.56**
NW4	**65.5000**	**2YR**	**1265.00**	**5836.92**	**5839.55**		**5839.64**	**0.004755**	**4.84**	**568.98**	**403.64**	**0.53**
NW4	**65.0000**	**500YR**	**9600.30**	**5836.01**	**5844.43**		**5844.53**	**0.000769**	**4.23**	**4345.13**	**818.60**	**0.26**
NW4	**65.0000**	**100YR**	**6951.00**	**5836.01**	**5840.37**		**5840.70**	**0.005561**	**7.27**	**1657.71**	**537.63**	**0.62**
NW4	**65.0000**	**10YR**	**3461.10**	**5836.01**	**5839.36**		**5839.53**	**0.004195**	**5.27**	**1138.10**	**489.29**	**0.52**
NW4	**65.0000**	**2YR**	**1265.00**	**5836.01**	**5838.21**		**5838.30**	**0.003605**	**3.65**	**612.51**	**431.33**	**0.44**
NW4	**64.5000**	**500YR**	**9600.30**	**5834.01**	**5844.37**		**5844.40**	**0.000211**	**2.55**	**6932.97**	**1026.21**	**0.14**
NW4	**64.5000**	**100YR**	**6951.00**	**5834.01**	**5838.85**		**5839.22**	**0.004598**	**7.12**	**1778.59**	**629.98**	**0.57**
NW4	**64.5000**	**10YR**	**3461.10**	**5834.01**	**5836.98**	**5836.84**	**5837.58**	**0.011636**	**8.15**	**738.55**	**477.00**	**0.84**
NW4	**64.5000**	**2YR**	**1265.00**	**5834.01**	**5835.80**	**5835.71**	**5836.32**	**0.016449**	**6.82**	**272.27**	**258.32**	**0.92**
NW4	**64.0000**	**500YR**	**9600.30**	**5830.01**	**5844.33**		**5844.36**	**0.000103**	**2.21**	**8339.83**	**890.24**	**0.10**
NW4	**64.0000**	**100YR**	**6951.00**	**5830.01**	**5838.57**		**5838.65**	**0.000759**	**4.26**	**3424.91**	**732.72**	**0.26**
NW4	**64.0000**	**10YR**	**3461.10**	**5830.01**	**5834.50**		**5834.87**	**0.006356**	**7.98**	**938.99**	**447.60**	**0.67**
NW4	**64.0000**	**2YR**	**1265.00**	**5830.01**	**5833.19**		**5833.44**	**0.005546**	**5.90**	**445.97**	**314.76**	**0.59**
NW4	**63.5000**	**500YR**	**9600.30**	**5828.01**	**5844.32**		**5844.33**	**0.000046**	**1.61**	**10638.88**	**900.87**	**0.07**
NW4	**63.5000**	**100YR**	**6951.00**	**5828.01**	**5838.50**		**5838.53**	**0.000200**	**2.49**	**5483.80**	**873.09**	**0.14**
NW4	**63.5000**	**10YR**	**3461.10**	**5828.01**	**5831.85**		**5832.40**	**0.010153**	**8.91**	**838.72**	**531.76**	**0.82**
NW4	**63.5000**	**2YR**	**1265.00**	**5828.01**	**5830.83**	**5830.83**	**5831.26**	**0.009076**	**6.79**	**383.40**	**399.37**	**0.73**
NW4	**63.0000**	**500YR**	**9600.30**	**5826.01**	**5844.31**		**5844.32**	**0.000023**	**1.21**	**13665.85**	**1020.09**	**0.05**
NW4	**63.0000**	**100YR**	**6951.00**	**5826.01**	**5838.48**		**5838.50**	**0.000069**	**1.63**	**7843.70**	**979.61**	**0.08**
NW4	**63.0000**	**10YR**	**3461.10**	**5826.01**	**5830.12**		**5830.59**	**0.006298**	**7.19**	**895.39**	**509.89**	**0.65**
NW4	**63.0000**	**2YR**	**1265.00**	**5826.01**	**5828.83**	**5828.67**	**5829.19**	**0.006521**	**5.55**	**371.23**	**338.08**	**0.62**
NW4	**62.5000**	**500YR**	**9600.30**	**5824.01**	**5844.31**		**5844.32**	**0.000017**	**1.14**	**14548.68**	**925.19**	**0.04**
NW4	**62.5000**	**100YR**	**6951.00**	**5824.01**	**5838.47**		**5838.48**	**0.000041**	**1.38**	**9150.05**	**916.02**	**0.06**
NW4	**62.5000**	**10YR**	**3461.10**	**5824.01**	**5828.03**	**5827.60**	**5828.44**	**0.007876**	**7.94**	**924.54**	**545.58**	**0.72**
NW4	**62.5000**	**2YR**	**1265.00**	**5824.01**	**5827.12**	**5826.88**	**5827.35**	**0.005300**	**5.41**	**493.43**	**436.96**	**0.57**
NW4	**62.0000**	**500YR**	**9600.30**	**5822.01**	**5844.31**		**5844.31**	**0.000005**	**0.66**	**23777.73**	**1251.52**	**0.02**
NW4	**62.0000**	**100YR**	**6951.00**	**5822.01**	**5838.47**		**5838.48**	**0.000009**	**0.71**	**16471.50**	**1251.52**	**0.03**
NW4	**62.0000**	**10YR**	**3461.10**	**5822.01**	**5824.45**	**5823.91**	**5824.83**	**0.017162**	**8.36**	**816.48**	**657.72**	**0.98**
NW4	**62.0000**	**2YR**	**1265.00**	**5822.01**	**5823.27**	**5823.27**	**5823.68**	**0.039333**	**7.75**	**273.08**	**335.93**	**1.31**
NW5	**59.5000**	**500YR**	**7744.20**	**5818.15**	**5844.31**		**5844.31**	**0.000010**	**1.03**	**13899.36**	**721.49**	**0.04**
NW5	**59.5000**	**100YR**	**6205.90**	**5818.15**	**5838.47**		**5838.47**	**0.000018**	**1.19**	**9824.10**	**676.59**	**0.05**
NW5	**59.5000**	**10YR**	**3837.10**	**5818.15**	**5824.65**		**5824.74**	**0.001396**	**4.82**	**1637.14**	**415.76**	**0.33**
NW5	**59.5000**	**2YR**	**1450.70**	**5818.15**	**5821.87**		**5821.98**	**0.003757**	**5.45**	**606.05**	**324.44**	**0.50**
NW5	**59.0000**	**500YR**	**7744.20**	**5818.01**	**5844.31**		**5844.31**	**0.000006**	**0.83**	**15449.35**	**769.00**	**0.03**

NW5	**59.0000**	**100YR**	**6205.90**	**5818.01**	**5838.46**		**5838.47**	**0.000011**	**0.94**	**11063.97**	**733.62**	**0.04**
NW5	**59.0000**	**10YR**	**3837.10**	**5818.01**	**5824.44**		**5824.52**	**0.000591**	**3.11**	**1930.75**	**426.61**	**0.22**
NW5	**59.0000**	**2YR**	**1450.70**	**5818.01**	**5820.61**		**5820.89**	**0.004865**	**4.86**	**455.17**	**348.80**	**0.53**
NW5	**58.5000**	**500YR**	**7744.20**	**5816.01**	**5844.31**		**5844.31**	**0.000003**	**0.64**	**20660.93**	**940.60**	**0.02**
NW5	**58.5000**	**100YR**	**6205.90**	**5816.01**	**5838.47**		**5838.47**	**0.000006**	**0.70**	**15294.36**	**898.52**	**0.03**
NW5	**58.5000**	**10YR**	**3837.10**	**5816.01**	**5824.39**		**5824.42**	**0.000187**	**2.08**	**3329.68**	**651.38**	**0.13**
NW5	**58.5000**	**2YR**	**1450.70**	**5816.01**	**5818.75**	**5818.68**	**5819.21**	**0.007986**	**6.41**	**390.84**	**358.01**	**0.69**
NW5	**58.0000**	**500YR**	**7744.20**	**5814.01**	**5844.31**		**5844.31**	**0.000003**	**0.60**	**23279.76**	**1059.88**	**0.02**
NW5	**58.0000**	**100YR**	**6205.90**	**5814.01**	**5838.46**		**5838.47**	**0.000004**	**0.65**	**17303.01**	**991.83**	**0.02**
NW5	**58.0000**	**10YR**	**3837.10**	**5814.01**	**5824.36**		**5824.38**	**0.000104**	**1.78**	**4334.19**	**746.19**	**0.10**
NW5	**58.0000**	**2YR**	**1450.70**	**5814.01**	**5817.46**		**5817.63**	**0.003322**	**4.74**	**592.51**	**357.96**	**0.46**
NW5	**57.5000**	**500YR**	**7786.40**	**5812.01**	**5844.30**		**5844.31**	**0.000003**	**0.63**	**22497.08**	**1095.86**	**0.02**
NW5	**57.5000**	**100YR**	**6240.70**	**5812.01**	**5838.46**		**5838.47**	**0.000005**	**0.68**	**16604.84**	**941.04**	**0.02**
NW5	**57.5000**	**10YR**	**3862.30**	**5812.01**	**5824.33**		**5824.35**	**0.000101**	**1.90**	**4424.19**	**796.76**	**0.10**
NW5	**57.5000**	**2YR**	**1462.90**	**5812.01**	**5816.61**		**5816.78**	**0.002928**	**5.04**	**643.11**	**388.10**	**0.44**
NW5	**57.0000**	**500YR**	**7786.40**	**5812.01**	**5844.30**		**5844.31**	**0.000002**	**0.55**	**24680.71**	**1107.39**	**0.02**
NW5	**57.0000**	**100YR**	**6240.70**	**5812.01**	**5838.46**		**5838.46**	**0.000003**	**0.60**	**18255.44**	**1076.30**	**0.02**
NW5	**57.0000**	**10YR**	**3862.30**	**5812.01**	**5824.32**		**5824.33**	**0.000039**	**1.23**	**5677.63**	**763.79**	**0.06**
NW5	**57.0000**	**2YR**	**1462.90**	**5812.01**	**5816.36**		**5816.42**	**0.000575**	**2.36**	**1021.11**	**446.86**	**0.20**
NW5	**56.5000**	**500YR**	**7814.30**	**5808.01**	**5844.30**		**5844.30**	**0.000002**	**0.50**	**29025.67**	**1165.82**	**0.01**
NW5	**56.5000**	**100YR**	**6264.20**	**5808.01**	**5838.46**		**5838.46**	**0.000002**	**0.55**	**22215.74**	**1165.82**	**0.02**
NW5	**56.5000**	**10YR**	**3879.30**	**5808.01**	**5824.31**		**5824.32**	**0.000024**	**1.17**	**7292.09**	**862.30**	**0.05**
NW5	**56.5000**	**2YR**	**1471.60**	**5808.01**	**5816.31**		**5816.32**	**0.000150**	**1.83**	**1734.75**	**430.64**	**0.11**
NW5	**56.0000**	**500YR**	**10636.00**	**5806.02**	**5844.30**		**5844.30**	**0.000002**	**0.52**	**37736.30**	**1364.52**	**0.01**
NW5	**56.0000**	**100YR**	**8334.80**	**5806.02**	**5838.46**		**5838.46**	**0.000002**	**0.53**	**29765.71**	**1364.52**	**0.02**
NW5	**56.0000**	**10YR**	**4940.80**	**5806.02**	**5824.31**		**5824.31**	**0.000018**	**1.07**	**10713.09**	**1251.30**	**0.04**
NW5	**56.0000**	**2YR**	**1980.30**	**5806.02**	**5816.25**		**5816.28**	**0.000159**	**2.12**	**2415.85**	**685.09**	**0.12**
W1	**49.5000**	**500YR**	**1639.60**	**5989.65**	**5993.19**	**5993.19**	**5994.48**	**0.023512**	**12.80**	**204.25**	**80.04**	**1.23**
W1	**49.5000**	**100YR**	**1064.70**	**5989.65**	**5992.44**	**5992.44**	**5993.48**	**0.025560**	**11.28**	**146.88**	**72.42**	**1.23**
W1	**49.5000**	**10YR**	**483.10**	**5989.65**	**5991.42**	**5991.42**	**5992.13**	**0.030682**	**8.93**	**79.61**	**59.52**	**1.24**
W1	**49.5000**	**2YR**	**240.70**	**5989.65**	**5990.83**	**5990.83**	**5991.32**	**0.036577**	**7.21**	**46.89**	**51.49**	**1.25**
W1	**49.0000**	**500YR**	**1639.60**	**5980.99**	**5984.09**	**5984.09**	**5985.26**	**0.033440**	**14.29**	**202.32**	**89.33**	**1.44**
W1	**49.0000**	**100YR**	**1064.70**	**5980.99**	**5983.48**	**5983.48**	**5984.39**	**0.034411**	**12.50**	**149.79**	**82.87**	**1.41**
W1	**49.0000**	**10YR**	**483.10**	**5980.99**	**5982.68**	**5982.68**	**5983.26**	**0.036461**	**9.88**	**86.98**	**74.30**	**1.36**
W1	**49.0000**	**2YR**	**240.70**	**5980.99**	**5982.24**	**5982.24**	**5982.62**	**0.035867**	**7.94**	**55.19**	**69.34**	**1.28**
W1	**48.5000**	**500YR**	**1639.60**	**5972.01**	**5975.83**	**5975.83**	**5976.88**	**0.017592**	**11.61**	**245.36**	**108.08**	**1.07**
W1	**48.5000**	**100YR**	**1064.70**	**5972.01**	**5975.24**	**5975.24**	**5976.07**	**0.016754**	**10.08**	**184.18**	**100.88**	**1.02**
W1	**48.5000**	**10YR**	**483.10**	**5972.01**	**5974.46**	**5974.46**	**5975.01**	**0.014691**	**7.76**	**109.50**	**90.60**	**0.91**
W1	**48.5000**	**2YR**	**240.70**	**5972.01**	**5974.00**	**5974.00**	**5974.38**	**0.011871**	**6.01**	**69.53**	**83.56**	**0.78**
W1	**48.0000**	**500YR**	**1639.60**	**5964.02**	**5967.68**	**5967.68**	**5968.65**	**0.021323**	**11.69**	**243.65**	**114.22**	**1.14**
W1	**48.0000**	**100YR**	**1064.70**	**5964.02**	**5967.18**	**5967.18**	**5967.92**	**0.019966**	**10.12**	**187.44**	**110.94**	**1.08**
W1	**48.0000**	**10YR**	**483.10**	**5964.02**	**5965.97**	**5965.97**	**5967.74**	**0.080258**	**13.76**	**59.27**	**73.01**	**1.96**
W1	**48.0000**	**2YR**	**240.70**	**5964.02**	**5965.97**	**5965.97**	**5966.41**	**0.019809**	**6.84**	**59.41**	**73.13**	**0.97**
W1	**47.5000**	**500YR**	**1639.60**	**5956.02**	**5960.12**	**5960.12**	**5961.29**	**0.017374**	**11.36**	**232.66**	**99.52**	**1.06**
W1	**47.5000**	**100YR**	**1064.70**	**5956.02**	**5959.48**	**5959.48**	**5960.40**	**0.016909**	**9.83**	**172.45**	**91.15**	**1.01**
W1	**47.5000**	**10YR**	**483.10**	**5956.02**	**5958.68**	**5958.68**	**5959.26**	**0.014795**	**7.42**	**102.46**	**82.09**	**0.90**
W1	**47.5000**	**2YR**	**240.70**	**5956.02**	**5957.79**	**5957.79**	**5958.34**	**0.025643**	**6.82**	**45.63**	**45.29**	**1.08**
W1	**47.25**		**Lat Struct**									
W1	**47.0000**	**500YR**	**1639.60**	**5942.10**	**5954.94**	**5951.91**	**5955.11**	**0.001210**	**4.23**	**683.49**	**212.38**	**0.26**
W1	**47.0000**	**100YR**	**1064.70**	**5942.10**	**5954.18**	**5950.98**	**5954.30**	**0.000921**	**3.46**	**529.29**	**192.52**	**0.22**
W1	**47.0000**	**10YR**	**483.10**	**5942.10**	**5952.96**	**5948.67**	**5953.02**	**0.000455**	**2.16**	**344.66**	**130.16**	**0.15**
W1	**47.0000**	**2YR**	**240.70**	**5942.10**	**5951.89**	**5945.85**	**5951.92**	**0.000286**	**1.51**	**223.08**	**98.41**	**0.12**
W1	**46.75**		**Culvert**									
W1	**46.5000**	**500YR**	**1639.60**	**5938.06**	**5945.64**	**5945.64**	**5946.72**	**0.016540**	**10.19**	**245.46**	**117.82**	**0.92**

W1	**46.5000**	**100YR**	**1064.70**	**5938.06**	**5945.03**	**5945.03**	**5945.91**	**0.015123**	**8.89**	**178.02**	**101.31**	**0.86**
W1	**46.5000**	**10YR**	**483.10**	**5938.06**	**5944.05**	**5944.05**	**5944.74**	**0.013445**	**7.14**	**92.02**	**76.14**	**0.77**
W1	**46.5000**	**2YR**	**240.70**	**5938.06**	**5942.83**	**5942.83**	**5943.67**	**0.025125**	**7.35**	**33.11**	**25.65**	**0.97**
W1	**46.0000**	**500YR**	**1639.60**	**5935.43**	**5937.94**	**5937.94**	**5938.90**	**0.035883**	**12.93**	**218.79**	**112.62**	**1.44**
W1	**46.0000**	**100YR**	**1064.70**	**5935.43**	**5937.43**	**5937.43**	**5938.17**	**0.038836**	**11.53**	**161.93**	**108.21**	**1.45**
W1	**46.0000**	**10YR**	**483.10**	**5935.43**	**5936.81**	**5936.81**	**5937.26**	**0.040877**	**9.21**	**96.60**	**102.47**	**1.39**
W1	**46.0000**	**2YR**	**240.70**	**5935.43**	**5936.46**	**5936.46**	**5936.76**	**0.042044**	**7.67**	**61.68**	**98.92**	**1.34**
W1	**45.5000**	**500YR**	**1639.60**	**5922.01**	**5924.06**	**5924.06**	**5924.81**	**0.029630**	**9.88**	**261.64**	**170.84**	**1.25**
W1	**45.5000**	**100YR**	**1064.70**	**5922.01**	**5923.67**	**5923.67**	**5924.25**	**0.030958**	**8.69**	**196.04**	**165.99**	**1.23**
W1	**45.5000**	**10YR**	**483.10**	**5922.01**	**5923.19**	**5923.19**	**5923.54**	**0.030477**	**6.73**	**118.69**	**158.44**	**1.15**
W1	**45.5000**	**2YR**	**240.70**	**5922.01**	**5922.93**	**5922.93**	**5923.16**	**0.027598**	**5.31**	**77.99**	**154.45**	**1.05**
W1	**45.0000**	**500YR**	**230.70**	**5911.54**	**5913.22**	**5913.22**	**5913.78**	**0.021811**	**7.17**	**45.99**	**42.85**	**1.03**
W1	**45.0000**	**100YR**	**221.20**	**5911.54**	**5913.18**	**5913.18**	**5913.73**	**0.022234**	**7.12**	**44.31**	**42.31**	**1.04**
W1	**45.0000**	**10YR**	**208.90**	**5911.54**	**5913.14**	**5913.14**	**5913.67**	**0.022167**	**6.97**	**42.56**	**41.74**	**1.03**
W1	**45.0000**	**2YR**	**199.90**	**5911.54**	**5913.10**	**5913.10**	**5913.62**	**0.022333**	**6.88**	**41.12**	**41.26**	**1.03**
W1	**44.5000**	**500YR**	**230.70**	**5896.01**	**5897.70**	**5897.70**	**5898.32**	**0.018687**	**6.60**	**40.74**	**35.95**	**0.95**
W1	**44.5000**	**100YR**	**221.20**	**5896.01**	**5897.66**	**5897.66**	**5898.27**	**0.018869**	**6.51**	**39.38**	**35.46**	**0.95**
W1	**44.5000**	**10YR**	**208.90**	**5896.01**	**5897.61**	**5897.61**	**5898.20**	**0.019322**	**6.43**	**37.46**	**34.69**	**0.95**
W1	**44.5000**	**2YR**	**199.90**	**5896.01**	**5897.56**	**5897.56**	**5898.15**	**0.019862**	**6.38**	**35.90**	**34.01**	**0.96**
W1	**44.0000**	**500YR**	**251.50**	**5886.67**	**5888.12**	**5888.12**	**5888.63**	**0.030776**	**7.30**	**49.97**	**54.45**	**1.18**
W1	**44.0000**	**100YR**	**236.30**	**5886.67**	**5888.08**	**5888.08**	**5888.57**	**0.030432**	**7.10**	**47.95**	**53.19**	**1.17**
W1	**44.0000**	**10YR**	**216.90**	**5886.67**	**5888.01**	**5888.01**	**5888.49**	**0.031831**	**6.97**	**44.33**	**51.12**	**1.18**
W1	**44.0000**	**2YR**	**202.50**	**5886.67**	**5887.96**	**5887.96**	**5888.42**	**0.033182**	**6.87**	**41.56**	**49.51**	**1.19**
W1	**43.5000**	**500YR**	**251.50**	**5878.01**	**5880.41**	**5880.41**	**5881.15**	**0.015595**	**7.04**	**40.43**	**34.49**	**0.90**
W1	**43.5000**	**100YR**	**236.30**	**5878.01**	**5880.33**	**5880.33**	**5881.06**	**0.016125**	**6.96**	**37.77**	**32.93**	**0.91**
W1	**43.5000**	**10YR**	**216.90**	**5878.01**	**5880.19**	**5880.19**	**5880.93**	**0.018016**	**6.98**	**33.50**	**28.85**	**0.95**
W1	**43.5000**	**2YR**	**202.50**	**5878.01**	**5880.10**	**5880.10**	**5880.83**	**0.018869**	**6.90**	**31.13**	**26.18**	**0.96**
W1	**43.0000**	**500YR**	**251.50**	**5872.88**	**5874.44**	**5874.44**	**5874.97**	**0.025850**	**7.59**	**51.32**	**49.95**	**1.12**
W1	**43.0000**	**100YR**	**236.30**	**5872.88**	**5874.39**	**5874.39**	**5874.90**	**0.026146**	**7.46**	**48.90**	**49.22**	**1.12**
W1	**43.0000**	**10YR**	**216.90**	**5872.88**	**5874.33**	**5874.33**	**5874.82**	**0.026387**	**7.27**	**45.85**	**48.21**	**1.11**
W1	**43.0000**	**2YR**	**202.50**	**5872.88**	**5874.28**	**5874.28**	**5874.75**	**0.026684**	**7.12**	**43.47**	**47.35**	**1.11**
W1	**42.5000**	**500YR**	**251.50**	**5866.01**	**5866.89**	**5866.87**	**5867.14**	**0.019481**	**4.25**	**72.87**	**134.23**	**0.87**
W1	**42.5000**	**100YR**	**236.30**	**5866.01**	**5866.87**	**5866.85**	**5867.10**	**0.018749**	**4.12**	**70.51**	**133.60**	**0.85**
W1	**42.5000**	**10YR**	**216.90**	**5866.01**	**5866.84**	**5866.82**	**5867.06**	**0.018979**	**4.05**	**65.71**	**132.31**	**0.85**
W1	**42.5000**	**2YR**	**202.50**	**5866.01**	**5866.81**	**5866.75**	**5867.03**	**0.019213**	**3.99**	**61.98**	**131.29**	**0.85**
W1	**42.0000**	**500YR**	**251.50**	**5860.42**	**5861.32**	**5861.32**	**5861.60**	**0.026641**	**5.46**	**70.87**	**116.41**	**1.04**
W1	**42.0000**	**100YR**	**236.30**	**5860.42**	**5861.29**	**5861.29**	**5861.57**	**0.027942**	**5.44**	**66.85**	**115.38**	**1.06**
W1	**42.0000**	**10YR**	**216.90**	**5860.42**	**5861.26**	**5861.26**	**5861.52**	**0.027629**	**5.27**	**63.32**	**114.45**	**1.05**
W1	**42.0000**	**2YR**	**202.50**	**5860.42**	**5861.23**	**5861.23**	**5861.49**	**0.027324**	**5.14**	**60.64**	**113.66**	**1.03**
W1	**41.5000**	**500YR**	**251.50**	**5852.23**	**5853.28**	**5853.28**	**5853.54**	**0.018554**	**4.80**	**79.46**	**149.59**	**0.88**
W1	**41.5000**	**100YR**	**236.30**	**5852.23**	**5853.25**	**5853.25**	**5853.51**	**0.018278**	**4.69**	**76.19**	**148.36**	**0.87**
W1	**41.5000**	**10YR**	**216.90**	**5852.23**	**5853.24**	**5853.22**	**5853.47**	**0.016349**	**4.40**	**74.45**	**147.71**	**0.82**
W1	**41.5000**	**2YR**	**202.50**	**5852.23**	**5853.19**	**5853.19**	**5853.43**	**0.018848**	**4.53**	**66.63**	**143.25**	**0.87**
W1	**41.0000**	**500YR**	**296.30**	**5841.51**	**5844.30**		**5844.30**	**0.000065**	**0.59**	**947.43**	**510.13**	**0.06**
W1	**41.0000**	**100YR**	**267.00**	**5841.51**	**5842.39**	**5842.39**	**5842.56**	**0.029514**	**5.69**	**109.43**	**299.32**	**1.09**
W1	**41.0000**	**10YR**	**230.90**	**5841.51**	**5842.36**	**5842.36**	**5842.51**	**0.028935**	**5.48**	**99.07**	**291.33**	**1.07**
W1	**41.0000**	**2YR**	**208.20**	**5841.51**	**5842.36**	**5842.36**	**5842.48**	**0.024118**	**4.99**	**98.21**	**291.01**	**0.98**
W1	**40.5000**	**500YR**	**296.30**	**5831.44**	**5844.30**		**5844.30**	**0.000000**	**0.07**	**7446.63**	**772.48**	**0.00**
W1	**40.5000**	**100YR**	**267.00**	**5831.44**	**5838.46**		**5838.46**	**0.000001**	**0.14**	**3207.10**	**623.23**	**0.01**
W1	**40.5000**	**10YR**	**230.90**	**5831.44**	**5832.40**	**5832.40**	**5832.56**	**0.017328**	**4.41**	**104.32**	**288.50**	**0.84**
W1	**40.5000**	**2YR**	**208.20**	**5831.44**	**5832.37**	**5832.37**	**5832.53**	**0.016703**	**4.25**	**97.58**	**287.02**	**0.82**
W1	**40.0000**	**500YR**	**459.20**	**5820.01**	**5844.30**		**5844.30**	**0.000000**	**0.06**	**12928.60**	**680.37**	**0.00**
W1	**40.0000**	**100YR**	**383.80**	**5820.01**	**5838.46**		**5838.46**	**0.000000**	**0.07**	**9060.57**	**650.10**	**0.00**
W1	**40.0000**	**10YR**	**289.60**	**5820.01**	**5824.30**		**5824.32**	**0.000211**	**1.36**	**452.87**	**333.90**	**0.12**
W1	**40.0000**	**2YR**	**224.80**	**5820.01**	**5821.49**	**5821.49**	**5822.07**	**0.020845**	**6.18**	**37.89**	**34.73**	**0.98**

W1	**39.5000**	**500YR**	**246.70**	**5814.02**	**5844.30**		**5844.30**	**0.000000**	**0.02**	**19866.60**	**816.93**	**0.00**
W1	**39.5000**	**100YR**	**244.30**	**5814.02**	**5838.46**		**5838.46**	**0.000000**	**0.03**	**15213.18**	**781.21**	**0.00**
W1	**39.5000**	**10YR**	**239.70**	**5814.02**	**5824.31**		**5824.31**	**0.000000**	**0.11**	**4404.04**	**746.00**	**0.01**
W1	**39.5000**	**2YR**	**212.30**	**5814.02**	**5816.24**		**5816.30**	**0.001468**	**2.25**	**165.77**	**200.23**	**0.28**
W1	**39.0000**	**500YR**	**246.70**	**5808.01**	**5844.30**		**5844.30**	**0.000000**	**0.01**	**34105.26**	**1264.92**	**0.00**
W1	**39.0000**	**100YR**	**244.30**	**5808.01**	**5838.46**		**5838.46**	**0.000000**	**0.02**	**26945.21**	**1194.46**	**0.00**
W1	**39.0000**	**10YR**	**239.70**	**5808.01**	**5824.31**		**5824.31**	**0.000000**	**0.05**	**10557.29**	**1123.05**	**0.00**
W1	**39.0000**	**2YR**	**212.30**	**5808.01**	**5816.28**		**5816.28**	**0.000001**	**0.15**	**2874.41**	**680.12**	**0.01**
SP1	**199.0000**	**500YR**	**1171.50**	**5882.02**	**5886.40**		**5887.03**	**0.009092**	**9.24**	**241.86**	**106.51**	**0.79**
SP1	**199.0000**	**100YR**	**862.00**	**5882.02**	**5885.88**		**5886.46**	**0.009336**	**8.59**	**189.11**	**96.42**	**0.79**
SP1	**199.0000**	**10YR**	**461.60**	**5882.02**	**5884.87**	**5884.71**	**5885.43**	**0.011856**	**7.83**	**104.15**	**71.95**	**0.84**
SP1	**199.0000**	**2YR**	**180.10**	**5882.02**	**5883.90**	**5883.82**	**5884.32**	**0.013316**	**6.17**	**46.03**	**47.92**	**0.83**
SP1	**198.5000**	**500YR**	**1171.50**	**5880.01**	**5883.64**	**5883.64**	**5884.80**	**0.013083**	**9.47**	**165.33**	**78.70**	**0.91**
SP1	**198.5000**	**100YR**	**862.00**	**5880.01**	**5883.10**	**5883.10**	**5884.14**	**0.014044**	**8.74**	**125.84**	**69.30**	**0.92**
SP1	**198.5000**	**10YR**	**461.60**	**5880.01**	**5882.42**	**5882.24**	**5883.05**	**0.011718**	**6.62**	**82.68**	**57.32**	**0.80**
SP1	**198.5000**	**2YR**	**180.10**	**5880.01**	**5881.60**		**5881.91**	**0.010604**	**4.54**	**42.02**	**41.04**	**0.70**
SP1	**198.0000**	**500YR**	**1171.50**	**5876.72**	**5879.38**	**5879.28**	**5880.01**	**0.025410**	**11.20**	**206.83**	**129.86**	**1.22**
SP1	**198.0000**	**100YR**	**862.00**	**5876.72**	**5879.04**	**5878.96**	**5879.60**	**0.027441**	**10.59**	**163.41**	**122.34**	**1.24**
SP1	**198.0000**	**10YR**	**461.60**	**5876.72**	**5878.47**	**5878.44**	**5878.92**	**0.030439**	**9.19**	**100.06**	**100.76**	**1.25**
SP1	**198.0000**	**2YR**	**180.10**	**5876.72**	**5877.90**	**5877.84**	**5878.18**	**0.028390**	**6.73**	**49.34**	**69.50**	**1.12**
SP1	**197.5000**	**500YR**	**1171.50**	**5874.01**	**5876.80**	**5876.80**	**5877.73**	**0.015585**	**9.11**	**189.38**	**109.34**	**0.97**
SP1	**197.5000**	**100YR**	**862.00**	**5874.01**	**5876.40**	**5876.40**	**5877.21**	**0.016030**	**8.32**	**147.94**	**98.22**	**0.96**
SP1	**197.5000**	**10YR**	**461.60**	**5874.01**	**5875.74**	**5875.74**	**5876.34**	**0.017031**	**6.90**	**89.52**	**79.93**	**0.93**
SP1	**197.5000**	**2YR**	**180.10**	**5874.01**	**5875.03**	**5875.03**	**5875.42**	**0.020532**	**5.26**	**40.67**	**56.61**	**0.94**
SP1	**197.375***	**500YR**	**1171.50**	**5873.51**	**5876.27**	**5876.27**	**5877.19**	**0.013941**	**8.42**	**185.52**	**111.87**	**0.91**
SP1	**197.375***	**100YR**	**862.00**	**5873.51**	**5875.84**	**5875.84**	**5876.65**	**0.014907**	**7.75**	**141.12**	**96.70**	**0.91**
SP1	**197.375***	**10YR**	**461.60**	**5873.51**	**5875.12**	**5875.12**	**5875.75**	**0.018195**	**6.61**	**80.55**	**72.67**	**0.95**
SP1	**197.375***	**2YR**	**180.10**	**5873.51**	**5874.45**	**5874.44**	**5874.82**	**0.021875**	**4.92**	**38.25**	**53.80**	**0.94**
SP1	**197.25***	**500YR**	**1171.50**	**5873.01**	**5875.59**	**5875.59**	**5876.54**	**0.014977**	**8.18**	**170.30**	**103.82**	**0.93**
SP1	**197.25***	**100YR**	**862.00**	**5873.01**	**5875.18**	**5875.18**	**5876.00**	**0.016067**	**7.49**	**130.64**	**90.09**	**0.93**
SP1	**197.25***	**10YR**	**461.60**	**5873.01**	**5874.49**	**5874.49**	**5875.11**	**0.020261**	**6.36**	**76.06**	**69.50**	**0.98**
SP1	**197.25***	**2YR**	**180.10**	**5873.01**	**5873.92**	**5873.87**	**5874.23**	**0.020235**	**4.42**	**40.79**	**54.64**	**0.89**
SP1	**197.125***	**500YR**	**1171.50**	**5872.51**	**5874.92**	**5874.92**	**5875.87**	**0.016204**	**7.94**	**161.44**	**100.26**	**0.95**
SP1	**197.125***	**100YR**	**862.00**	**5872.51**	**5874.53**	**5874.53**	**5875.33**	**0.017694**	**7.26**	**124.77**	**86.64**	**0.96**
SP1	**197.125***	**10YR**	**461.60**	**5872.51**	**5873.90**	**5873.90**	**5874.47**	**0.022225**	**6.09**	**76.14**	**69.42**	**1.00**
SP1	**197.125***	**2YR**	**180.10**	**5872.51**	**5873.33**	**5873.29**	**5873.64**	**0.022858**	**4.44**	**40.52**	**57.49**	**0.93**
SP1	**197.0000**	**500YR**	**1171.50**	**5872.01**	**5874.27**	**5874.27**	**5875.19**	**0.017736**	**7.73**	**156.34**	**95.52**	**0.97**
SP1	**197.0000**	**100YR**	**862.00**	**5872.01**	**5873.89**	**5873.89**	**5874.67**	**0.019821**	**7.08**	**122.81**	**84.00**	**0.99**
SP1	**197.0000**	**10YR**	**461.60**	**5872.01**	**5873.35**	**5873.32**	**5873.87**	**0.020942**	**5.73**	**80.53**	**73.00**	**0.96**
SP1	**197.0000**	**2YR**	**180.10**	**5872.01**	**5872.85**	**5872.74**	**5873.09**	**0.017007**	**3.91**	**46.02**	**63.30**	**0.81**
SP1	**196.5000**	**500YR**	**1171.50**	**5868.01**	**5869.74**	**5869.74**	**5870.43**	**0.019735**	**6.75**	**181.72**	**144.36**	**0.98**
SP1	**196.5000**	**100YR**	**862.00**	**5868.01**	**5869.47**	**5869.47**	**5870.05**	**0.021491**	**6.14**	**144.24**	**131.43**	**0.99**
SP1	**196.5000**	**10YR**	**461.60**	**5868.01**	**5869.02**	**5869.02**	**5869.43**	**0.024282**	**5.20**	**90.11**	**110.43**	**0.99**
SP1	**196.5000**	**2YR**	**180.10**	**5868.01**	**5868.57**	**5868.57**	**5868.82**	**0.029023**	**3.98**	**45.34**	**92.24**	**0.99**
SP1	**196.0000**	**500YR**	**1171.50**	**5862.01**	**5865.01**		**5865.27**	**0.008181**	**6.15**	**351.16**	**238.01**	**0.69**
SP1	**196.0000**	**100YR**	**862.00**	**5862.01**	**5864.72**		**5864.95**	**0.008138**	**5.67**	**285.39**	**230.01**	**0.67**
SP1	**196.0000**	**10YR**	**461.60**	**5862.01**	**5864.27**	**5863.63**	**5864.46**	**0.008346**	**4.91**	**182.81**	**217.19**	**0.65**
SP1	**196.0000**	**2YR**	**180.10**	**5862.01**	**5863.74**		**5863.87**	**0.006503**	**3.55**	**86.40**	**124.44**	**0.55**
SP1	**195.5000**	**500YR**	**1171.50**	**5859.11**	**5860.45**	**5860.45**	**5860.79**	**0.030991**	**7.85**	**298.36**	**395.61**	**1.21**
SP1	**195.5000**	**100YR**	**862.00**	**5859.11**	**5860.33**	**5860.33**	**5860.61**	**0.028654**	**7.08**	**250.63**	**389.96**	**1.14**
SP1	**195.5000**	**10YR**	**461.60**	**5859.11**	**5860.14**	**5860.14**	**5860.33**	**0.023723**	**5.73**	**176.75**	**383.33**	**1.01**
SP1	**195.5000**	**2YR**	**180.10**	**5859.11**	**5859.79**	**5859.79**	**5859.98**	**0.031995**	**5.00**	**66.49**	**193.06**	**1.09**
SP1	**195.0000**	**500YR**	**1171.50**	**5854.01**	**5855.57**	**5855.15**	**5855.69**	**0.009996**	**3.31**	**444.76**	**443.37**	**0.50**
SP1	**195.0000**	**100YR**	**862.00**	**5854.01**	**5855.38**	**5855.02**	**5855.47**	**0.010014**	**3.00**	**361.49**	**421.27**	**0.49**
SP1	**195.0000**	**10YR**	**461.60**	**5854.01**	**5855.07**	**5854.83**	**5855.14**	**0.010013**	**2.48**	**238.41**	**390.03**	**0.47**
SP1	**195.0000**	**2YR**	**180.10**	**5854.01**	**5854.77**	**5854.59**	**5854.81**	**0.009989**	**1.89**	**125.95**	**349.73**	**0.45**

SP2	**189.5000**	**500YR**	**142.70**	**6082.02**	**6084.36**	**6084.36**	**6085.12**	**0.019710**	**7.15**	**21.44**	**14.86**	**0.97**
SP2	**189.5000**	**100YR**	**100.00**	**6082.02**	**6083.96**	**6083.96**	**6084.62**	**0.021338**	**6.58**	**15.95**	**13.07**	**0.98**
SP2	**189.5000**	**10YR**	**42.50**	**6082.02**	**6083.28**	**6083.28**	**6083.71**	**0.026208**	**5.28**	**8.08**	**9.88**	**1.01**
SP2	**189.5000**	**2YR**	**12.80**	**6082.02**	**6082.72**	**6082.72**	**6082.95**	**0.032109**	**3.90**	**3.29**	**7.15**	**1.01**
SP2	**189.0000**	**500YR**	**142.70**	**6064.54**	**6066.75**	**6066.75**	**6067.44**	**0.022463**	**7.26**	**23.21**	**16.80**	**1.03**
SP2	**189.0000**	**100YR**	**100.00**	**6064.54**	**6066.40**	**6066.40**	**6066.99**	**0.022916**	**6.64**	**17.72**	**15.20**	**1.02**
SP2	**189.0000**	**10YR**	**42.50**	**6064.54**	**6065.76**	**6065.76**	**6066.16**	**0.025144**	**5.40**	**9.06**	**11.66**	**1.00**
SP2	**189.0000**	**2YR**	**12.80**	**6064.54**	**6065.20**	**6065.20**	**6065.43**	**0.029672**	**3.97**	**3.53**	**8.16**	**0.99**
SP2	**188.5000**	**500YR**	**194.60**	**6041.85**	**6044.08**	**6044.08**	**6044.88**	**0.034807**	**8.53**	**28.66**	**19.91**	**1.25**
SP2	**188.5000**	**100YR**	**135.70**	**6041.85**	**6043.74**	**6043.74**	**6044.38**	**0.034617**	**7.61**	**22.17**	**17.81**	**1.22**
SP2	**188.5000**	**10YR**	**59.20**	**6041.85**	**6043.08**	**6043.08**	**6043.51**	**0.038563**	**6.21**	**11.80**	**13.88**	**1.21**
SP2	**188.5000**	**2YR**	**17.60**	**6041.85**	**6042.50**	**6042.50**	**6042.74**	**0.047613**	**4.62**	**4.75**	**10.30**	**1.23**
SP2	**188.0000**	**500YR**	**194.60**	**6021.78**	**6024.03**	**6024.03**	**6024.79**	**0.024410**	**7.68**	**30.06**	**20.86**	**1.08**
SP2	**188.0000**	**100YR**	**135.70**	**6021.78**	**6023.68**	**6023.68**	**6024.30**	**0.024584**	**6.95**	**23.09**	**18.80**	**1.06**
SP2	**188.0000**	**10YR**	**59.20**	**6021.78**	**6023.02**	**6023.02**	**6023.45**	**0.027286**	**5.68**	**12.16**	**14.60**	**1.05**
SP2	**188.0000**	**2YR**	**17.60**	**6021.78**	**6022.44**	**6022.44**	**6022.68**	**0.031060**	**4.14**	**4.86**	**10.48**	**1.02**
SP2	**187.5000**	**500YR**	**194.60**	**6010.01**	**6011.72**	**6011.72**	**6012.34**	**0.020204**	**6.42**	**31.99**	**27.57**	**0.97**
SP2	**187.5000**	**100YR**	**135.70**	**6010.01**	**6011.40**	**6011.40**	**6011.93**	**0.021864**	**5.85**	**23.92**	**24.22**	**0.98**
SP2	**187.5000**	**10YR**	**59.20**	**6010.01**	**6011.19**		**6011.34**	**0.008126**	**3.18**	**18.90**	**22.08**	**0.58**
SP2	**187.5000**	**2YR**	**17.60**	**6010.01**	**6010.44**	**6010.44**	**6010.62**	**0.032735**	**3.35**	**5.25**	**14.86**	**0.99**
SP2	**187.375***	**500YR**	**194.60**	**6008.30**	**6011.68**		**6011.77**	**0.001134**	**2.60**	**99.49**	**52.16**	**0.26**
SP2	**187.375***	**100YR**	**135.70**	**6008.30**	**6011.53**		**6011.58**	**0.000679**	**1.94**	**91.57**	**50.18**	**0.20**
SP2	**187.375***	**10YR**	**59.20**	**6008.30**	**6011.28**		**6011.29**	**0.000185**	**0.95**	**79.34**	**46.73**	**0.10**
SP2	**187.375***	**2YR**	**17.60**	**6008.30**	**6009.85**		**6009.86**	**0.000284**	**0.71**	**26.84**	**26.61**	**0.11**
SP2	**187.25***	**500YR**	**194.60**	**6006.60**	**6011.72**		**6011.74**	**0.000170**	**1.38**	**225.11**	**78.44**	**0.11**
SP2	**187.25***	**100YR**	**135.70**	**6006.60**	**6011.55**		**6011.56**	**0.000097**	**1.02**	**211.72**	**76.46**	**0.08**
SP2	**187.25***	**10YR**	**59.20**	**6006.60**	**6011.28**		**6011.28**	**0.000024**	**0.48**	**191.55**	**73.20**	**0.04**
SP2	**187.25***	**2YR**	**17.60**	**6006.60**	**6009.86**		**6009.86**	**0.000011**	**0.25**	**99.87**	**55.13**	**0.03**
SP2	**187.125***	**500YR**	**194.60**	**6004.90**	**6011.73**	**6006.73**	**6011.74**	**0.000042**	**0.84**	**414.42**	**107.53**	**0.06**
SP2	**187.125***	**100YR**	**135.70**	**6004.90**	**6011.56**	**6006.41**	**6011.56**	**0.000023**	**0.61**	**395.66**	**105.41**	**0.04**
SP2	**187.125***	**10YR**	**59.20**	**6004.90**	**6011.28**	**6005.89**	**6011.28**	**0.000005**	**0.29**	**367.33**	**102.13**	**0.02**
SP2	**187.125***	**2YR**	**17.60**	**6004.90**	**6009.86**	**6005.44**	**6009.86**	**0.000001**	**0.13**	**235.00**	**83.32**	**0.01**
SP2	**187.1**		**Culvert**									
SP2	**187.0000**	**500YR**	**194.60**	**6003.19**	**6004.92**	**6004.92**	**6005.43**	**0.017911**	**6.87**	**43.30**	**43.26**	**0.95**
SP2	**187.0000**	**100YR**	**135.70**	**6003.19**	**6004.63**	**6004.63**	**6005.09**	**0.019573**	**6.31**	**31.60**	**37.95**	**0.96**
SP2	**187.0000**	**10YR**	**59.20**	**6003.19**	**6004.16**	**6004.16**	**6004.47**	**0.021467**	**4.94**	**15.98**	**28.29**	**0.94**
SP2	**187.0000**	**2YR**	**17.60**	**6003.19**	**6003.72**	**6003.72**	**6003.90**	**0.027123**	**3.48**	**5.78**	**18.64**	**0.94**
SP2	**186.5000**	**500YR**	**194.60**	**5977.77**	**5980.02**	**5980.02**	**5980.74**	**0.021064**	**6.81**	**28.97**	**21.40**	**0.99**
SP2	**186.5000**	**100YR**	**135.70**	**5977.77**	**5979.67**	**5979.67**	**5980.27**	**0.022927**	**6.21**	**21.87**	**18.39**	**1.00**
SP2	**186.5000**	**10YR**	**59.20**	**5977.77**	**5979.04**	**5979.04**	**5979.45**	**0.026115**	**5.14**	**11.51**	**14.22**	**1.01**
SP2	**186.5000**	**2YR**	**17.60**	**5977.77**	**5978.47**	**5978.47**	**5978.70**	**0.031444**	**3.85**	**4.57**	**10.09**	**1.01**
SP2	**186.0000**	**500YR**	**194.60**	**5962.23**	**5964.32**	**5964.32**	**5965.03**	**0.017193**	**7.20**	**33.26**	**26.28**	**0.94**
SP2	**186.0000**	**100YR**	**135.70**	**5962.23**	**5963.97**	**5963.97**	**5964.57**	**0.018490**	**6.47**	**24.65**	**23.17**	**0.94**
SP2	**186.0000**	**10YR**	**59.20**	**5962.23**	**5963.37**	**5963.37**	**5963.77**	**0.023132**	**5.11**	**12.43**	**17.73**	**0.97**
SP2	**186.0000**	**2YR**	**17.60**	**5962.23**	**5962.87**	**5962.87**	**5963.08**	**0.032001**	**3.63**	**4.85**	**11.89**	**1.00**
SP2	**185.5000**	**500YR**	**203.30**	**5947.58**	**5949.45**	**5949.45**	**5950.07**	**0.022726**	**7.12**	**36.57**	**32.86**	**1.04**
SP2	**185.5000**	**100YR**	**141.80**	**5947.58**	**5949.15**	**5949.15**	**5949.67**	**0.025020**	**6.41**	**27.36**	**29.22**	**1.05**
SP2	**185.5000**	**10YR**	**61.70**	**5947.58**	**5948.67**	**5948.67**	**5948.99**	**0.028408**	**4.98**	**14.79**	**23.18**	**1.04**
SP2	**185.5000**	**2YR**	**19.00**	**5947.58**	**5948.26**	**5948.26**	**5948.44**	**0.027766**	**3.56**	**6.34**	**18.05**	**0.95**
SP2	**185.0000**	**500YR**	**203.30**	**5938.02**	**5939.86**	**5939.86**	**5940.46**	**0.020575**	**6.51**	**35.98**	**32.10**	**0.98**
SP2	**185.0000**	**100YR**	**141.80**	**5938.02**	**5939.57**	**5939.57**	**5940.07**	**0.021204**	**5.92**	**27.01**	**28.23**	**0.97**
SP2	**185.0000**	**10YR**	**61.70**	**5938.02**	**5939.03**	**5939.03**	**5939.38**	**0.024252**	**4.80**	**13.75**	**21.20**	**0.97**
SP2	**185.0000**	**2YR**	**19.00**	**5938.02**	**5938.58**	**5938.58**	**5938.76**	**0.031450**	**3.48**	**5.48**	**14.92**	**0.99**
SP2	**184.5000**	**500YR**	**203.30**	**5924.07**	**5925.58**	**5925.58**	**5926.12**	**0.024398**	**7.47**	**41.62**	**39.77**	**1.09**

SP2	**184.5000**	**100YR**	**141.80**	**5924.07**	**5925.33**	**5925.33**	**5925.77**	**0.024866**	**6.66**	**32.02**	**36.74**	**1.07**
SP2	**184.5000**	**10YR**	**61.70**	**5924.07**	**5924.88**	**5924.88**	**5925.17**	**0.028937**	**5.24**	**16.77**	**29.85**	**1.06**
SP2	**184.5000**	**2YR**	**19.00**	**5924.07**	**5924.52**	**5924.52**	**5924.67**	**0.031620**	**3.56**	**7.10**	**23.94**	**1.00**
SP2	**184.0000**	**500YR**	**203.30**	**5908.28**	**5909.80**	**5909.80**	**5910.24**	**0.020971**	**6.50**	**46.48**	**52.42**	**0.99**
SP2	**184.0000**	**100YR**	**141.80**	**5908.28**	**5909.55**	**5909.55**	**5909.94**	**0.022688**	**5.92**	**34.48**	**46.73**	**1.00**
SP2	**184.0000**	**10YR**	**61.70**	**5908.28**	**5909.16**	**5909.16**	**5909.42**	**0.024376**	**4.56**	**18.14**	**37.08**	**0.96**
SP2	**184.0000**	**2YR**	**19.00**	**5908.28**	**5908.81**	**5908.81**	**5908.96**	**0.029448**	**3.31**	**6.91**	**23.67**	**0.95**
SP2	**183.5000**	**500YR**	**203.30**	**5895.98**	**5897.61**	**5897.16**	**5897.76**	**0.010003**	**5.10**	**78.36**	**85.36**	**0.71**
SP2	**183.5000**	**100YR**	**141.80**	**5895.98**	**5897.35**	**5896.98**	**5897.48**	**0.010009**	**4.54**	**58.44**	**69.89**	**0.69**
SP2	**183.5000**	**10YR**	**61.70**	**5895.98**	**5896.90**	**5896.61**	**5896.98**	**0.010019**	**3.44**	**31.22**	**51.33**	**0.64**
SP2	**183.5000**	**2YR**	**19.00**	**5895.98**	**5896.48**	**5896.31**	**5896.52**	**0.009984**	**2.28**	**13.42**	**36.61**	**0.58**
MAIN	**39.5000**	**500YR**	**8462.60**	**5806.01**	**5844.30**		**5844.30**	**0.000002**	**0.58**	**27318.96**	**1050.27**	**0.02**
MAIN	**39.5000**	**100YR**	**7076.30**	**5806.01**	**5838.46**		**5838.46**	**0.000003**	**0.63**	**21294.60**	**1004.16**	**0.02**
MAIN	**39.5000**	**10YR**	**4440.60**	**5806.01**	**5824.30**		**5824.31**	**0.000023**	**1.22**	**7783.35**	**852.86**	**0.05**
MAIN	**39.5000**	**2YR**	**2140.70**	**5806.01**	**5816.23**		**5816.27**	**0.000195**	**2.40**	**1961.97**	**538.08**	**0.13**
MAIN	**39.375***	**500YR**	**8462.60**	**5806.01**	**5844.30**		**5844.30**	**0.000002**	**0.65**	**24858.80**	**997.26**	**0.02**
MAIN	**39.375***	**100YR**	**7076.30**	**5806.01**	**5838.46**		**5838.46**	**0.000004**	**0.72**	**19151.34**	**948.00**	**0.02**
MAIN	**39.375***	**10YR**	**4440.60**	**5806.01**	**5824.29**		**5824.31**	**0.000037**	**1.55**	**6469.45**	**793.61**	**0.06**
MAIN	**39.375***	**2YR**	**2140.70**	**5806.01**	**5816.15**		**5816.25**	**0.000344**	**3.17**	**1396.87**	**391.71**	**0.18**
MAIN	**39.25***	**500YR**	**8462.60**	**5806.01**	**5844.30**		**5844.30**	**0.000003**	**0.73**	**22610.99**	**944.24**	**0.02**
MAIN	**39.25***	**100YR**	**7076.30**	**5806.01**	**5838.46**		**5838.46**	**0.000005**	**0.82**	**17226.69**	**890.51**	**0.03**
MAIN	**39.25***	**10YR**	**4440.60**	**5806.01**	**5824.29**		**5824.31**	**0.000057**	**1.92**	**5432.65**	**720.51**	**0.08**
MAIN	**39.25***	**2YR**	**2140.70**	**5806.01**	**5816.04**		**5816.23**	**0.000638**	**4.28**	**1000.24**	**317.78**	**0.24**
MAIN	**39.125***	**500YR**	**8462.60**	**5806.01**	**5844.30**		**5844.30**	**0.000004**	**0.82**	**20576.52**	**891.23**	**0.02**
MAIN	**39.125***	**100YR**	**7076.30**	**5806.01**	**5838.46**		**5838.46**	**0.000006**	**0.93**	**15529.52**	**827.05**	**0.03**
MAIN	**39.125***	**10YR**	**4440.60**	**5806.01**	**5824.27**		**5824.30**	**0.000081**	**2.29**	**4672.90**	**653.95**	**0.09**
MAIN	**39.125***	**2YR**	**2140.70**	**5806.01**	**5815.77**		**5816.18**	**0.001259**	**5.90**	**670.12**	**244.97**	**0.34**
MAIN	**39.0000**	**500YR**	**8462.60**	**5806.01**	**5844.30**	**5818.98**	**5844.30**	**0.000005**	**0.91**	**18755.69**	**838.21**	**0.03**
MAIN	**39.0000**	**100YR**	**7076.30**	**5806.01**	**5838.46**	**5818.59**	**5838.46**	**0.000008**	**1.03**	**14091.36**	**755.61**	**0.03**
MAIN	**39.0000**	**10YR**	**4440.60**	**5806.01**	**5824.26**	**5814.64**	**5824.30**	**0.000118**	**2.75**	**4079.48**	**623.71**	**0.11**
MAIN	**39.0000**	**2YR**	**2140.70**	**5806.01**	**5815.27**	**5811.92**	**5816.10**	**0.002497**	**8.02**	**413.41**	**144.25**	**0.47**
MAIN	**38.75**		**Culvert**									
MAIN	**38.5000**	**500YR**	**8462.60**	**5804.96**	**5814.35**		**5815.61**	**0.007264**	**12.58**	**1260.91**	**303.05**	**0.78**
MAIN	**38.5000**	**100YR**	**7076.30**	**5804.96**	**5813.83**		**5815.01**	**0.007134**	**11.93**	**1106.32**	**292.70**	**0.76**
MAIN	**38.5000**	**10YR**	**4440.60**	**5804.96**	**5812.63**		**5813.66**	**0.007049**	**10.57**	**770.11**	**265.66**	**0.74**
MAIN	**38.5000**	**2YR**	**2140.70**	**5804.96**	**5811.09**	**5811.09**	**5812.07**	**0.007592**	**9.12**	**386.71**	**229.04**	**0.73**
MAIN	**38.0000**	**500YR**	**8462.60**	**5804.24**	**5814.98**	**5811.96**	**5815.15**	**0.001002**	**5.27**	**3463.09**	**804.27**	**0.30**
MAIN	**38.0000**	**100YR**	**7076.30**	**5804.24**	**5814.41**	**5811.63**	**5814.57**	**0.001000**	**5.06**	**3014.47**	**763.47**	**0.30**
MAIN	**38.0000**	**10YR**	**4440.60**	**5804.24**	**5813.11**	**5810.71**	**5813.26**	**0.001001**	**4.57**	**2077.73**	**667.04**	**0.29**
MAIN	**38.0000**	**2YR**	**2140.70**	**5804.24**	**5811.39**	**5809.36**	**5811.53**	**0.001000**	**3.87**	**1075.20**	**465.54**	**0.28**
NS18	**20.0000**	**500YR**	**112.60**	**6274.72**	**6276.51**	**6276.51**	**6277.06**	**0.020612**	**6.03**	**20.08**	**19.80**	**0.96**
NS18	**20.0000**	**100YR**	**78.50**	**6274.72**	**6276.22**	**6276.22**	**6276.69**	**0.022585**	**5.56**	**14.75**	**16.93**	**0.97**
NS18	**20.0000**	**10YR**	**30.30**	**6274.72**	**6275.68**	**6275.68**	**6275.97**	**0.028614**	**4.35**	**6.97**	**12.05**	**1.00**
NS18	**20.0000**	**2YR**	**10.40**	**6274.72**	**6275.31**	**6275.31**	**6275.48**	**0.032958**	**3.35**	**3.11**	**8.79**	**0.99**
NS18	**19.0000**	**500YR**	**112.60**	**6261.80**	**6263.53**	**6263.53**	**6264.09**	**0.023762**	**5.96**	**18.88**	**17.40**	**1.01**
NS18	**19.0000**	**100YR**	**78.50**	**6261.80**	**6263.26**	**6263.26**	**6263.72**	**0.025092**	**5.48**	**14.33**	**15.63**	**1.01**
NS18	**19.0000**	**10YR**	**30.30**	**6261.80**	**6262.72**	**6262.72**	**6263.02**	**0.028888**	**4.37**	**6.93**	**11.85**	**1.01**
NS18	**19.0000**	**2YR**	**10.40**	**6261.80**	**6262.35**	**6262.35**	**6262.53**	**0.033677**	**3.39**	**3.07**	**8.66**	**1.00**
NS18	**18.0000**	**500YR**	**112.60**	**6245.73**	**6247.60**	**6247.60**	**6248.20**	**0.022901**	**6.24**	**18.18**	**16.01**	**1.00**
NS18	**18.0000**	**100YR**	**78.50**	**6245.73**	**6247.31**	**6247.31**	**6247.81**	**0.024875**	**5.67**	**13.83**	**14.16**	**1.01**
NS18	**18.0000**	**10YR**	**30.30**	**6245.73**	**6246.73**	**6246.73**	**6247.05**	**0.028751**	**4.56**	**6.64**	**10.54**	**1.01**
NS18	**18.0000**	**2YR**	**10.40**	**6245.73**	**6246.33**	**6246.33**	**6246.52**	**0.032905**	**3.52**	**2.96**	**7.74**	**1.00**
NS18	**17.75***	**500YR**	**112.60**	**6240.01**	**6241.82**	**6241.82**	**6242.41**	**0.023693**	**6.14**	**18.36**	**16.48**	**1.01**
NS18	**17.75***	**100YR**	**78.50**	**6240.01**	**6241.55**	**6241.55**	**6242.03**	**0.025025**	**5.60**	**14.02**	**14.69**	**1.01**
NS18	**17.75***	**10YR**	**30.30**	**6240.01**	**6240.98**	**6240.98**	**6241.29**	**0.028734**	**4.49**	**6.74**	**10.98**	**1.01**

NS18	**17.75***	**2YR**	**10.40**	**6240.01**	**6240.59**	**6240.59**	**6240.77**	**0.032820**	**3.46**	**3.01**	**8.04**	**1.00**
NS18	**17.5***	**500YR**	**112.60**	**6234.29**	**6236.04**	**6236.04**	**6236.61**	**0.023121**	**6.06**	**18.72**	**17.48**	**1.00**
NS18	**17.5***	**100YR**	**78.50**	**6234.29**	**6235.77**	**6235.77**	**6236.24**	**0.024984**	**5.48**	**14.34**	**15.67**	**1.01**
NS18	**17.5***	**10YR**	**30.30**	**6234.29**	**6235.23**	**6235.23**	**6235.53**	**0.028586**	**4.39**	**6.89**	**11.59**	**1.00**
NS18	**17.5***	**2YR**	**10.40**	**6234.29**	**6234.84**	**6234.84**	**6235.03**	**0.034752**	**3.47**	**3.00**	**8.36**	**1.02**
NS18	**17.25***	**500YR**	**112.60**	**6228.57**	**6230.24**	**6230.24**	**6230.79**	**0.022698**	**5.96**	**19.25**	**19.01**	**0.99**
NS18	**17.25***	**100YR**	**78.50**	**6228.57**	**6229.98**	**6229.98**	**6230.44**	**0.024869**	**5.41**	**14.56**	**16.90**	**1.00**
NS18	**17.25***	**10YR**	**30.30**	**6228.57**	**6229.47**	**6229.47**	**6229.76**	**0.029458**	**4.32**	**7.01**	**12.39**	**1.01**
NS18	**17.25***	**2YR**	**10.40**	**6228.57**	**6229.10**	**6229.10**	**6229.28**	**0.034466**	**3.37**	**3.09**	**8.95**	**1.01**
NS18	**17.0000**	**500YR**	**112.60**	**6222.85**	**6224.44**	**6224.44**	**6224.97**	**0.022149**	**5.84**	**20.15**	**21.25**	**0.98**
NS18	**17.0000**	**100YR**	**78.50**	**6222.85**	**6224.20**	**6224.20**	**6224.63**	**0.023925**	**5.28**	**15.15**	**18.92**	**0.98**
NS18	**17.0000**	**10YR**	**30.30**	**6222.85**	**6223.72**	**6223.72**	**6223.98**	**0.029358**	**4.15**	**7.30**	**13.69**	**1.00**
NS18	**17.0000**	**2YR**	**10.40**	**6222.85**	**6223.36**	**6223.36**	**6223.53**	**0.034806**	**3.29**	**3.16**	**9.62**	**1.01**
NS18	**16.0000**	**500YR**	**112.60**	**6207.42**	**6209.08**	**6209.08**	**6209.66**	**0.023059**	**6.10**	**18.51**	**16.86**	**1.00**
NS18	**16.0000**	**100YR**	**78.50**	**6207.42**	**6208.82**	**6208.82**	**6209.29**	**0.024809**	**5.51**	**14.24**	**15.24**	**1.00**
NS18	**16.0000**	**10YR**	**30.30**	**6207.42**	**6208.28**	**6208.28**	**6208.58**	**0.028635**	**4.35**	**6.97**	**11.95**	**1.00**
NS18	**16.0000**	**2YR**	**10.40**	**6207.42**	**6207.92**	**6207.92**	**6208.09**	**0.034342**	**3.33**	**3.12**	**9.22**	**1.01**
NS18	**15.0000**	**500YR**	**112.60**	**6191.66**	**6193.24**	**6193.24**	**6193.77**	**0.023523**	**6.08**	**20.53**	**20.75**	**1.02**
NS18	**15.0000**	**100YR**	**78.50**	**6191.66**	**6192.99**	**6192.99**	**6193.43**	**0.024553**	**5.53**	**15.54**	**18.41**	**1.01**
NS18	**15.0000**	**10YR**	**30.30**	**6191.66**	**6192.49**	**6192.49**	**6192.77**	**0.027108**	**4.31**	**7.48**	**13.85**	**0.98**
NS18	**15.0000**	**2YR**	**10.40**	**6191.66**	**6192.14**	**6192.14**	**6192.31**	**0.032169**	**3.27**	**3.27**	**10.32**	**0.98**
NS18	**14.0000**	**500YR**	**112.60**	**6172.79**	**6174.14**	**6173.93**	**6174.37**	**0.010000**	**4.32**	**36.25**	**43.51**	**0.68**
NS18	**14.0000**	**100YR**	**78.50**	**6172.79**	**6173.93**	**6173.74**	**6174.11**	**0.010007**	**3.82**	**27.58**	**38.87**	**0.66**
NS18	**14.0000**	**10YR**	**30.30**	**6172.79**	**6173.52**	**6173.38**	**6173.63**	**0.009998**	**2.75**	**13.54**	**30.14**	**0.61**
NS18	**14.0000**	**2YR**	**10.40**	**6172.79**	**6173.24**	**6173.14**	**6173.30**	**0.010017**	**1.87**	**6.11**	**22.52**	**0.55**

C-2. HEC-RAS Pre-Project FROZEN Condition SUMMARY TABLE

Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
NW	100.0000	500YR	527.62	5912.01	5913.65	5913.65	5914.28	0.018861	6.86	95.69	85.19	0.97
NW	100.0000	100YR	398.19	5912.01	5913.41	5913.41	5913.95	0.019578	6.26	76.64	77.08	0.96
NW	100.0000	10YR	235.60	5912.01	5913.04	5913.04	5913.45	0.022595	5.40	50.00	65.30	0.98
NW	100.0000	2YR	120.49	5912.01	5912.71	5912.70	5912.99	0.026412	4.39	30.04	54.61	0.98
NW	99.5000	500YR	527.62	5909.28	5910.91	5910.91	5911.43	0.025187	7.94	111.92	110.04	1.12
NW	99.5000	100YR	398.19	5909.28	5910.73	5910.73	5911.16	0.024345	7.17	92.01	101.54	1.08
NW	99.5000	10YR	235.60	5909.28	5910.41	5910.41	5910.75	0.025289	6.14	62.02	88.70	1.05
NW	99.5000	2YR	120.49	5909.28	5910.11	5910.11	5910.36	0.025982	5.00	37.81	75.98	1.01
NW	99.0000	500YR	527.62	5906.01	5907.86	5907.68	5908.30	0.014145	5.69	108.97	86.71	0.83
NW	99.0000	100YR	398.19	5906.01	5907.61		5907.99	0.014439	5.28	87.86	79.61	0.82
NW	99.0000	10YR	235.60	5906.01	5907.23		5907.52	0.014583	4.52	59.71	69.59	0.79
NW	99.0000	2YR	120.49	5906.01	5906.88		5907.07	0.014069	3.61	37.18	59.93	0.74
NW	98.5000	500YR	527.62	5903.51	5905.54	5905.38	5905.96	0.015642	7.35	130.79	117.66	0.92
NW	98.5000	100YR	398.19	5903.51	5905.32	5905.16	5905.68	0.014952	6.64	106.31	104.69	0.88
NW	98.5000	10YR	235.60	5903.51	5904.95	5904.81	5905.23	0.014521	5.61	71.30	86.28	0.83
NW	98.5000	2YR	120.49	5903.51	5904.56	5904.48	5904.77	0.015130	4.61	41.64	66.93	0.81
NW	98.0000	500YR	527.62	5900.13	5902.97	5902.97	5903.55	0.013063	8.11	123.80	106.62	0.88
NW	98.0000	100YR	398.19	5900.13	5902.66	5902.66	5903.22	0.014073	7.73	92.87	87.46	0.89
NW	98.0000	10YR	235.60	5900.13	5902.12	5902.12	5902.64	0.016111	6.96	54.55	57.86	0.91
NW	98.0000	2YR	120.49	5900.13	5901.60	5901.60	5902.00	0.017802	5.80	29.83	39.08	0.91
NW	97.5000	500YR	527.62	5898.01	5900.78		5901.15	0.007430	5.82	146.73	132.93	0.65
NW	97.5000	100YR	398.19	5898.01	5900.54		5900.86	0.006852	5.22	116.62	117.28	0.62
NW	97.5000	10YR	235.60	5898.01	5900.11		5900.33	0.006029	4.23	75.07	74.45	0.56
NW	97.5000	2YR	120.49	5898.01	5899.63		5899.76	0.005045	3.14	47.38	49.38	0.49
NW	97.0000	500YR	527.62	5896.81	5898.70	5898.63	5899.10	0.025637	8.97	120.77	116.53	1.16
NW	97.0000	100YR	398.19	5896.81	5898.47	5898.45	5898.86	0.027888	8.59	95.80	107.11	1.19
NW	97.0000	10YR	235.60	5896.81	5898.15	5898.15	5898.46	0.029204	7.57	63.57	89.41	1.17
NW	97.0000	2YR	120.49	5896.81	5897.76	5897.76	5898.03	0.034613	6.51	34.68	62.94	1.20
NW	96.5000	500YR	527.62	5894.01	5896.34		5896.67	0.006967	5.30	142.04	101.93	0.62
NW	96.5000	100YR	398.19	5894.01	5896.05		5896.33	0.007002	4.84	114.07	90.37	0.61
NW	96.5000	10YR	235.60	5894.01	5895.64		5895.83	0.006096	3.87	79.98	75.37	0.55
NW	96.5000	2YR	120.49	5894.01	5895.17		5895.30	0.006147	3.06	48.08	59.73	0.52
NW	96.0000	500YR	607.31	5892.01	5894.21	5894.21	5894.80	0.016221	7.77	128.70	107.03	0.94
NW	96.0000	100YR	459.96	5892.01	5893.98	5893.98	5894.50	0.015643	7.07	105.07	99.02	0.91
NW	96.0000	10YR	273.65	5892.01	5893.51	5893.51	5893.98	0.018781	6.41	63.85	76.99	0.95
NW	96.0000	2YR	140.34	5892.01	5893.13	5893.13	5893.46	0.018394	5.13	37.48	59.74	0.89
NW	95.5000	500YR	607.31	5890.01	5891.55		5891.73	0.005227	3.54	183.46	135.81	0.51
NW	95.5000	100YR	459.96	5890.01	5891.31		5891.47	0.005387	3.20	151.77	131.07	0.50
NW	95.5000	10YR	273.65	5890.01	5890.95		5891.06	0.005786	2.68	106.29	123.91	0.49
NW	95.5000	2YR	140.34	5890.01	5890.63		5890.70	0.006453	2.14	67.22	116.58	0.48
NW	95.0000	500YR	607.31	5888.01	5890.05	5889.94	5890.52	0.013178	6.21	134.39	113.18	0.82
NW	95.0000	100YR	459.96	5888.01	5889.82	5889.69	5890.23	0.013200	5.72	108.85	107.47	0.81
NW	95.0000	10YR	273.65	5888.01	5889.45	5889.37	5889.77	0.013403	4.87	71.73	91.03	0.78
NW	95.0000	2YR	140.34	5888.01	5889.09	5889.00	5889.31	0.013280	3.90	42.06	74.74	0.74
NW	94.5000	500YR	607.31	5886.01	5887.85		5888.20	0.010066	5.45	147.84	111.85	0.72
NW	94.5000	100YR	459.96	5886.01	5887.61		5887.91	0.010077	4.95	121.82	107.62	0.70
NW	94.5000	10YR	273.65	5886.01	5887.25		5887.47	0.009765	4.11	84.94	97.53	0.66
NW	94.5000	2YR	140.34	5886.01	5886.88		5887.03	0.009809	3.27	51.86	82.28	0.63
NW	94.0000	500YR	607.31	5884.01	5886.41		5886.76	0.012600	7.08	155.56	114.97	0.84
NW	94.0000	100YR	459.96	5884.01	5886.17		5886.48	0.012361	6.51	128.88	109.87	0.81
NW	94.0000	10YR	273.65	5884.01	5885.74		5886.00	0.013438	5.77	84.68	93.42	0.81
NW	94.0000	2YR	140.34	5884.01	5885.30		5885.51	0.014717	4.84	48.59	71.17	0.81
NW	93.5000	500YR	607.31	5882.01	5884.39	5884.16	5884.68	0.009483	6.41	182.39	143.88	0.74

NW	**93.5000**	**100YR**	**459.96**	**5882.01**	**5884.16**	**5883.69**	**5884.43**	**0.009400**	**5.97**	**150.56**	**140.71**	**0.72**
NW	**93.5000**	**10YR**	**273.65**	**5882.01**	**5883.76**	**5883.34**	**5883.97**	**0.008542**	**4.96**	**99.74**	**104.47**	**0.66**
NW	**93.5000**	**2YR**	**140.34**	**5882.01**	**5883.31**	**5882.97**	**5883.46**	**0.008107**	**3.95**	**59.41**	**77.74**	**0.61**
NW	**93.0000**	**500YR**	**607.31**	**5880.01**	**5881.87**	**5881.70**	**5882.24**	**0.011844**	**5.91**	**161.73**	**157.07**	**0.78**
NW	**93.0000**	**100YR**	**459.96**	**5880.01**	**5881.64**	**5881.49**	**5881.97**	**0.012160**	**5.46**	**127.93**	**139.69**	**0.78**
NW	**93.0000**	**10YR**	**273.65**	**5880.01**	**5881.28**	**5881.17**	**5881.55**	**0.013217**	**4.76**	**81.87**	**114.48**	**0.77**
NW	**93.0000**	**2YR**	**140.34**	**5880.01**	**5880.93**		**5881.12**	**0.013093**	**3.77**	**47.71**	**81.18**	**0.73**
NW	**92.5000**	**500YR**	**607.31**	**5878.01**	**5879.75**		**5879.86**	**0.006435**	**4.02**	**230.73**	**159.26**	**0.56**
NW	**92.5000**	**100YR**	**459.96**	**5878.01**	**5879.50**		**5879.60**	**0.006303**	**3.55**	**192.77**	**151.57**	**0.54**
NW	**92.5000**	**10YR**	**273.65**	**5878.01**	**5879.15**		**5879.21**	**0.005853**	**2.78**	**140.50**	**141.32**	**0.50**
NW	**92.5000**	**2YR**	**140.34**	**5878.01**	**5878.78**		**5878.82**	**0.005790**	**2.03**	**91.36**	**129.26**	**0.46**
NW	**92.0000**	**500YR**	**607.31**	**5875.73**	**5876.86**	**5876.67**	**5877.04**	**0.020292**	**5.62**	**190.30**	**235.48**	**0.95**
NW	**92.0000**	**100YR**	**459.96**	**5875.73**	**5876.75**		**5876.89**	**0.018818**	**5.02**	**163.21**	**230.90**	**0.89**
NW	**92.0000**	**10YR**	**273.65**	**5875.73**	**5876.55**		**5876.65**	**0.018410**	**4.26**	**117.85**	**221.70**	**0.85**
NW	**92.0000**	**2YR**	**140.34**	**5875.73**	**5876.38**	**5876.27**	**5876.44**	**0.015569**	**3.32**	**80.87**	**211.43**	**0.75**
NW	**91.5000**	**500YR**	**607.31**	**5874.01**	**5875.20**		**5875.31**	**0.004825**	**2.85**	**246.68**	**249.38**	**0.47**
NW	**91.5000**	**100YR**	**459.96**	**5874.01**	**5875.01**		**5875.11**	**0.005226**	**2.63**	**200.23**	**242.12**	**0.47**
NW	**91.5000**	**10YR**	**273.65**	**5874.01**	**5874.75**		**5874.82**	**0.005488**	**2.21**	**139.04**	**226.77**	**0.46**
NW	**91.5000**	**2YR**	**140.34**	**5874.01**	**5874.50**		**5874.55**	**0.006331**	**1.81**	**84.45**	**203.50**	**0.46**
NW	**91.0000**	**500YR**	**699.31**	**5872.01**	**5873.55**		**5873.81**	**0.008664**	**4.55**	**202.57**	**195.59**	**0.65**
NW	**91.0000**	**100YR**	**532.88**	**5872.01**	**5873.37**		**5873.59**	**0.008150**	**4.05**	**168.81**	**181.71**	**0.62**
NW	**91.0000**	**10YR**	**318.10**	**5872.01**	**5873.04**		**5873.20**	**0.008603**	**3.43**	**112.62**	**154.22**	**0.61**
NW	**91.0000**	**2YR**	**163.05**	**5872.01**	**5872.74**		**5872.84**	**0.008268**	**2.66**	**70.45**	**129.72**	**0.56**
NW	**90.5000**	**500YR**	**699.31**	**5868.01**	**5869.52**	**5869.52**	**5870.12**	**0.020368**	**6.68**	**126.03**	**109.62**	**0.99**
NW	**90.5000**	**100YR**	**532.88**	**5868.01**	**5869.26**	**5869.26**	**5869.81**	**0.023894**	**6.39**	**98.13**	**100.09**	**1.04**
NW	**90.5000**	**10YR**	**318.10**	**5868.01**	**5868.96**	**5868.96**	**5869.35**	**0.023160**	**5.27**	**69.45**	**91.56**	**0.98**
NW	**90.5000**	**2YR**	**163.05**	**5868.01**	**5868.64**	**5868.64**	**5868.91**	**0.026317**	**4.30**	**42.20**	**80.50**	**0.98**
NW	**90.0000**	**500YR**	**699.31**	**5864.61**	**5866.61**	**5865.97**	**5866.68**	**0.003459**	**3.44**	**386.71**	**322.10**	**0.43**
NW	**90.0000**	**100YR**	**532.88**	**5864.61**	**5866.41**	**5865.80**	**5866.47**	**0.003382**	**3.17**	**323.20**	**309.13**	**0.42**
NW	**90.0000**	**10YR**	**318.10**	**5864.61**	**5866.10**	**5865.64**	**5866.14**	**0.003259**	**2.74**	**229.74**	**290.34**	**0.40**
NW	**90.0000**	**2YR**	**163.05**	**5864.61**	**5865.76**	**5865.37**	**5865.80**	**0.003069**	**2.24**	**140.83**	**234.54**	**0.37**
NW	**89.5000**	**500YR**	**699.31**	**5862.01**	**5862.96**	**5862.96**	**5863.28**	**0.052244**	**6.43**	**158.04**	**240.84**	**1.39**
NW	**89.5000**	**100YR**	**532.88**	**5862.01**	**5862.84**	**5862.84**	**5863.11**	**0.053333**	**6.05**	**131.60**	**233.09**	**1.38**
NW	**89.5000**	**10YR**	**318.10**	**5862.01**	**5862.67**	**5862.67**	**5862.87**	**0.055855**	**5.41**	**92.24**	**216.39**	**1.37**
NW	**89.5000**	**2YR**	**163.05**	**5862.01**	**5862.51**	**5862.51**	**5862.65**	**0.059555**	**4.75**	**58.51**	**201.18**	**1.36**
NW	**89.0000**	**500YR**	**1206.50**	**5856.01**	**5857.84**		**5857.99**	**0.003766**	**3.41**	**470.51**	**385.67**	**0.44**
NW	**89.0000**	**100YR**	**918.25**	**5856.01**	**5857.59**		**5857.72**	**0.003859**	**3.12**	**377.81**	**348.85**	**0.44**
NW	**89.0000**	**10YR**	**545.97**	**5856.01**	**5857.19**		**5857.29**	**0.004021**	**2.62**	**250.99**	**285.15**	**0.43**
NW	**89.0000**	**2YR**	**279.82**	**5856.01**	**5856.83**		**5856.89**	**0.003948**	**2.04**	**156.38**	**239.90**	**0.40**
NW	**88.5000**	**500YR**	**1206.50**	**5854.01**	**5856.07**		**5856.20**	**0.003179**	**3.38**	**522.45**	**411.26**	**0.42**
NW	**88.5000**	**100YR**	**918.25**	**5854.01**	**5855.82**		**5855.93**	**0.003080**	**3.05**	**426.57**	**373.39**	**0.40**
NW	**88.5000**	**10YR**	**545.97**	**5854.01**	**5855.40**		**5855.48**	**0.003070**	**2.55**	**283.95**	**301.83**	**0.38**
NW	**88.5000**	**2YR**	**279.82**	**5854.01**	**5854.97**		**5855.02**	**0.003342**	**2.07**	**166.90**	**244.01**	**0.38**
NW	**88.0000**	**500YR**	**1206.50**	**5852.01**	**5853.90**	**5853.90**	**5854.44**	**0.019231**	**7.75**	**272.21**	**277.63**	**1.01**
NW	**88.0000**	**100YR**	**918.25**	**5852.01**	**5853.65**	**5853.65**	**5854.17**	**0.021177**	**7.39**	**208.33**	**234.16**	**1.03**
NW	**88.0000**	**10YR**	**545.97**	**5852.01**	**5853.28**	**5853.28**	**5853.71**	**0.022568**	**6.40**	**132.60**	**177.27**	**1.02**
NW	**88.0000**	**2YR**	**279.82**	**5852.01**	**5852.96**	**5852.96**	**5853.24**	**0.020007**	**4.94**	**82.42**	**141.49**	**0.91**
NW	**87.5000**	**500YR**	**1206.50**	**5850.01**	**5852.46**		**5852.51**	**0.001582**	**2.68**	**884.10**	**713.47**	**0.30**
NW	**87.5000**	**100YR**	**918.25**	**5850.01**	**5852.24**		**5852.29**	**0.001574**	**2.50**	**727.54**	**694.91**	**0.30**
NW	**87.5000**	**10YR**	**545.97**	**5850.01**	**5851.86**		**5851.90**	**0.001376**	**2.07**	**487.66**	**530.54**	**0.27**
NW	**87.5000**	**2YR**	**279.82**	**5850.01**	**5851.41**		**5851.43**	**0.001316**	**1.67**	**284.42**	**388.71**	**0.25**
NW	**87.0000**	**500YR**	**1206.50**	**5847.98**	**5849.55**	**5849.55**	**5849.83**	**0.025942**	**7.88**	**361.79**	**556.39**	**1.13**
NW	**87.0000**	**100YR**	**918.25**	**5847.98**	**5849.36**	**5849.36**	**5849.62**	**0.026098**	**7.23**	**261.55**	**493.50**	**1.11**
NW	**87.0000**	**10YR**	**545.97**	**5847.98**	**5848.91**	**5848.91**	**5849.26**	**0.045185**	**7.22**	**124.61**	**182.02**	**1.36**
NW	**87.0000**	**2YR**	**279.82**	**5847.98**	**5848.63**	**5848.63**	**5848.87**	**0.048897**	**5.79**	**76.66**	**157.33**	**1.33**

NW2	**110.0000**	**500YR**	**28.51**	**5864.01**	**5864.39**		**5864.41**	**0.003886**	**1.17**	**26.18**	**83.03**	**0.34**
NW2	**110.0000**	**100YR**	**21.47**	**5864.01**	**5864.33**		**5864.35**	**0.003901**	**1.05**	**21.57**	**79.72**	**0.34**
NW2	**110.0000**	**10YR**	**12.38**	**5864.01**	**5864.25**		**5864.26**	**0.003567**	**0.84**	**15.39**	**73.26**	**0.31**
NW2	**110.0000**	**2YR**	**6.10**	**5864.01**	**5864.18**		**5864.18**	**0.003194**	**0.62**	**10.04**	**66.65**	**0.27**
NW2	**109.5000**	**500YR**	**28.51**	**5861.97**	**5862.21**	**5862.21**	**5862.31**	**0.068036**	**3.26**	**12.10**	**64.17**	**1.30**
NW2	**109.5000**	**100YR**	**21.47**	**5861.97**	**5862.18**	**5862.18**	**5862.26**	**0.066721**	**2.94**	**10.14**	**62.20**	**1.26**
NW2	**109.5000**	**10YR**	**12.38**	**5861.97**	**5862.12**	**5862.12**	**5862.19**	**0.097333**	**2.75**	**6.38**	**59.88**	**1.43**
NW2	**109.5000**	**2YR**	**6.10**	**5861.97**	**5862.08**	**5862.08**	**5862.12**	**0.093753**	**2.18**	**4.13**	**58.11**	**1.33**
NW2	**109.0000**	**500YR**	**28.51**	**5858.01**	**5858.77**		**5858.81**	**0.002884**	**1.62**	**23.12**	**50.06**	**0.33**
NW2	**109.0000**	**100YR**	**21.47**	**5858.01**	**5858.68**		**5858.71**	**0.002733**	**1.44**	**18.82**	**45.25**	**0.32**
NW2	**109.0000**	**10YR**	**12.38**	**5858.01**	**5858.53**		**5858.55**	**0.002576**	**1.16**	**12.48**	**35.50**	**0.29**
NW2	**109.0000**	**2YR**	**6.10**	**5858.01**	**5858.38**	**5858.18**	**5858.39**	**0.002426**	**0.88**	**7.59**	**29.17**	**0.27**
NW2	**108.875***	**500YR**	**28.51**	**5857.51**	**5857.97**		**5858.09**	**0.021009**	**2.84**	**10.56**	**32.76**	**0.81**
NW2	**108.875***	**100YR**	**21.47**	**5857.51**	**5857.90**		**5858.01**	**0.021681**	**2.58**	**8.60**	**29.93**	**0.80**
NW2	**108.875***	**10YR**	**12.38**	**5857.51**	**5857.81**		**5857.88**	**0.021776**	**2.12**	**5.88**	**26.58**	**0.76**
NW2	**108.875***	**2YR**	**6.10**	**5857.51**	**5857.72**		**5857.76**	**0.021168**	**1.65**	**3.69**	**21.86**	**0.71**
NW2	**108.75***	**500YR**	**28.51**	**5857.01**	**5857.51**	**5857.41**	**5857.59**	**0.013227**	**2.35**	**12.59**	**34.97**	**0.65**
NW2	**108.75***	**100YR**	**21.47**	**5857.01**	**5857.45**	**5857.35**	**5857.51**	**0.012488**	**2.09**	**10.53**	**32.90**	**0.62**
NW2	**108.75***	**10YR**	**12.38**	**5857.01**	**5857.34**		**5857.38**	**0.013323**	**1.74**	**7.10**	**27.76**	**0.60**
NW2	**108.75***	**2YR**	**6.10**	**5857.01**	**5857.23**		**5857.26**	**0.013652**	**1.40**	**4.36**	**23.90**	**0.58**
NW2	**108.625***	**500YR**	**28.51**	**5856.51**	**5856.91**	**5856.89**	**5857.04**	**0.028377**	**2.91**	**9.82**	**32.03**	**0.91**
NW2	**108.625***	**100YR**	**21.47**	**5856.51**	**5856.85**	**5856.83**	**5856.96**	**0.030222**	**2.71**	**7.93**	**29.17**	**0.92**
NW2	**108.625***	**10YR**	**12.38**	**5856.51**	**5856.77**	**5856.75**	**5856.84**	**0.027782**	**2.20**	**5.62**	**26.46**	**0.84**
NW2	**108.625***	**2YR**	**6.10**	**5856.51**	**5856.69**		**5856.73**	**0.024754**	**1.67**	**3.65**	**23.91**	**0.75**
NW2	**108.5000**	**500YR**	**28.51**	**5856.01**	**5856.53**		**5856.59**	**0.008800**	**1.94**	**14.82**	**38.50**	**0.53**
NW2	**108.5000**	**100YR**	**21.47**	**5856.01**	**5856.47**		**5856.51**	**0.008729**	**1.75**	**12.28**	**34.34**	**0.52**
NW2	**108.5000**	**10YR**	**12.38**	**5856.01**	**5856.33**		**5856.37**	**0.010121**	**1.54**	**8.02**	**30.16**	**0.53**
NW2	**108.5000**	**2YR**	**6.10**	**5856.01**	**5856.22**		**5856.24**	**0.011726**	**1.28**	**4.76**	**26.53**	**0.53**
NW2	**108.0000**	**500YR**	**41.46**	**5853.40**	**5854.15**	**5854.13**	**5854.25**	**0.011332**	**2.94**	**23.46**	**88.68**	**0.65**
NW2	**108.0000**	**100YR**	**31.14**	**5853.40**	**5854.09**	**5854.08**	**5854.18**	**0.011403**	**2.75**	**17.75**	**83.74**	**0.64**
NW2	**108.0000**	**10YR**	**18.07**	**5853.40**	**5853.97**		**5854.04**	**0.010180**	**2.22**	**9.95**	**33.75**	**0.58**
NW2	**108.0000**	**2YR**	**8.92**	**5853.40**	**5853.83**	**5853.73**	**5853.87**	**0.009592**	**1.70**	**5.78**	**25.97**	**0.53**
NW2	**107.5000**	**500YR**	**41.46**	**5852.01**	**5852.39**		**5852.44**	**0.008821**	**1.80**	**23.66**	**69.79**	**0.52**
NW2	**107.5000**	**100YR**	**31.14**	**5852.01**	**5852.33**		**5852.37**	**0.008863**	**1.62**	**19.67**	**67.73**	**0.51**
NW2	**107.5000**	**10YR**	**18.07**	**5852.01**	**5852.24**		**5852.27**	**0.009355**	**1.32**	**13.72**	**63.73**	**0.49**
NW2	**107.5000**	**2YR**	**8.92**	**5852.01**	**5852.17**		**5852.18**	**0.009170**	**1.00**	**8.96**	**60.52**	**0.46**
NW2	**107.0000**	**500YR**	**41.46**	**5848.01**	**5848.78**	**5848.78**	**5849.00**	**0.024874**	**4.62**	**14.54**	**37.95**	**0.97**
NW2	**107.0000**	**100YR**	**31.14**	**5848.01**	**5848.69**	**5848.69**	**5848.89**	**0.025733**	**4.27**	**11.25**	**32.36**	**0.97**
NW2	**107.0000**	**10YR**	**18.07**	**5848.01**	**5848.55**	**5848.55**	**5848.70**	**0.024866**	**3.55**	**7.31**	**26.02**	**0.91**
NW2	**107.0000**	**2YR**	**8.92**	**5848.01**	**5848.40**	**5848.40**	**5848.52**	**0.028130**	**2.92**	**3.94**	**19.08**	**0.91**
NW3	**79.5000**	**500YR**	**1247.90**	**5846.01**	**5848.31**		**5848.45**	**0.004267**	**4.16**	**539.46**	**410.89**	**0.49**
NW3	**79.5000**	**100YR**	**949.40**	**5846.01**	**5848.04**		**5848.16**	**0.004456**	**3.89**	**431.76**	**375.25**	**0.49**
NW3	**79.5000**	**10YR**	**564.03**	**5846.01**	**5847.65**		**5847.75**	**0.004210**	**3.27**	**298.38**	**327.43**	**0.46**
NW3	**79.5000**	**2YR**	**288.73**	**5846.01**	**5847.23**		**5847.32**	**0.005165**	**2.95**	**167.96**	**291.71**	**0.48**
NW3	**79.0000**	**500YR**	**1247.90**	**5844.01**	**5847.18**		**5847.38**	**0.004117**	**4.76**	**451.54**	**291.05**	**0.50**
NW3	**79.0000**	**100YR**	**949.40**	**5844.01**	**5846.82**		**5847.01**	**0.004563**	**4.57**	**350.57**	**262.82**	**0.51**
NW3	**79.0000**	**10YR**	**564.03**	**5844.01**	**5846.18**		**5846.39**	**0.006788**	**4.55**	**200.47**	**206.31**	**0.59**
NW3	**79.0000**	**2YR**	**288.73**	**5844.01**	**5845.58**		**5845.75**	**0.007503**	**3.81**	**106.93**	**120.47**	**0.59**
NW3	**78.5000**	**500YR**	**1247.90**	**5842.01**	**5846.57**		**5846.69**	**0.001411**	**3.67**	**658.91**	**346.50**	**0.31**
NW3	**78.5000**	**100YR**	**949.40**	**5842.01**	**5846.23**		**5846.33**	**0.001284**	**3.31**	**545.01**	**321.69**	**0.29**
NW3	**78.5000**	**10YR**	**564.03**	**5842.01**	**5844.82**		**5845.00**	**0.003382**	**4.00**	**229.38**	**179.02**	**0.44**
NW3	**78.5000**	**2YR**	**288.73**	**5842.01**	**5844.23**		**5844.36**	**0.003094**	**3.20**	**132.16**	**149.50**	**0.41**
NW3	**78.0000**	**500YR**	**1620.20**	**5842.01**	**5846.40**		**5846.47**	**0.000605**	**2.43**	**1008.78**	**411.45**	**0.21**
NW3	**78.0000**	**100YR**	**1227.10**	**5842.01**	**5846.10**		**5846.15**	**0.000477**	**2.06**	**886.17**	**390.01**	**0.18**
NW3	**78.0000**	**10YR**	**727.31**	**5842.01**	**5843.63**		**5843.86**	**0.006483**	**4.04**	**206.56**	**167.27**	**0.57**
NW3	**78.0000**	**2YR**	**368.89**	**5842.01**	**5843.12**		**5843.27**	**0.006615**	**3.15**	**127.76**	**144.69**	**0.54**

NW3	**77.5000**	**500YR**	**1620.20**	**5840.01**	**5846.37**	**5846.39**	**0.000207**	**1.80**	**1582.77**	**453.93**	**0.13**
NW3	**77.5000**	**100YR**	**1227.10**	**5840.01**	**5846.07**	**5846.09**	**0.000149**	**1.47**	**1450.97**	**438.95**	**0.11**
NW3	**77.5000**	**10YR**	**727.31**	**5840.01**	**5841.96**	**5842.33**	**0.009656**	**5.30**	**171.18**	**137.59**	**0.71**
NW3	**77.5000**	**2YR**	**368.89**	**5840.01**	**5841.36**	**5841.63**	**0.011226**	**4.33**	**98.52**	**106.48**	**0.71**
NW3	**77.0000**	**500YR**	**1644.10**	**5838.01**	**5846.35**	**5846.37**	**0.000109**	**1.58**	**2067.76**	**444.64**	**0.10**
NW3	**77.0000**	**100YR**	**1246.80**	**5838.01**	**5846.06**	**5846.07**	**0.000074**	**1.27**	**1940.60**	**431.82**	**0.08**
NW3	**77.0000**	**10YR**	**738.74**	**5838.01**	**5841.15**	**5841.35**	**0.003798**	**4.80**	**278.84**	**181.77**	**0.48**
NW3	**77.0000**	**2YR**	**374.88**	**5838.01**	**5840.50**	**5840.66**	**0.003523**	**3.94**	**169.10**	**155.93**	**0.45**
NW3	**76.5000**	**500YR**	**1644.10**	**5838.01**	**5846.34**	**5846.35**	**0.000075**	**1.32**	**2264.36**	**438.50**	**0.08**
NW3	**76.5000**	**100YR**	**1246.80**	**5838.01**	**5846.05**	**5846.06**	**0.000050**	**1.06**	**2140.66**	**429.29**	**0.07**
NW3	**76.5000**	**10YR**	**738.74**	**5838.01**	**5840.57**	**5840.70**	**0.002949**	**3.75**	**335.00**	**246.04**	**0.41**
NW3	**76.5000**	**2YR**	**374.88**	**5838.01**	**5839.96**	**5840.05**	**0.002752**	**3.01**	**192.61**	**171.33**	**0.38**
NW3	**76.0000**	**500YR**	**1644.10**	**5838.01**	**5846.33**	**5846.34**	**0.000051**	**1.09**	**2621.37**	**560.76**	**0.07**
NW3	**76.0000**	**100YR**	**1246.80**	**5838.01**	**5846.05**	**5846.05**	**0.000034**	**0.86**	**2467.40**	**535.05**	**0.05**
NW3	**76.0000**	**10YR**	**738.74**	**5838.01**	**5839.80**	**5840.02**	**0.005672**	**4.05**	**222.80**	**176.11**	**0.54**
NW3	**76.0000**	**2YR**	**374.88**	**5838.01**	**5839.20**	**5839.37**	**0.006708**	**3.34**	**127.64**	**142.15**	**0.55**
NW3	**75.5000**	**500YR**	**1644.10**	**5835.60**	**5846.32**	**5846.33**	**0.000024**	**0.89**	**3459.06**	**453.28**	**0.05**
NW3	**75.5000**	**100YR**	**1246.80**	**5835.60**	**5846.04**	**5846.05**	**0.000015**	**0.69**	**3332.74**	**445.52**	**0.04**
NW3	**75.5000**	**10YR**	**738.74**	**5835.60**	**5837.36**	**5837.57**	**0.015531**	**6.73**	**222.75**	**217.67**	**0.90**
NW3	**75.5000**	**2YR**	**374.88**	**5835.60**	**5837.07**	**5837.17**	**0.009286**	**4.62**	**163.52**	**188.44**	**0.67**
NW3	**75.0000**	**500YR**	**1644.10**	**5833.31**	**5846.32**	**5846.32**	**0.000011**	**0.68**	**4577.82**	**531.12**	**0.03**
NW3	**75.0000**	**100YR**	**1246.80**	**5833.31**	**5846.04**	**5846.04**	**0.000007**	**0.53**	**4429.49**	**527.41**	**0.03**
NW3	**75.0000**	**10YR**	**738.74**	**5833.31**	**5835.23**	**5835.38**	**0.007688**	**5.00**	**269.39**	**215.24**	**0.64**
NW3	**75.0000**	**2YR**	**374.88**	**5833.31**	**5834.53**	**5834.71**	**0.016015**	**5.32**	**131.58**	**177.73**	**0.85**
NW3	**74.5000**	**500YR**	**1644.10**	**5831.30**	**5846.32**	**5846.32**	**0.000008**	**0.62**	**5191.70**	**542.45**	**0.03**
NW3	**74.5000**	**100YR**	**1246.80**	**5831.30**	**5846.04**	**5846.04**	**0.000005**	**0.48**	**5041.17**	**535.16**	**0.02**
NW3	**74.5000**	**10YR**	**738.74**	**5831.30**	**5832.91**	**5833.13**	**0.015572**	**6.30**	**214.74**	**198.45**	**0.88**
NW3	**74.5000**	**2YR**	**374.88**	**5831.30**	**5832.81**	**5832.88**	**0.005261**	**3.52**	**196.32**	**194.63**	**0.51**
NW3	**74.0000**	**500YR**	**1644.10**	**5828.71**	**5846.32**	**5846.32**	**0.000002**	**0.39**	**8341.60**	**729.89**	**0.02**
NW3	**74.0000**	**100YR**	**1246.80**	**5828.71**	**5846.04**	**5846.04**	**0.000002**	**0.30**	**8137.63**	**728.17**	**0.01**
NW3	**74.0000**	**10YR**	**738.74**	**5828.71**	**5831.05**	**5831.11**	**0.002983**	**3.55**	**397.99**	**260.74**	**0.41**
NW3	**74.0000**	**2YR**	**374.88**	**5828.71**	**5830.01**	**5830.13**	**0.013530**	**5.09**	**152.09**	**210.11**	**0.79**
NW3	**73.5000**	**500YR**	**1644.10**	**5828.01**	**5846.32**	**5846.32**	**0.000001**	**0.31**	**10180.37**	**843.21**	**0.01**
NW3	**73.5000**	**100YR**	**1246.80**	**5828.01**	**5846.04**	**5846.04**	**0.000001**	**0.24**	**9945.16**	**841.04**	**0.01**
NW3	**73.5000**	**10YR**	**738.74**	**5828.01**	**5830.94**	**5830.96**	**0.000520**	**1.73**	**721.14**	**334.93**	**0.18**
NW3	**73.5000**	**2YR**	**374.88**	**5828.01**	**5829.48**	**5829.52**	**0.002227**	**2.26**	**277.46**	**263.59**	**0.33**
NW3	**73.375***	**500YR**	**1644.10**	**5827.56**	**5846.32**	**5846.32**	**0.000001**	**0.32**	**10001.12**	**822.09**	**0.01**
NW3	**73.375***	**100YR**	**1246.80**	**5827.56**	**5846.04**	**5846.04**	**0.000001**	**0.25**	**9772.08**	**818.15**	**0.01**
NW3	**73.375***	**10YR**	**738.74**	**5827.56**	**5830.88**	**5830.90**	**0.000510**	**1.86**	**714.26**	**327.74**	**0.18**
NW3	**73.375***	**2YR**	**374.88**	**5827.56**	**5829.06**	**5829.15**	**0.005098**	**3.45**	**195.23**	**222.95**	**0.50**
NW3	**73.25***	**500YR**	**1644.10**	**5827.12**	**5846.32**	**5846.32**	**0.000001**	**0.32**	**9924.55**	**793.16**	**0.01**
NW3	**73.25***	**100YR**	**1246.80**	**5827.12**	**5846.04**	**5846.04**	**0.000001**	**0.25**	**9703.55**	**789.22**	**0.01**
NW3	**73.25***	**10YR**	**738.74**	**5827.12**	**5830.87**	**5830.89**	**0.000464**	**1.92**	**731.78**	**324.74**	**0.18**
NW3	**73.25***	**2YR**	**374.88**	**5827.12**	**5828.91**	**5829.01**	**0.004838**	**3.75**	**191.85**	**214.72**	**0.50**
NW3	**73.125***	**500YR**	**1644.10**	**5826.67**	**5846.32**	**5846.32**	**0.000001**	**0.32**	**9922.60**	**777.15**	**0.01**
NW3	**73.125***	**100YR**	**1246.80**	**5826.67**	**5846.04**	**5846.04**	**0.000001**	**0.25**	**9705.81**	**775.17**	**0.01**
NW3	**73.125***	**10YR**	**738.74**	**5826.67**	**5830.85**	**5830.88**	**0.000447**	**2.01**	**737.75**	**322.75**	**0.18**
NW3	**73.125***	**2YR**	**374.88**	**5826.67**	**5828.71**	**5828.86**	**0.005699**	**4.40**	**172.62**	**195.02**	**0.55**
NW3	**73.0000**	**500YR**	**638.13**	**5826.22**	**5846.32**	**5846.32**	**0.000000**	**0.13**	**9950.70**	**771.81**	**0.00**
NW3	**73.0000**	**100YR**	**580.14**	**5826.22**	**5846.04**	**5846.04**	**0.000000**	**0.12**	**9735.43**	**769.77**	**0.00**
NW3	**73.0000**	**10YR**	**521.65**	**5826.22**	**5830.85**	**5830.86**	**0.000227**	**1.52**	**732.30**	**322.69**	**0.13**
NW3	**73.0000**	**2YR**	**340.64**	**5826.22**	**5828.50**	**5828.69**	**0.006530**	**4.96**	**147.68**	**173.79**	**0.60**
NW3	**72.5000**	**500YR**	**638.13**	**5826.01**	**5846.32**	**5846.32**	**0.000000**	**0.10**	**11723.94**	**841.38**	**0.00**
NW3	**72.5000**	**100YR**	**580.14**	**5826.01**	**5846.04**	**5846.04**	**0.000000**	**0.09**	**11489.25**	**839.17**	**0.00**
NW3	**72.5000**	**10YR**	**521.65**	**5826.01**	**5830.84**	**5830.85**	**0.000079**	**0.94**	**1026.23**	**369.77**	**0.08**

NW3	**72.5000**	**2YR**	**340.64**	**5826.01**	**5827.43**	**5827.24**	**5827.68**	**0.010217**	**4.58**	**106.36**	**127.23**	**0.70**
NW3	**72.0000**	**500YR**	**638.13**	**5824.01**	**5846.32**		**5846.32**	**0.000000**	**0.06**	**17541.76**	**971.01**	**0.00**
NW3	**72.0000**	**100YR**	**580.14**	**5824.01**	**5846.04**		**5846.04**	**0.000000**	**0.06**	**17270.74**	**969.76**	**0.00**
NW3	**72.0000**	**10YR**	**521.65**	**5824.01**	**5830.84**		**5830.84**	**0.000004**	**0.26**	**3559.29**	**772.03**	**0.02**
NW3	**72.0000**	**2YR**	**340.64**	**5824.01**	**5824.90**		**5824.97**	**0.005769**	**2.60**	**180.92**	**235.67**	**0.49**
NW3	**71.5000**	**500YR**	**638.13**	**5822.01**	**5846.32**		**5846.32**	**0.000000**	**0.04**	**27620.33**	**1372.32**	**0.00**
NW3	**71.5000**	**100YR**	**580.14**	**5822.01**	**5846.04**		**5846.04**	**0.000000**	**0.04**	**27237.23**	**1371.01**	**0.00**
NW3	**71.5000**	**10YR**	**521.65**	**5822.01**	**5830.84**		**5830.84**	**0.000001**	**0.13**	**7351.59**	**1189.19**	**0.01**
NW3	**71.5000**	**2YR**	**340.64**	**5822.01**	**5823.05**	**5823.05**	**5823.32**	**0.018235**	**4.76**	**103.26**	**193.42**	**0.87**
NW4	**69.5000**	**500YR**	**10035.00**	**5852.01**	**5860.96**		**5861.38**	**0.003572**	**9.25**	**2245.85**	**480.09**	**0.55**
NW4	**69.5000**	**100YR**	**7695.90**	**5852.01**	**5860.03**		**5860.44**	**0.003961**	**9.03**	**1808.65**	**458.23**	**0.57**
NW4	**69.5000**	**10YR**	**4740.10**	**5852.01**	**5858.57**		**5858.99**	**0.005204**	**9.01**	**1172.64**	**411.37**	**0.63**
NW4	**69.5000**	**2YR**	**2480.30**	**5852.01**	**5857.16**		**5857.62**	**0.006875**	**8.76**	**656.10**	**332.36**	**0.70**
NW4	**69.0000**	**500YR**	**10035.00**	**5852.01**	**5860.44**		**5860.78**	**0.002336**	**7.26**	**2473.77**	**456.06**	**0.45**
NW4	**69.0000**	**100YR**	**7695.90**	**5852.01**	**5859.51**		**5859.79**	**0.002343**	**6.70**	**2057.62**	**433.25**	**0.44**
NW4	**69.0000**	**10YR**	**4740.10**	**5852.01**	**5857.97**		**5858.21**	**0.002621**	**6.04**	**1411.12**	**388.25**	**0.45**
NW4	**69.0000**	**2YR**	**2480.30**	**5852.01**	**5856.37**		**5856.58**	**0.003472**	**5.58**	**819.52**	**350.89**	**0.49**
NW4	**68.5000**	**500YR**	**10083.00**	**5850.01**	**5859.51**		**5860.10**	**0.003789**	**10.23**	**2002.63**	**391.19**	**0.59**
NW4	**68.5000**	**100YR**	**7739.90**	**5850.01**	**5858.61**		**5859.13**	**0.003677**	**9.42**	**1662.80**	**363.27**	**0.57**
NW4	**68.5000**	**10YR**	**4760.70**	**5850.01**	**5857.17**		**5857.55**	**0.003227**	**7.81**	**1190.59**	**298.78**	**0.52**
NW4	**68.5000**	**2YR**	**2495.40**	**5850.01**	**5855.62**		**5855.89**	**0.002855**	**6.24**	**768.05**	**249.40**	**0.47**
NW4	**68.4166***	**500YR**	**10083.00**	**5849.34**	**5856.92**	**5856.51**	**5858.43**	**0.011850**	**15.51**	**1273.20**	**306.96**	**1.00**
NW4	**68.4166***	**100YR**	**7739.90**	**5849.34**	**5856.12**	**5855.75**	**5857.49**	**0.011979**	**14.47**	**1038.45**	**281.56**	**0.98**
NW4	**68.4166***	**10YR**	**4760.70**	**5849.34**	**5854.85**	**5854.67**	**5856.03**	**0.012490**	**12.85**	**708.18**	**242.54**	**0.97**
NW4	**68.4166***	**2YR**	**2495.40**	**5849.34**	**5853.53**	**5853.38**	**5854.48**	**0.012880**	**10.86**	**414.70**	**178.59**	**0.94**
NW4	**68.3333***	**500YR**	**10083.00**	**5848.68**	**5856.29**	**5855.95**	**5857.91**	**0.012288**	**15.80**	**1246.60**	**304.91**	**1.01**
NW4	**68.3333***	**100YR**	**7739.90**	**5848.68**	**5855.47**	**5855.22**	**5856.95**	**0.012651**	**14.83**	**1005.80**	**276.92**	**1.01**
NW4	**68.3333***	**10YR**	**4760.70**	**5848.68**	**5854.27**	**5854.17**	**5855.49**	**0.012415**	**12.89**	**698.26**	**239.02**	**0.97**
NW4	**68.3333***	**2YR**	**2495.40**	**5848.68**	**5852.88**	**5852.88**	**5853.90**	**0.013622**	**11.13**	**401.38**	**177.84**	**0.97**
NW4	**68.25***	**500YR**	**10083.00**	**5848.01**	**5855.70**	**5855.44**	**5857.37**	**0.012348**	**15.88**	**1232.85**	**303.61**	**1.02**
NW4	**68.25***	**100YR**	**7739.90**	**5848.01**	**5854.90**	**5854.64**	**5856.41**	**0.012453**	**14.80**	**999.34**	**274.64**	**1.00**
NW4	**68.25***	**10YR**	**4760.70**	**5848.01**	**5853.61**	**5853.57**	**5854.93**	**0.013156**	**13.22**	**671.94**	**234.11**	**0.99**
NW4	**68.25***	**2YR**	**2495.40**	**5848.01**	**5852.28**	**5852.28**	**5853.31**	**0.013362**	**11.07**	**398.30**	**177.51**	**0.96**
NW4	**68.1666***	**500YR**	**10083.00**	**5847.34**	**5855.03**	**5854.88**	**5856.82**	**0.012996**	**16.22**	**1197.21**	**300.33**	**1.04**
NW4	**68.1666***	**100YR**	**7739.90**	**5847.34**	**5854.26**	**5854.13**	**5855.86**	**0.012862**	**15.01**	**975.28**	**271.78**	**1.02**
NW4	**68.1666***	**10YR**	**4760.70**	**5847.34**	**5852.94**	**5852.94**	**5854.35**	**0.013741**	**13.43**	**647.68**	**226.33**	**1.01**
NW4	**68.1666***	**2YR**	**2495.40**	**5847.34**	**5851.60**	**5851.60**	**5852.70**	**0.013996**	**11.24**	**383.96**	**173.95**	**0.98**
NW4	**68.0833***	**500YR**	**10083.00**	**5846.68**	**5854.51**	**5854.33**	**5856.27**	**0.012360**	**15.93**	**1208.23**	**301.68**	**1.01**
NW4	**68.0833***	**100YR**	**7739.90**	**5846.68**	**5853.61**	**5853.55**	**5855.29**	**0.013258**	**15.17**	**950.98**	**267.58**	**1.03**
NW4	**68.0833***	**10YR**	**4760.70**	**5846.68**	**5852.22**	**5852.22**	**5853.72**	**0.014691**	**13.69**	**616.15**	**211.46**	**1.04**
NW4	**68.0833***	**2YR**	**2495.40**	**5846.68**	**5850.92**	**5850.92**	**5852.05**	**0.014438**	**11.28**	**371.33**	**168.19**	**0.99**
NW4	**68.0000**	**500YR**	**10083.00**	**5846.01**	**5853.66**	**5853.66**	**5855.69**	**0.014329**	**16.78**	**1123.93**	**289.22**	**1.08**
NW4	**68.0000**	**100YR**	**7739.90**	**5846.01**	**5852.91**	**5852.91**	**5854.71**	**0.013977**	**15.44**	**917.49**	**261.51**	**1.05**
NW4	**68.0000**	**10YR**	**4760.70**	**5846.01**	**5851.59**	**5851.59**	**5853.08**	**0.014348**	**13.51**	**610.68**	**205.59**	**1.03**
NW4	**68.0000**	**2YR**	**2495.40**	**5846.01**	**5850.17**	**5850.17**	**5851.36**	**0.015531**	**11.45**	**352.50**	**158.49**	**1.02**
NW4	**67.875***	**500YR**	**10083.00**	**5845.51**	**5853.05**	**5853.05**	**5854.96**	**0.014062**	**16.46**	**1153.33**	**298.88**	**1.07**
NW4	**67.875***	**100YR**	**7739.90**	**5845.51**	**5852.23**	**5852.23**	**5854.00**	**0.014532**	**15.46**	**922.66**	**266.81**	**1.07**
NW4	**67.875***	**10YR**	**4760.70**	**5845.51**	**5851.00**	**5851.00**	**5852.44**	**0.014538**	**13.45**	**627.53**	**217.76**	**1.03**
NW4	**67.875***	**2YR**	**2495.40**	**5845.51**	**5849.71**	**5849.71**	**5850.82**	**0.014758**	**11.23**	**375.00**	**172.36**	**0.99**
NW4	**67.75***	**500YR**	**10083.00**	**5845.01**	**5852.38**	**5852.38**	**5854.26**	**0.014526**	**16.48**	**1162.01**	**306.31**	**1.09**
NW4	**67.75***	**100YR**	**7739.90**	**5845.01**	**5851.63**	**5851.63**	**5853.33**	**0.014597**	**15.34**	**943.11**	**276.45**	**1.07**
NW4	**67.75***	**10YR**	**4760.70**	**5845.01**	**5850.50**	**5850.50**	**5851.86**	**0.014086**	**13.23**	**655.94**	**233.33**	**1.02**
NW4	**67.75***	**2YR**	**2495.40**	**5845.01**	**5849.29**	**5849.29**	**5850.33**	**0.013775**	**10.99**	**399.98**	**188.28**	**0.96**
NW4	**67.625***	**500YR**	**10083.00**	**5844.51**	**5851.79**	**5851.79**	**5853.61**	**0.014616**	**16.39**	**1188.75**	**320.25**	**1.09**
NW4	**67.625***	**100YR**	**7739.90**	**5844.51**	**5851.11**	**5851.11**	**5852.71**	**0.014128**	**15.06**	**980.67**	**292.09**	**1.05**

NW4	**67.625***	**10YR**	**4760.70**	**5844.51**	**5850.03**	**5850.03**	**5851.31**	**0.013605**	**13.04**	**686.30**	**251.30**	**1.00**
NW4	**67.625***	**2YR**	**2495.40**	**5844.51**	**5848.91**	**5848.91**	**5849.88**	**0.012640**	**10.72**	**429.01**	**209.69**	**0.93**
NW4	**67.5000**	**500YR**	**10083.00**	**5844.01**	**5851.28**	**5851.28**	**5852.98**	**0.014244**	**16.14**	**1240.26**	**344.20**	**1.08**
NW4	**67.5000**	**100YR**	**7739.90**	**5844.01**	**5850.59**	**5850.59**	**5852.13**	**0.014087**	**14.98**	**1014.56**	**313.43**	**1.05**
NW4	**67.5000**	**10YR**	**4760.70**	**5844.01**	**5849.58**	**5849.58**	**5850.80**	**0.013072**	**12.84**	**718.87**	**271.80**	**0.98**
NW4	**67.5000**	**2YR**	**2495.40**	**5844.01**	**5848.62**	**5848.57**	**5849.46**	**0.010415**	**10.04**	**477.32**	**234.42**	**0.85**
NW4	**67.0000**	**500YR**	**10083.00**	**5844.01**	**5849.35**		**5850.04**	**0.008310**	**10.27**	**1779.33**	**525.54**	**0.79**
NW4	**67.0000**	**100YR**	**7739.90**	**5844.01**	**5848.80**		**5849.40**	**0.008174**	**9.45**	**1492.31**	**506.61**	**0.77**
NW4	**67.0000**	**10YR**	**4760.70**	**5844.01**	**5848.18**		**5848.56**	**0.006060**	**7.41**	**1184.00**	**486.38**	**0.64**
NW4	**67.0000**	**2YR**	**2495.40**	**5844.01**	**5847.26**		**5847.54**	**0.005811**	**6.13**	**759.29**	**434.98**	**0.61**
NW4	**66.5000**	**500YR**	**10083.00**	**5842.01**	**5847.30**		**5847.83**	**0.005766**	**8.53**	**2119.19**	**653.28**	**0.66**
NW4	**66.5000**	**100YR**	**7739.90**	**5842.01**	**5846.75**		**5847.22**	**0.005683**	**7.87**	**1769.87**	**626.35**	**0.64**
NW4	**66.5000**	**10YR**	**4760.70**	**5842.01**	**5845.32**		**5845.97**	**0.011320**	**8.72**	**941.49**	**483.17**	**0.85**
NW4	**66.5000**	**2YR**	**2495.40**	**5842.01**	**5844.45**	**5844.28**	**5844.96**	**0.011931**	**7.30**	**563.04**	**390.74**	**0.83**
NW4	**66.0000**	**500YR**	**10083.00**	**5840.01**	**5846.75**		**5847.08**	**0.001803**	**5.62**	**2713.53**	**635.31**	**0.38**
NW4	**66.0000**	**100YR**	**7739.90**	**5840.01**	**5846.34**		**5846.58**	**0.001374**	**4.70**	**2457.75**	**608.60**	**0.33**
NW4	**66.0000**	**10YR**	**4760.70**	**5840.01**	**5843.29**		**5843.90**	**0.007069**	**6.88**	**906.34**	**405.33**	**0.67**
NW4	**66.0000**	**2YR**	**2495.40**	**5840.01**	**5842.33**		**5842.76**	**0.007390**	**5.58**	**550.99**	**333.99**	**0.65**
NW4	**65.5000**	**500YR**	**11231.00**	**5836.92**	**5846.54**		**5846.63**	**0.000717**	**4.49**	**5103.77**	**933.69**	**0.26**
NW4	**65.5000**	**100YR**	**8605.10**	**5836.92**	**5846.19**		**5846.25**	**0.000503**	**3.67**	**4778.23**	**907.01**	**0.21**
NW4	**65.5000**	**10YR**	**5289.70**	**5836.92**	**5841.55**		**5841.77**	**0.004663**	**7.01**	**1498.73**	**529.88**	**0.58**
NW4	**65.5000**	**2YR**	**2775.40**	**5836.92**	**5840.47**		**5840.62**	**0.004683**	**5.88**	**965.35**	**461.33**	**0.55**
NW4	**65.0000**	**500YR**	**11231.00**	**5836.01**	**5846.39**		**5846.46**	**0.000381**	**3.43**	**5958.55**	**827.25**	**0.19**
NW4	**65.0000**	**100YR**	**8605.10**	**5836.01**	**5846.09**		**5846.13**	**0.000257**	**2.76**	**5705.56**	**825.42**	**0.15**
NW4	**65.0000**	**10YR**	**5289.70**	**5836.01**	**5840.01**		**5840.25**	**0.004628**	**6.25**	**1466.92**	**521.82**	**0.56**
NW4	**65.0000**	**2YR**	**2775.40**	**5836.01**	**5839.06**		**5839.21**	**0.004018**	**4.83**	**994.53**	**472.79**	**0.50**
NW4	**64.5000**	**500YR**	**11231.00**	**5834.01**	**5846.36**		**5846.39**	**0.000127**	**2.22**	**8985.58**	**1033.67**	**0.11**
NW4	**64.5000**	**100YR**	**8605.10**	**5834.01**	**5846.06**		**5846.08**	**0.000083**	**1.77**	**8681.95**	**1032.23**	**0.09**
NW4	**64.5000**	**10YR**	**5289.70**	**5834.01**	**5837.65**		**5838.29**	**0.010175**	**8.75**	**1079.94**	**538.22**	**0.81**
NW4	**64.5000**	**2YR**	**2775.40**	**5834.01**	**5836.69**	**5836.60**	**5837.27**	**0.012316**	**7.81**	**604.15**	**445.68**	**0.85**
NW4	**64.0000**	**500YR**	**11231.00**	**5830.01**	**5846.33**		**5846.36**	**0.000076**	**2.07**	**10134.36**	**902.35**	**0.09**
NW4	**64.0000**	**100YR**	**8605.10**	**5830.01**	**5846.05**		**5846.06**	**0.000048**	**1.63**	**9877.40**	**899.93**	**0.07**
NW4	**64.0000**	**10YR**	**5289.70**	**5830.01**	**5835.18**	**5834.45**	**5835.63**	**0.006862**	**9.11**	**1262.66**	**509.74**	**0.71**
NW4	**64.0000**	**2YR**	**2775.40**	**5830.01**	**5834.18**		**5834.52**	**0.006232**	**7.51**	**799.10**	**419.33**	**0.65**
NW4	**63.5000**	**500YR**	**11231.00**	**5828.01**	**5846.32**		**5846.34**	**0.000038**	**1.58**	**12455.44**	**910.08**	**0.07**
NW4	**63.5000**	**100YR**	**8605.10**	**5828.01**	**5846.04**		**5846.05**	**0.000024**	**1.24**	**12199.67**	**908.73**	**0.05**
NW4	**63.5000**	**10YR**	**5289.70**	**5828.01**	**5832.39**		**5833.01**	**0.010543**	**9.93**	**1141.55**	**586.51**	**0.85**
NW4	**63.5000**	**2YR**	**2775.40**	**5828.01**	**5831.53**		**5832.06**	**0.010305**	**8.45**	**682.67**	**458.39**	**0.81**
NW4	**63.0000**	**500YR**	**11231.00**	**5826.01**	**5846.32**		**5846.33**	**0.000020**	**1.22**	**15730.67**	**1030.89**	**0.05**
NW4	**63.0000**	**100YR**	**8605.10**	**5826.01**	**5846.04**		**5846.05**	**0.000012**	**0.95**	**15441.74**	**1030.89**	**0.04**
NW4	**63.0000**	**10YR**	**5289.70**	**5826.01**	**5831.14**		**5831.51**	**0.004148**	**6.83**	**1443.28**	**567.75**	**0.55**
NW4	**63.0000**	**2YR**	**2775.40**	**5826.01**	**5829.71**	**5829.38**	**5830.17**	**0.006780**	**6.91**	**706.53**	**426.91**	**0.66**
NW4	**62.5000**	**500YR**	**11231.00**	**5824.01**	**5846.32**		**5846.32**	**0.000016**	**1.16**	**16405.39**	**925.19**	**0.04**
NW4	**62.5000**	**100YR**	**8605.10**	**5824.01**	**5846.04**		**5846.04**	**0.000010**	**0.91**	**16147.89**	**925.19**	**0.03**
NW4	**62.5000**	**10YR**	**5289.70**	**5824.01**	**5830.84**		**5830.92**	**0.000904**	**3.90**	**2673.49**	**695.76**	**0.27**
NW4	**62.5000**	**2YR**	**2775.40**	**5824.01**	**5827.93**	**5827.44**	**5828.23**	**0.005748**	**6.67**	**874.88**	**521.55**	**0.61**
NW4	**62.0000**	**500YR**	**11231.00**	**5822.01**	**5846.32**		**5846.32**	**0.000005**	**0.70**	**26289.33**	**1251.52**	**0.03**
NW4	**62.0000**	**100YR**	**8605.10**	**5822.01**	**5846.04**		**5846.04**	**0.000003**	**0.54**	**25941.00**	**1251.52**	**0.02**
NW4	**62.0000**	**10YR**	**5289.70**	**5822.01**	**5830.83**		**5830.84**	**0.000076**	**1.36**	**7098.94**	**1176.79**	**0.08**
NW4	**62.0000**	**2YR**	**2775.40**	**5822.01**	**5823.84**	**5823.84**	**5824.47**	**0.034333**	**9.61**	**474.98**	**369.82**	**1.32**
NW5	**59.5000**	**500YR**	**8888.50**	**5818.15**	**5846.31**		**5846.32**	**0.000010**	**1.07**	**15364.04**	**738.75**	**0.04**
NW5	**59.5000**	**100YR**	**7266.20**	**5818.15**	**5846.04**		**5846.04**	**0.000007**	**0.88**	**15159.13**	**736.24**	**0.03**
NW5	**59.5000**	**10YR**	**5273.30**	**5818.15**	**5830.82**		**5830.84**	**0.000127**	**2.27**	**4817.30**	**634.10**	**0.11**
NW5	**59.5000**	**2YR**	**3047.10**	**5818.15**	**5822.94**		**5823.11**	**0.004104**	**6.74**	**971.46**	**361.93**	**0.54**
NW5	**59.0000**	**500YR**	**8888.50**	**5818.01**	**5846.31**		**5846.32**	**0.000006**	**0.86**	**17008.35**	**784.53**	**0.03**

NW5	**59.0000**	**100YR**	**7266.20**	**5818.01**	**5846.04**		**5846.04**	**0.000004**	**0.71**	**16791.07**	**782.38**	**0.02**
NW5	**59.0000**	**10YR**	**5273.30**	**5818.01**	**5830.80**		**5830.82**	**0.000068**	**1.67**	**5585.98**	**696.17**	**0.08**
NW5	**59.0000**	**2YR**	**3047.10**	**5818.01**	**5822.02**		**5822.26**	**0.002770**	**4.92**	**966.64**	**375.10**	**0.43**
NW5	**58.5000**	**500YR**	**8888.50**	**5816.01**	**5846.31**		**5846.32**	**0.000003**	**0.67**	**22565.32**	**957.91**	**0.02**
NW5	**58.5000**	**100YR**	**7266.20**	**5816.01**	**5846.04**		**5846.04**	**0.000002**	**0.55**	**22300.05**	**954.99**	**0.02**
NW5	**58.5000**	**10YR**	**5273.30**	**5816.01**	**5830.79**		**5830.80**	**0.000025**	**1.11**	**8570.67**	**855.60**	**0.05**
NW5	**58.5000**	**2YR**	**3047.10**	**5816.01**	**5821.82**		**5821.89**	**0.000657**	**3.06**	**1830.28**	**541.13**	**0.22**
NW5	**58.0000**	**500YR**	**8888.50**	**5814.01**	**5846.31**		**5846.31**	**0.000003**	**0.63**	**25438.21**	**1091.76**	**0.02**
NW5	**58.0000**	**100YR**	**7266.20**	**5814.01**	**5846.04**		**5846.04**	**0.000002**	**0.52**	**25135.49**	**1087.02**	**0.02**
NW5	**58.0000**	**10YR**	**5273.30**	**5814.01**	**5830.79**		**5830.79**	**0.000018**	**1.01**	**9963.08**	**921.00**	**0.04**
NW5	**58.0000**	**2YR**	**3047.10**	**5814.01**	**5821.73**		**5821.76**	**0.000251**	**2.27**	**2604.31**	**580.91**	**0.15**
NW5	**57.5000**	**500YR**	**8933.30**	**5812.01**	**5846.31**		**5846.31**	**0.000003**	**0.65**	**24720.19**	**1121.26**	**0.02**
NW5	**57.5000**	**100YR**	**7302.00**	**5812.01**	**5846.03**		**5846.04**	**0.000002**	**0.54**	**24410.42**	**1116.56**	**0.02**
NW5	**57.5000**	**10YR**	**5300.20**	**5812.01**	**5830.78**		**5830.79**	**0.000017**	**1.05**	**9783.38**	**848.06**	**0.04**
NW5	**57.5000**	**2YR**	**3063.60**	**5812.01**	**5821.68**		**5821.70**	**0.000151**	**1.96**	**2918.29**	**503.47**	**0.11**
NW5	**57.0000**	**500YR**	**8933.30**	**5812.01**	**5846.31**		**5846.31**	**0.000002**	**0.57**	**26903.06**	**1107.39**	**0.02**
NW5	**57.0000**	**100YR**	**7302.00**	**5812.01**	**5846.03**		**5846.04**	**0.000001**	**0.47**	**26597.02**	**1107.39**	**0.01**
NW5	**57.0000**	**10YR**	**5300.20**	**5812.01**	**5830.78**		**5830.79**	**0.000010**	**0.84**	**10708.19**	**794.92**	**0.03**
NW5	**57.0000**	**2YR**	**3063.60**	**5812.01**	**5821.66**		**5821.67**	**0.000066**	**1.37**	**3850.73**	**625.63**	**0.08**
NW5	**56.5000**	**500YR**	**8961.40**	**5808.01**	**5846.31**		**5846.31**	**0.000002**	**0.53**	**31365.83**	**1165.82**	**0.02**
NW5	**56.5000**	**100YR**	**7324.60**	**5808.01**	**5846.03**		**5846.04**	**0.000001**	**0.44**	**31043.65**	**1165.82**	**0.01**
NW5	**56.5000**	**10YR**	**5317.70**	**5808.01**	**5830.78**		**5830.78**	**0.000008**	**0.82**	**13340.69**	**1113.46**	**0.03**
NW5	**56.5000**	**2YR**	**3073.40**	**5808.01**	**5821.65**		**5821.65**	**0.000048**	**1.44**	**5036.12**	**818.08**	**0.07**
NW5	**56.0000**	**500YR**	**12448.00**	**5806.02**	**5846.31**		**5846.31**	**0.000002**	**0.56**	**40475.34**	**1364.52**	**0.02**
NW5	**56.0000**	**100YR**	**10094.00**	**5806.02**	**5846.03**		**5846.03**	**0.000001**	**0.46**	**40098.23**	**1364.52**	**0.01**
NW5	**56.0000**	**10YR**	**7125.30**	**5806.02**	**5830.78**		**5830.78**	**0.000006**	**0.77**	**19281.30**	**1364.52**	**0.03**
NW5	**56.0000**	**2YR**	**4087.50**	**5806.02**	**5821.63**		**5821.64**	**0.000037**	**1.38**	**7453.21**	**1178.17**	**0.06**
W1	**49.5000**	**500YR**	**2691.20**	**5989.65**	**5994.28**	**5994.28**	**5995.94**	**0.021943**	**14.90**	**297.65**	**91.30**	**1.24**
W1	**49.5000**	**100YR**	**1968.10**	**5989.65**	**5993.53**	**5993.53**	**5994.98**	**0.023547**	**13.66**	**232.11**	**83.48**	**1.25**
W1	**49.5000**	**10YR**	**1104.20**	**5989.65**	**5992.49**	**5992.49**	**5993.56**	**0.025648**	**11.44**	**150.46**	**72.94**	**1.23**
W1	**49.5000**	**2YR**	**587.62**	**5989.65**	**5991.63**	**5991.63**	**5992.42**	**0.029696**	**9.52**	**92.24**	**62.63**	**1.24**
W1	**49.0000**	**500YR**	**2691.20**	**5980.99**	**5985.07**	**5985.07**	**5986.54**	**0.030343**	**16.40**	**296.30**	**102.08**	**1.44**
W1	**49.0000**	**100YR**	**1968.10**	**5980.99**	**5984.44**	**5984.44**	**5985.69**	**0.031570**	**14.93**	**234.43**	**93.87**	**1.43**
W1	**49.0000**	**10YR**	**1104.20**	**5980.99**	**5983.53**	**5983.53**	**5984.45**	**0.034409**	**12.65**	**153.53**	**83.39**	**1.41**
W1	**49.0000**	**2YR**	**587.62**	**5980.99**	**5982.85**	**5982.85**	**5983.49**	**0.035636**	**10.43**	**99.78**	**76.23**	**1.36**
W1	**48.5000**	**500YR**	**2691.20**	**5972.01**	**5976.68**	**5976.68**	**5978.07**	**0.018382**	**13.64**	**340.67**	**116.26**	**1.13**
W1	**48.5000**	**100YR**	**1968.10**	**5972.01**	**5976.11**	**5976.11**	**5977.28**	**0.017948**	**12.33**	**276.68**	**111.09**	**1.10**
W1	**48.5000**	**10YR**	**1104.20**	**5972.01**	**5975.29**	**5975.29**	**5976.13**	**0.016842**	**10.21**	**188.63**	**101.42**	**1.02**
W1	**48.5000**	**2YR**	**587.62**	**5972.01**	**5974.64**	**5974.62**	**5975.23**	**0.014731**	**8.18**	**126.17**	**92.96**	**0.92**
W1	**48.0000**	**500YR**	**2691.20**	**5964.02**	**5968.44**	**5968.44**	**5969.77**	**0.022359**	**13.79**	**333.71**	**122.00**	**1.21**
W1	**48.0000**	**100YR**	**1968.10**	**5964.02**	**5967.93**	**5967.93**	**5969.02**	**0.021939**	**12.46**	**272.28**	**116.30**	**1.18**
W1	**48.0000**	**10YR**	**1104.20**	**5964.02**	**5967.22**	**5967.22**	**5967.97**	**0.020138**	**10.25**	**191.45**	**111.16**	**1.08**
W1	**48.0000**	**2YR**	**587.62**	**5964.02**	**5965.98**	**5965.98**	**5968.54**	**0.114888**	**16.55**	**60.09**	**73.68**	**2.35**
W1	**47.5000**	**500YR**	**2691.20**	**5956.02**	**5961.13**	**5961.13**	**5962.61**	**0.016693**	**13.15**	**342.41**	**118.52**	**1.08**
W1	**47.5000**	**100YR**	**1968.10**	**5956.02**	**5960.42**	**5960.42**	**5961.74**	**0.017756**	**12.13**	**263.88**	**104.57**	**1.09**
W1	**47.5000**	**10YR**	**1104.20**	**5956.02**	**5959.53**	**5959.53**	**5960.47**	**0.016895**	**9.94**	**177.00**	**91.70**	**1.01**
W1	**47.5000**	**2YR**	**587.62**	**5956.02**	**5958.85**	**5958.85**	**5959.50**	**0.015359**	**7.96**	**116.66**	**84.05**	**0.93**
W1	**47.25**		**Lat Struct**									
W1	**47.0000**	**500YR**	**235.02**	**5942.10**	**5951.85**	**5945.79**	**5951.88**	**0.000285**	**1.50**	**218.73**	**97.48**	**0.12**
W1	**47.0000**	**100YR**	**225.51**	**5942.10**	**5951.73**	**5945.70**	**5951.75**	**0.000294**	**1.50**	**207.07**	**94.29**	**0.12**
W1	**47.0000**	**10YR**	**213.06**	**5942.10**	**5951.59**	**5945.58**	**5951.62**	**0.000300**	**1.48**	**194.46**	**90.96**	**0.12**
W1	**47.0000**	**2YR**	**204.19**	**5942.10**	**5951.45**	**5945.49**	**5951.48**	**0.000316**	**1.49**	**181.78**	**87.31**	**0.12**
W1	**46.75**		**Culvert**									
W1	**46.5000**	**500YR**	**235.02**	**5938.06**	**5942.77**	**5942.77**	**5943.63**	**0.026749**	**7.44**	**31.66**	**20.52**	**1.00**

W1	46.5000	100YR	225.51	5938.06	5942.70	5942.70	5943.56	0.027852	7.44	30.33	18.69	1.01
W1	46.5000	10YR	213.06	5938.06	5942.64	5942.64	5943.47	0.027674	7.30	29.21	17.84	1.00
W1	46.5000	2YR	204.19	5938.06	5942.56	5942.56	5943.40	0.028239	7.36	27.75	16.77	1.01
W1	46.0000	500YR	235.02	5935.43	5936.46	5936.46	5936.74	0.040991	7.55	61.24	98.87	1.33
W1	46.0000	100YR	225.51	5935.43	5936.44	5936.44	5936.72	0.040502	7.44	59.89	98.73	1.32
W1	46.0000	10YR	213.06	5935.43	5936.42	5936.42	5936.69	0.041057	7.37	57.53	98.48	1.32
W1	46.0000	2YR	204.19	5935.43	5936.41	5936.41	5936.67	0.038931	7.15	56.96	98.42	1.28
W1	45.5000	500YR	235.02	5922.01	5922.93	5922.93	5923.15	0.027343	5.26	77.01	154.36	1.04
W1	45.5000	100YR	225.51	5922.01	5922.91	5922.91	5923.13	0.027473	5.21	74.83	154.15	1.04
W1	45.5000	10YR	213.06	5922.01	5922.91	5922.91	5923.11	0.024977	4.95	74.37	154.11	0.99
W1	45.5000	2YR	204.19	5922.01	5922.90	5922.90	5923.09	0.024481	4.86	72.79	153.95	0.98
W1	45.0000	500YR	235.02	5911.54	5913.23	5913.23	5913.80	0.021746	7.21	46.66	43.07	1.03
W1	45.0000	100YR	225.51	5911.54	5913.20	5913.20	5913.75	0.021952	7.13	45.13	42.58	1.03
W1	45.0000	10YR	213.06	5911.54	5913.15	5913.15	5913.69	0.021959	7.00	43.32	41.99	1.03
W1	45.0000	2YR	204.19	5911.54	5913.12	5913.12	5913.65	0.022254	6.92	41.81	41.49	1.03
W1	44.5000	500YR	235.02	5896.01	5897.72	5897.72	5898.34	0.018586	6.63	41.38	36.18	0.95
W1	44.5000	100YR	225.51	5896.01	5897.68	5897.68	5898.29	0.018844	6.56	39.96	35.67	0.95
W1	44.5000	10YR	213.06	5896.01	5897.62	5897.62	5898.22	0.019410	6.48	37.94	34.89	0.96
W1	44.5000	2YR	204.19	5896.01	5897.58	5897.58	5898.17	0.019737	6.42	36.57	34.30	0.96
W1	44.0000	500YR	258.22	5886.67	5888.13	5888.13	5888.66	0.030929	7.38	50.85	54.98	1.18
W1	44.0000	100YR	243.07	5886.67	5888.09	5888.09	5888.60	0.031211	7.24	48.50	53.54	1.18
W1	44.0000	10YR	223.49	5886.67	5888.03	5888.03	5888.52	0.031647	7.04	45.41	51.76	1.18
W1	44.0000	2YR	209.52	5886.67	5887.98	5887.98	5888.45	0.033287	6.97	42.53	50.04	1.20
W1	43.5000	500YR	258.22	5878.01	5880.44	5880.44	5881.19	0.015318	7.06	41.69	35.20	0.89
W1	43.5000	100YR	243.07	5878.01	5880.36	5880.36	5881.10	0.016004	7.01	38.82	33.56	0.91
W1	43.5000	10YR	223.49	5878.01	5880.24	5880.24	5880.97	0.017162	6.95	35.05	30.46	0.93
W1	43.5000	2YR	209.52	5878.01	5880.15	5880.15	5880.88	0.018406	6.93	32.29	27.52	0.95
W1	43.0000	500YR	258.22	5872.88	5874.46	5874.46	5874.99	0.025872	7.66	52.27	50.23	1.12
W1	43.0000	100YR	243.07	5872.88	5874.42	5874.42	5874.93	0.025904	7.51	50.05	49.58	1.11
W1	43.0000	10YR	223.49	5872.88	5874.36	5874.36	5874.85	0.025937	7.30	47.13	48.64	1.11
W1	43.0000	2YR	209.52	5872.88	5874.31	5874.31	5874.79	0.026543	7.19	44.63	47.78	1.11
W1	42.5000	500YR	258.22	5866.01	5866.90	5866.89	5867.15	0.019315	4.27	74.57	134.68	0.87
W1	42.5000	100YR	243.07	5866.01	5866.88	5866.86	5867.12	0.018860	4.17	71.89	133.97	0.85
W1	42.5000	10YR	223.49	5866.01	5866.85	5866.83	5867.08	0.019256	4.10	66.87	132.62	0.86
W1	42.5000	2YR	209.52	5866.01	5866.82	5866.81	5867.05	0.019271	4.03	63.58	131.73	0.85
W1	42.0000	500YR	258.22	5860.42	5861.33	5861.33	5861.62	0.026854	5.52	71.95	116.69	1.05
W1	42.0000	100YR	243.07	5860.42	5861.30	5861.30	5861.59	0.027596	5.47	68.43	115.79	1.05
W1	42.0000	10YR	223.49	5860.42	5861.27	5861.27	5861.54	0.027090	5.29	65.05	114.92	1.04
W1	42.0000	2YR	209.52	5860.42	5861.25	5861.25	5861.51	0.027164	5.19	62.20	114.15	1.04
W1	41.5000	500YR	258.22	5852.23	5853.29	5853.29	5853.55	0.018734	4.85	80.78	150.08	0.89
W1	41.5000	100YR	243.07	5852.23	5853.26	5853.26	5853.52	0.018640	4.76	77.27	148.77	0.88
W1	41.5000	10YR	223.49	5852.23	5853.24	5853.24	5853.48	0.017889	4.58	73.59	147.38	0.86
W1	41.5000	2YR	209.52	5852.23	5853.21	5853.21	5853.45	0.018480	4.54	69.02	144.76	0.87
W1	41.0000	500YR	306.89	5841.51	5846.31		5846.31	0.000007	0.27	2045.60	581.24	0.02
W1	41.0000	100YR	278.14	5841.51	5846.03		5846.03	0.000007	0.26	1885.85	572.96	0.02
W1	41.0000	10YR	242.34	5841.51	5842.37	5842.37	5842.53	0.029974	5.61	101.20	292.15	1.10
W1	41.0000	2YR	218.93	5841.51	5842.36	5842.36	5842.50	0.024864	5.10	100.63	291.94	1.00
W1	40.5000	500YR	306.89	5831.44	5846.31		5846.31	0.000000	0.06	8997.24	772.48	0.00
W1	40.5000	100YR	278.14	5831.44	5846.03		5846.03	0.000000	0.05	8783.38	772.48	0.00
W1	40.5000	10YR	242.34	5831.44	5832.42	5832.42	5832.58	0.016857	4.42	110.43	296.60	0.83
W1	40.5000	2YR	218.93	5831.44	5832.37	5832.37	5832.55	0.018469	4.47	97.58	287.02	0.86
W1	40.0000	500YR	490.29	5820.01	5846.31		5846.31	0.000000	0.06	14294.32	680.37	0.00
W1	40.0000	100YR	414.42	5820.01	5846.03		5846.03	0.000000	0.05	14105.96	680.37	0.00
W1	40.0000	10YR	322.31	5820.01	5830.78		5830.78	0.000001	0.15	4132.18	632.69	0.01
W1	40.0000	2YR	259.19	5820.01	5821.61	5821.61	5822.24	0.020241	6.44	42.28	36.30	0.97

W1	**39.5000**	**500YR**	**247.21**	**5814.02**	**5846.31**		**5846.31**	**0.000000**	**0.02**	**21506.45**	**816.93**	**0.00**
W1	**39.5000**	**100YR**	**244.72**	**5814.02**	**5846.03**		**5846.03**	**0.000000**	**0.02**	**21280.27**	**816.93**	**0.00**
W1	**39.5000**	**10YR**	**241.82**	**5814.02**	**5830.78**		**5830.78**	**0.000000**	**0.05**	**9284.20**	**762.47**	**0.00**
W1	**39.5000**	**2YR**	**224.31**	**5814.02**	**5821.64**		**5821.64**	**0.000002**	**0.20**	**2441.06**	**685.15**	**0.01**
W1	**39.0000**	**500YR**	**247.21**	**5808.01**	**5846.31**		**5846.31**	**0.000000**	**0.01**	**36644.37**	**1264.92**	**0.00**
W1	**39.0000**	**100YR**	**244.72**	**5808.01**	**5846.03**		**5846.03**	**0.000000**	**0.01**	**36294.17**	**1264.92**	**0.00**
W1	**39.0000**	**10YR**	**241.82**	**5808.01**	**5830.78**		**5830.78**	**0.000000**	**0.03**	**17918.13**	**1154.10**	**0.00**
W1	**39.0000**	**2YR**	**224.31**	**5808.01**	**5821.64**		**5821.64**	**0.000000**	**0.06**	**7590.48**	**1066.13**	**0.00**
SP1	**199.0000**	**500YR**	**1394.60**	**5882.02**	**5886.76**		**5887.40**	**0.008647**	**9.52**	**281.27**	**113.02**	**0.78**
SP1	**199.0000**	**100YR**	**1058.50**	**5882.02**	**5886.21**		**5886.83**	**0.009359**	**9.09**	**221.80**	**103.49**	**0.80**
SP1	**199.0000**	**10YR**	**646.06**	**5882.02**	**5885.38**		**5885.95**	**0.010470**	**8.26**	**143.82**	**84.89**	**0.81**
SP1	**199.0000**	**2YR**	**335.63**	**5882.02**	**5884.50**	**5884.38**	**5885.01**	**0.012271**	**7.23**	**79.39**	**63.11**	**0.83**
SP1	**198.5000**	**500YR**	**1394.60**	**5880.01**	**5883.94**	**5883.94**	**5885.22**	**0.013151**	**10.05**	**189.77**	**84.14**	**0.93**
SP1	**198.5000**	**100YR**	**1058.50**	**5880.01**	**5883.47**	**5883.47**	**5884.57**	**0.013089**	**9.15**	**152.47**	**75.88**	**0.91**
SP1	**198.5000**	**10YR**	**646.06**	**5880.01**	**5882.77**	**5882.68**	**5883.59**	**0.012925**	**7.69**	**103.49**	**63.09**	**0.86**
SP1	**198.5000**	**2YR**	**335.63**	**5880.01**	**5882.09**	**5881.90**	**5882.60**	**0.011574**	**5.88**	**64.84**	**51.01**	**0.77**
SP1	**198.0000**	**500YR**	**1394.60**	**5876.72**	**5879.57**	**5879.47**	**5880.27**	**0.026228**	**11.90**	**230.99**	**134.43**	**1.26**
SP1	**198.0000**	**100YR**	**1058.50**	**5876.72**	**5879.24**	**5879.17**	**5879.86**	**0.027384**	**11.19**	**188.10**	**126.69**	**1.26**
SP1	**198.0000**	**10YR**	**646.06**	**5876.72**	**5878.75**	**5878.71**	**5879.26**	**0.028811**	**9.90**	**129.84**	**110.74**	**1.24**
SP1	**198.0000**	**2YR**	**335.63**	**5876.72**	**5878.29**	**5878.24**	**5878.65**	**0.027993**	**8.16**	**82.20**	**94.41**	**1.17**
SP1	**197.5000**	**500YR**	**1394.60**	**5874.01**	**5877.10**	**5877.10**	**5878.06**	**0.014387**	**9.38**	**224.36**	**119.77**	**0.95**
SP1	**197.5000**	**100YR**	**1058.50**	**5874.01**	**5876.68**	**5876.68**	**5877.55**	**0.015182**	**8.73**	**176.88**	**106.02**	**0.95**
SP1	**197.5000**	**10YR**	**646.06**	**5874.01**	**5876.07**	**5876.07**	**5876.78**	**0.016530**	**7.64**	**117.19**	**89.11**	**0.95**
SP1	**197.5000**	**2YR**	**335.63**	**5874.01**	**5875.44**	**5875.44**	**5875.99**	**0.019319**	**6.45**	**66.64**	**70.43**	**0.96**
SP1	**197.375***	**500YR**	**1394.60**	**5873.51**	**5876.53**	**5876.53**	**5877.52**	**0.013538**	**8.83**	**216.04**	**120.81**	**0.91**
SP1	**197.375***	**100YR**	**1058.50**	**5873.51**	**5876.11**	**5876.11**	**5877.01**	**0.014337**	**8.21**	**169.05**	**106.78**	**0.91**
SP1	**197.375***	**10YR**	**646.06**	**5873.51**	**5875.48**	**5875.48**	**5876.20**	**0.016361**	**7.21**	**108.36**	**83.58**	**0.93**
SP1	**197.375***	**2YR**	**335.63**	**5873.51**	**5874.86**	**5874.86**	**5875.39**	**0.019245**	**5.99**	**62.32**	**65.70**	**0.94**
SP1	**197.25***	**500YR**	**1394.60**	**5873.01**	**5875.87**	**5875.87**	**5876.89**	**0.013930**	**8.50**	**201.91**	**115.93**	**0.91**
SP1	**197.25***	**100YR**	**1058.50**	**5873.01**	**5875.45**	**5875.45**	**5876.35**	**0.015148**	**7.92**	**156.56**	**99.31**	**0.92**
SP1	**197.25***	**10YR**	**646.06**	**5873.01**	**5874.83**	**5874.83**	**5875.56**	**0.017933**	**6.96**	**101.09**	**79.28**	**0.95**
SP1	**197.25***	**2YR**	**335.63**	**5873.01**	**5874.25**	**5874.23**	**5874.75**	**0.021270**	**5.71**	**60.18**	**63.14**	**0.97**
SP1	**197.125***	**500YR**	**1394.60**	**5872.51**	**5875.19**	**5875.19**	**5876.20**	**0.015048**	**8.27**	**189.85**	**109.68**	**0.93**
SP1	**197.125***	**100YR**	**1058.50**	**5872.51**	**5874.78**	**5874.78**	**5875.68**	**0.016865**	**7.74**	**147.36**	**94.69**	**0.96**
SP1	**197.125***	**10YR**	**646.06**	**5872.51**	**5874.20**	**5874.20**	**5874.90**	**0.019965**	**6.74**	**98.04**	**76.52**	**0.98**
SP1	**197.125***	**2YR**	**335.63**	**5872.51**	**5873.68**	**5873.67**	**5874.14**	**0.022629**	**5.45**	**61.58**	**64.41**	**0.98**
SP1	**197.0000**	**500YR**	**1394.60**	**5872.01**	**5874.53**	**5874.53**	**5875.52**	**0.016341**	**8.06**	**182.46**	**107.70**	**0.95**
SP1	**197.0000**	**100YR**	**1058.50**	**5872.01**	**5874.14**	**5874.14**	**5875.01**	**0.018429**	**7.51**	**143.92**	**90.82**	**0.98**
SP1	**197.0000**	**10YR**	**646.06**	**5872.01**	**5873.60**	**5873.60**	**5874.26**	**0.021612**	**6.51**	**99.37**	**77.79**	**1.00**
SP1	**197.0000**	**2YR**	**335.63**	**5872.01**	**5873.17**	**5873.09**	**5873.55**	**0.018993**	**5.00**	**67.11**	**69.39**	**0.90**
SP1	**196.5000**	**500YR**	**1394.60**	**5868.01**	**5869.92**	**5869.92**	**5870.68**	**0.018931**	**7.12**	**207.69**	**151.16**	**0.98**
SP1	**196.5000**	**100YR**	**1058.50**	**5868.01**	**5869.65**	**5869.65**	**5870.30**	**0.020232**	**6.54**	**168.28**	**140.90**	**0.98**
SP1	**196.5000**	**10YR**	**646.06**	**5868.01**	**5869.24**	**5869.24**	**5869.74**	**0.022827**	**5.68**	**116.01**	**119.17**	**0.99**
SP1	**196.5000**	**2YR**	**335.63**	**5868.01**	**5868.83**	**5868.83**	**5869.19**	**0.026409**	**4.80**	**70.56**	**102.95**	**1.00**
SP1	**196.0000**	**500YR**	**1394.60**	**5862.01**	**5865.18**		**5865.47**	**0.008335**	**6.50**	**393.34**	**243.86**	**0.70**
SP1	**196.0000**	**100YR**	**1058.50**	**5862.01**	**5864.91**		**5865.16**	**0.008095**	**5.96**	**328.87**	**235.11**	**0.68**
SP1	**196.0000**	**10YR**	**646.06**	**5862.01**	**5864.49**		**5864.70**	**0.008339**	**5.32**	**231.66**	**222.81**	**0.67**
SP1	**196.0000**	**2YR**	**335.63**	**5862.01**	**5864.07**		**5864.26**	**0.009079**	**4.73**	**140.24**	**211.98**	**0.67**
SP1	**195.5000**	**500YR**	**1394.60**	**5859.11**	**5860.54**	**5860.54**	**5860.91**	**0.031584**	**8.26**	**332.16**	**400.03**	**1.23**
SP1	**195.5000**	**100YR**	**1058.50**	**5859.11**	**5860.41**	**5860.41**	**5860.73**	**0.030588**	**7.62**	**280.45**	**393.25**	**1.19**
SP1	**195.5000**	**10YR**	**646.06**	**5859.11**	**5860.24**	**5860.24**	**5860.47**	**0.025445**	**6.33**	**215.91**	**387.26**	**1.06**
SP1	**195.5000**	**2YR**	**335.63**	**5859.11**	**5860.07**	**5860.07**	**5860.23**	**0.019668**	**4.99**	**151.60**	**379.83**	**0.91**
SP1	**195.0000**	**500YR**	**1394.60**	**5854.01**	**5855.69**	**5855.24**	**5855.82**	**0.010011**	**3.51**	**499.32**	**454.85**	**0.51**
SP1	**195.0000**	**100YR**	**1058.50**	**5854.01**	**5855.50**	**5855.10**	**5855.61**	**0.010017**	**3.21**	**415.05**	**435.87**	**0.50**
SP1	**195.0000**	**10YR**	**646.06**	**5854.01**	**5855.22**	**5854.92**	**5855.31**	**0.009994**	**2.75**	**298.87**	**408.76**	**0.48**
SP1	**195.0000**	**2YR**	**335.63**	**5854.01**	**5854.95**	**5854.74**	**5855.01**	**0.009998**	**2.25**	**192.73**	**376.86**	**0.46**

SP2	**189.5000**	**500YR**	**174.01**	**6082.02**	**6084.60**	**6084.60**	**6085.44**	**0.019341**	**7.54**	**25.11**	**15.92**	**0.97**
SP2	**189.5000**	**100YR**	**131.46**	**6082.02**	**6084.26**	**6084.26**	**6085.00**	**0.020028**	**7.01**	**20.03**	**14.42**	**0.97**
SP2	**189.5000**	**10YR**	**77.60**	**6082.02**	**6083.73**	**6083.73**	**6084.31**	**0.022292**	**6.15**	**13.03**	**11.99**	**0.98**
SP2	**189.5000**	**2YR**	**39.34**	**6082.02**	**6083.23**	**6083.23**	**6083.65**	**0.026492**	**5.16**	**7.65**	**9.68**	**1.00**
SP2	**189.0000**	**500YR**	**174.01**	**6064.54**	**6066.96**	**6066.96**	**6067.73**	**0.022326**	**7.64**	**26.95**	**17.81**	**1.04**
SP2	**189.0000**	**100YR**	**131.46**	**6064.54**	**6066.66**	**6066.66**	**6067.33**	**0.022745**	**7.14**	**21.75**	**16.39**	**1.03**
SP2	**189.0000**	**10YR**	**77.60**	**6064.54**	**6066.19**	**6066.19**	**6066.71**	**0.023388**	**6.24**	**14.56**	**14.05**	**1.01**
SP2	**189.0000**	**2YR**	**39.34**	**6064.54**	**6065.72**	**6065.72**	**6066.10**	**0.024676**	**5.24**	**8.62**	**11.43**	**0.99**
SP2	**188.5000**	**500YR**	**234.68**	**6041.85**	**6044.31**	**6044.31**	**6045.19**	**0.032322**	**9.07**	**33.39**	**21.31**	**1.23**
SP2	**188.5000**	**100YR**	**177.14**	**6041.85**	**6044.00**	**6044.00**	**6044.74**	**0.034018**	**8.16**	**27.08**	**19.42**	**1.23**
SP2	**188.5000**	**10YR**	**104.47**	**6041.85**	**6043.50**	**6043.50**	**6044.07**	**0.036043**	**7.16**	**18.09**	**16.35**	**1.22**
SP2	**188.5000**	**2YR**	**53.34**	**6041.85**	**6043.02**	**6043.02**	**6043.42**	**0.039264**	**6.06**	**10.90**	**13.48**	**1.21**
SP2	**188.0000**	**500YR**	**234.68**	**6021.78**	**6024.23**	**6024.23**	**6025.09**	**0.023393**	**8.17**	**34.50**	**22.06**	**1.08**
SP2	**188.0000**	**100YR**	**177.14**	**6021.78**	**6023.94**	**6023.94**	**6024.65**	**0.024127**	**7.44**	**28.23**	**20.35**	**1.07**
SP2	**188.0000**	**10YR**	**104.47**	**6021.78**	**6023.44**	**6023.44**	**6024.00**	**0.025271**	**6.51**	**18.90**	**17.35**	**1.06**
SP2	**188.0000**	**2YR**	**53.34**	**6021.78**	**6022.96**	**6022.96**	**6023.36**	**0.027770**	**5.55**	**11.21**	**14.15**	**1.05**
SP2	**187.5000**	**500YR**	**234.68**	**6010.01**	**6011.91**	**6011.91**	**6012.58**	**0.019283**	**6.71**	**37.48**	**29.91**	**0.96**
SP2	**187.5000**	**100YR**	**177.14**	**6010.01**	**6011.62**	**6011.62**	**6012.23**	**0.020832**	**6.29**	**29.51**	**26.48**	**0.98**
SP2	**187.5000**	**10YR**	**104.47**	**6010.01**	**6011.26**	**6011.21**	**6011.68**	**0.019890**	**5.18**	**20.56**	**22.81**	**0.92**
SP2	**187.5000**	**2YR**	**53.34**	**6010.01**	**6011.26**		**6011.37**	**0.005193**	**2.65**	**20.55**	**22.80**	**0.47**
SP2	**187.375***	**500YR**	**234.68**	**6008.30**	**6011.83**		**6011.94**	**0.001355**	**2.93**	**107.59**	**54.12**	**0.29**
SP2	**187.375***	**100YR**	**177.14**	**6008.30**	**6011.70**		**6011.77**	**0.000913**	**2.34**	**100.62**	**52.44**	**0.24**
SP2	**187.375***	**10YR**	**104.47**	**6008.30**	**6011.50**		**6011.53**	**0.000415**	**1.51**	**90.42**	**49.89**	**0.16**
SP2	**187.375***	**2YR**	**53.34**	**6008.30**	**6011.32**		**6011.33**	**0.000140**	**0.84**	**81.50**	**47.35**	**0.09**
SP2	**187.25***	**500YR**	**234.68**	**6006.60**	**6011.89**		**6011.91**	**0.000215**	**1.58**	**237.98**	**80.39**	**0.12**
SP2	**187.25***	**100YR**	**177.14**	**6006.60**	**6011.74**		**6011.75**	**0.000139**	**1.25**	**226.15**	**78.59**	**0.10**
SP2	**187.25***	**10YR**	**104.47**	**6006.60**	**6011.52**		**6011.53**	**0.000059**	**0.79**	**209.30**	**76.09**	**0.06**
SP2	**187.25***	**2YR**	**53.34**	**6006.60**	**6011.33**		**6011.33**	**0.000018**	**0.43**	**194.81**	**73.75**	**0.04**
SP2	**187.125***	**500YR**	**234.68**	**6004.90**	**6011.90**	**6006.90**	**6011.90**	**0.000054**	**0.98**	**432.34**	**109.57**	**0.07**
SP2	**187.125***	**100YR**	**177.14**	**6004.90**	**6011.74**	**6006.63**	**6011.75**	**0.000034**	**0.77**	**415.68**	**107.67**	**0.05**
SP2	**187.125***	**10YR**	**104.47**	**6004.90**	**6011.52**	**6006.24**	**6011.52**	**0.000014**	**0.48**	**392.06**	**104.97**	**0.03**
SP2	**187.125***	**2YR**	**53.34**	**6004.90**	**6011.33**	**6005.85**	**6011.33**	**0.000004**	**0.26**	**371.83**	**102.67**	**0.02**
SP2	**187.1**		**Culvert**									
SP2	**187.0000**	**500YR**	**234.68**	**6003.19**	**6005.06**	**6005.06**	**6005.63**	**0.018109**	**7.31**	**49.81**	**45.79**	**0.97**
SP2	**187.0000**	**100YR**	**177.14**	**6003.19**	**6004.84**	**6004.84**	**6005.33**	**0.018087**	**6.69**	**40.13**	**42.05**	**0.95**
SP2	**187.0000**	**10YR**	**104.47**	**6003.19**	**6004.45**	**6004.45**	**6004.86**	**0.020679**	**5.89**	**25.13**	**33.89**	**0.96**
SP2	**187.0000**	**2YR**	**53.34**	**6003.19**	**6004.11**	**6004.11**	**6004.41**	**0.021909**	**4.80**	**14.62**	**27.27**	**0.94**
SP2	**186.5000**	**500YR**	**234.68**	**5977.77**	**5980.23**	**5980.23**	**5981.02**	**0.020326**	**7.15**	**33.51**	**22.58**	**0.99**
SP2	**186.5000**	**100YR**	**177.14**	**5977.77**	**5979.92**	**5979.92**	**5980.61**	**0.021669**	**6.66**	**26.85**	**20.82**	**1.00**
SP2	**186.5000**	**10YR**	**104.47**	**5977.77**	**5979.45**	**5979.45**	**5979.98**	**0.023982**	**5.86**	**17.82**	**16.92**	**1.01**
SP2	**186.5000**	**2YR**	**53.34**	**5977.77**	**5978.98**	**5978.98**	**5979.37**	**0.026466**	**5.02**	**10.63**	**13.79**	**1.01**
SP2	**186.0000**	**500YR**	**234.68**	**5962.23**	**5964.53**	**5964.53**	**5965.30**	**0.016475**	**7.58**	**39.01**	**28.18**	**0.94**
SP2	**186.0000**	**100YR**	**177.14**	**5962.23**	**5964.22**	**5964.22**	**5964.90**	**0.017368**	**6.98**	**30.85**	**25.44**	**0.94**
SP2	**186.0000**	**10YR**	**104.47**	**5962.23**	**5963.76**	**5963.76**	**5964.28**	**0.019380**	**5.97**	**19.95**	**21.27**	**0.94**
SP2	**186.0000**	**2YR**	**53.34**	**5962.23**	**5963.31**	**5963.31**	**5963.69**	**0.023841**	**4.95**	**11.43**	**17.20**	**0.97**
SP2	**185.5000**	**500YR**	**245.13**	**5947.58**	**5949.63**	**5949.63**	**5950.31**	**0.021269**	**7.47**	**42.91**	**35.01**	**1.03**
SP2	**185.5000**	**100YR**	**185.05**	**5947.58**	**5949.37**	**5949.37**	**5949.96**	**0.022871**	**6.89**	**34.10**	**31.94**	**1.04**
SP2	**185.5000**	**10YR**	**109.27**	**5947.58**	**5948.97**	**5948.97**	**5949.42**	**0.027360**	**5.97**	**22.19**	**26.80**	**1.07**
SP2	**185.5000**	**2YR**	**55.98**	**5947.58**	**5948.62**	**5948.62**	**5948.93**	**0.029046**	**4.88**	**13.70**	**22.64**	**1.04**
SP2	**185.0000**	**500YR**	**245.13**	**5938.02**	**5940.05**	**5940.05**	**5940.69**	**0.019706**	**6.76**	**42.30**	**34.83**	**0.98**
SP2	**185.0000**	**100YR**	**185.05**	**5938.02**	**5939.77**	**5939.77**	**5940.35**	**0.021201**	**6.40**	**33.07**	**30.74**	**0.99**
SP2	**185.0000**	**10YR**	**109.27**	**5938.02**	**5939.38**	**5939.38**	**5939.83**	**0.021789**	**5.53**	**21.95**	**25.90**	**0.96**
SP2	**185.0000**	**2YR**	**55.98**	**5938.02**	**5938.98**	**5938.98**	**5939.31**	**0.024940**	**4.69**	**12.67**	**20.46**	**0.97**
SP2	**184.5000**	**500YR**	**245.13**	**5924.07**	**5925.73**	**5925.73**	**5926.32**	**0.024121**	**7.93**	**47.76**	**41.59**	**1.10**

SP2	**184.5000**	**100YR**	**185.05**	**5924.07**	**5925.51**	**5925.51**	**5926.02**	**0.024728**	**7.27**	**38.74**	**38.88**	**1.09**
SP2	**184.5000**	**10YR**	**109.27**	**5924.07**	**5925.16**	**5925.16**	**5925.55**	**0.026883**	**6.24**	**25.85**	**34.31**	**1.08**
SP2	**184.5000**	**2YR**	**55.98**	**5924.07**	**5924.84**	**5924.84**	**5925.11**	**0.028785**	**5.05**	**15.68**	**29.27**	**1.05**
SP2	**184.0000**	**500YR**	**245.13**	**5908.28**	**5909.91**	**5909.91**	**5910.42**	**0.021962**	**7.02**	**52.44**	**54.61**	**1.03**
SP2	**184.0000**	**100YR**	**185.05**	**5908.28**	**5909.73**	**5909.73**	**5910.16**	**0.021324**	**6.34**	**43.12**	**51.16**	**0.99**
SP2	**184.0000**	**10YR**	**109.27**	**5908.28**	**5909.40**	**5909.40**	**5909.75**	**0.023998**	**5.52**	**27.77**	**42.81**	**1.00**
SP2	**184.0000**	**2YR**	**55.98**	**5908.28**	**5909.13**	**5909.13**	**5909.37**	**0.024896**	**4.45**	**16.76**	**36.04**	**0.96**
SP2	**183.5000**	**500YR**	**245.13**	**5895.98**	**5897.75**	**5897.28**	**5897.91**	**0.010006**	**5.38**	**90.32**	**91.08**	**0.72**
SP2	**183.5000**	**100YR**	**185.05**	**5895.98**	**5897.54**	**5897.11**	**5897.68**	**0.010005**	**4.95**	**72.44**	**80.38**	**0.70**
SP2	**183.5000**	**10YR**	**109.27**	**5895.98**	**5897.18**	**5896.83**	**5897.29**	**0.010009**	**4.15**	**47.53**	**61.30**	**0.67**
SP2	**183.5000**	**2YR**	**55.98**	**5895.98**	**5896.85**	**5896.58**	**5896.93**	**0.010004**	**3.33**	**29.06**	**49.58**	**0.64**
MAIN	**39.5000**	**500YR**	**9993.10**	**5806.01**	**5846.31**		**5846.31**	**0.000002**	**0.63**	**29427.20**	**1050.27**	**0.02**
MAIN	**39.5000**	**100YR**	**8446.80**	**5806.01**	**5846.03**		**5846.03**	**0.000002**	**0.54**	**29136.93**	**1050.27**	**0.01**
MAIN	**39.5000**	**10YR**	**5796.90**	**5806.01**	**5830.78**		**5830.78**	**0.000007**	**0.85**	**13767.69**	**956.22**	**0.03**
MAIN	**39.5000**	**2YR**	**3793.30**	**5806.01**	**5821.63**		**5821.64**	**0.000043**	**1.49**	**5585.55**	**787.36**	**0.07**
MAIN	**39.375***	**500YR**	**9993.10**	**5806.01**	**5846.31**		**5846.31**	**0.000003**	**0.70**	**26859.65**	**997.26**	**0.02**
MAIN	**39.375***	**100YR**	**8446.80**	**5806.01**	**5846.03**		**5846.03**	**0.000002**	**0.60**	**26584.52**	**997.26**	**0.02**
MAIN	**39.375***	**10YR**	**5796.90**	**5806.01**	**5830.77**		**5830.78**	**0.000010**	**1.00**	**12068.60**	**894.41**	**0.04**
MAIN	**39.375***	**2YR**	**3793.30**	**5806.01**	**5821.61**		**5821.63**	**0.000075**	**1.98**	**4443.09**	**707.90**	**0.09**
MAIN	**39.25***	**500YR**	**9993.10**	**5806.01**	**5846.31**		**5846.31**	**0.000003**	**0.79**	**24505.46**	**944.24**	**0.02**
MAIN	**39.25***	**100YR**	**8446.80**	**5806.01**	**5846.03**		**5846.03**	**0.000002**	**0.67**	**24244.96**	**944.24**	**0.02**
MAIN	**39.25***	**10YR**	**5796.90**	**5806.01**	**5830.77**		**5830.78**	**0.000014**	**1.17**	**10617.19**	**831.30**	**0.04**
MAIN	**39.25***	**2YR**	**3793.30**	**5806.01**	**5821.59**		**5821.63**	**0.000116**	**2.46**	**3628.47**	**615.60**	**0.11**
MAIN	**39.125***	**500YR**	**9993.10**	**5806.01**	**5846.31**		**5846.31**	**0.000004**	**0.88**	**22364.64**	**891.23**	**0.02**
MAIN	**39.125***	**100YR**	**8446.80**	**5806.01**	**5846.03**		**5846.03**	**0.000003**	**0.75**	**22119.20**	**891.23**	**0.02**
MAIN	**39.125***	**10YR**	**5796.90**	**5806.01**	**5830.77**		**5830.78**	**0.000019**	**1.35**	**9421.58**	**766.42**	**0.05**
MAIN	**39.125***	**2YR**	**3793.30**	**5806.01**	**5821.57**		**5821.63**	**0.000178**	**3.05**	**3029.72**	**557.95**	**0.14**
MAIN	**39.0000**	**500YR**	**9993.10**	**5806.01**	**5846.31**	**5819.48**	**5846.31**	**0.000005**	**0.97**	**20437.43**	**838.21**	**0.03**
MAIN	**39.0000**	**100YR**	**8446.80**	**5806.01**	**5846.03**	**5819.02**	**5846.03**	**0.000004**	**0.83**	**20206.59**	**838.21**	**0.02**
MAIN	**39.0000**	**10YR**	**5796.90**	**5806.01**	**5830.77**	**5817.52**	**5830.78**	**0.000024**	**1.53**	**8479.53**	**703.99**	**0.05**
MAIN	**39.0000**	**2YR**	**3793.30**	**5806.01**	**5821.52**	**5814.08**	**5821.62**	**0.000278**	**3.79**	**2533.48**	**513.14**	**0.17**
MAIN	**38.75**		**Culvert**									
MAIN	**38.5000**	**500YR**	**9993.10**	**5804.96**	**5845.00**		**5845.00**	**0.000004**	**0.79**	**24810.17**	**1037.83**	**0.02**
MAIN	**38.5000**	**100YR**	**8446.80**	**5804.96**	**5845.00**		**5845.00**	**0.000003**	**0.67**	**24810.68**	**1037.83**	**0.02**
MAIN	**38.5000**	**10YR**	**5796.90**	**5804.96**	**5813.30**		**5814.40**	**0.007006**	**11.26**	**954.01**	**280.58**	**0.75**
MAIN	**38.5000**	**2YR**	**3793.30**	**5804.96**	**5812.27**	**5812.10**	**5813.28**	**0.007088**	**10.19**	**675.78**	**258.77**	**0.73**
MAIN	**38.0000**	**500YR**	**9993.10**	**5804.24**	**5845.00**	**5812.06**	**5845.00**	**0.000001**	**0.48**	**37466.09**	**1315.04**	**0.01**
MAIN	**38.0000**	**100YR**	**8446.80**	**5804.24**	**5845.00**	**5811.96**	**5845.00**	**0.000001**	**0.40**	**37466.09**	**1315.04**	**0.01**
MAIN	**38.0000**	**10YR**	**5796.90**	**5804.24**	**5813.83**	**5811.19**	**5813.98**	**0.001001**	**4.84**	**2581.37**	**728.65**	**0.29**
MAIN	**38.0000**	**2YR**	**3793.30**	**5804.24**	**5812.73**	**5810.40**	**5812.88**	**0.001002**	**4.42**	**1829.99**	**645.22**	**0.29**
NS18	**20.0000**	**500YR**	**142.00**	**6274.72**	**6276.70**	**6276.70**	**6277.32**	**0.019904**	**6.46**	**24.10**	**21.63**	**0.96**
NS18	**20.0000**	**100YR**	**107.90**	**6274.72**	**6276.47**	**6276.47**	**6277.01**	**0.020782**	**5.97**	**19.37**	**19.45**	**0.96**
NS18	**20.0000**	**10YR**	**64.00**	**6274.72**	**6276.08**	**6276.08**	**6276.51**	**0.023820**	**5.29**	**12.44**	**15.61**	**0.98**
NS18	**20.0000**	**2YR**	**32.70**	**6274.72**	**6275.71**	**6275.71**	**6276.02**	**0.028258**	**4.45**	**7.36**	**12.32**	**1.00**
NS18	**19.0000**	**500YR**	**142.00**	**6261.80**	**6263.73**	**6263.73**	**6264.36**	**0.022513**	**6.35**	**22.45**	**18.70**	**1.00**
NS18	**19.0000**	**100YR**	**107.90**	**6261.80**	**6263.50**	**6263.50**	**6264.04**	**0.024049**	**5.91**	**18.26**	**17.17**	**1.01**
NS18	**19.0000**	**10YR**	**64.00**	**6261.80**	**6263.12**	**6263.12**	**6263.54**	**0.025893**	**5.22**	**12.26**	**14.75**	**1.01**
NS18	**19.0000**	**2YR**	**32.70**	**6261.80**	**6262.76**	**6262.76**	**6263.06**	**0.028550**	**4.45**	**7.35**	**12.11**	**1.01**
NS18	**18.0000**	**500YR**	**142.00**	**6245.73**	**6247.81**	**6247.81**	**6248.50**	**0.021294**	**6.68**	**21.68**	**17.42**	**0.99**
NS18	**18.0000**	**100YR**	**107.90**	**6245.73**	**6247.56**	**6247.56**	**6248.15**	**0.023029**	**6.16**	**17.61**	**15.78**	**1.00**
NS18	**18.0000**	**10YR**	**64.00**	**6245.73**	**6247.16**	**6247.16**	**6247.62**	**0.025847**	**5.43**	**11.79**	**13.23**	**1.01**
NS18	**18.0000**	**2YR**	**32.70**	**6245.73**	**6246.76**	**6246.76**	**6247.10**	**0.028268**	**4.64**	**7.05**	**10.78**	**1.01**
NS18	**17.75***	**500YR**	**142.00**	**6240.01**	**6242.04**	**6242.04**	**6242.69**	**0.021979**	**6.49**	**22.07**	**17.84**	**1.00**
NS18	**17.75***	**100YR**	**107.90**	**6240.01**	**6241.79**	**6241.79**	**6242.36**	**0.023771**	**6.06**	**17.82**	**16.27**	**1.01**
NS18	**17.75***	**10YR**	**64.00**	**6240.01**	**6241.41**	**6241.41**	**6241.85**	**0.025428**	**5.32**	**12.02**	**13.78**	**1.00**

NS18	**17.75***	**2YR**	**32.70**	**6240.01**	**6241.01**	**6241.01**	**6241.34**	**0.028473**	**4.58**	**7.14**	**11.21**	**1.01**
NS18	**17.5***	**500YR**	**142.00**	**6234.29**	**6236.24**	**6236.24**	**6236.88**	**0.021710**	**6.43**	**22.49**	**18.92**	**0.99**
NS18	**17.5***	**100YR**	**107.90**	**6234.29**	**6236.00**	**6236.00**	**6236.56**	**0.023494**	**6.00**	**18.08**	**17.23**	**1.01**
NS18	**17.5***	**10YR**	**64.00**	**6234.29**	**6235.63**	**6235.63**	**6236.06**	**0.025939**	**5.23**	**12.23**	**14.66**	**1.01**
NS18	**17.5***	**2YR**	**32.70**	**6234.29**	**6235.26**	**6235.26**	**6235.57**	**0.028446**	**4.48**	**7.30**	**11.86**	**1.01**
NS18	**17.25***	**500YR**	**142.00**	**6228.57**	**6230.44**	**6230.44**	**6231.06**	**0.021300**	**6.32**	**23.23**	**20.56**	**0.98**
NS18	**17.25***	**100YR**	**107.90**	**6228.57**	**6230.21**	**6230.21**	**6230.75**	**0.022910**	**5.89**	**18.63**	**18.74**	**0.99**
NS18	**17.25***	**10YR**	**64.00**	**6228.57**	**6229.86**	**6229.86**	**6230.26**	**0.025628**	**5.08**	**12.61**	**15.93**	**1.00**
NS18	**17.25***	**2YR**	**32.70**	**6228.57**	**6229.51**	**6229.51**	**6229.80**	**0.028493**	**4.36**	**7.49**	**12.73**	**1.00**
NS18	**17.0000**	**500YR**	**142.00**	**6222.85**	**6224.64**	**6224.64**	**6225.22**	**0.020907**	**6.19**	**24.38**	**23.00**	**0.97**
NS18	**17.0000**	**100YR**	**107.90**	**6222.85**	**6224.42**	**6224.42**	**6224.92**	**0.022048**	**5.74**	**19.57**	**21.01**	**0.97**
NS18	**17.0000**	**10YR**	**64.00**	**6222.85**	**6224.07**	**6224.07**	**6224.46**	**0.025501**	**5.02**	**12.87**	**17.60**	**1.00**
NS18	**17.0000**	**2YR**	**32.70**	**6222.85**	**6223.74**	**6223.74**	**6224.02**	**0.029891**	**4.27**	**7.66**	**13.98**	**1.02**
NS18	**16.0000**	**500YR**	**142.00**	**6207.42**	**6209.29**	**6209.29**	**6209.95**	**0.021137**	**6.52**	**22.10**	**18.14**	**0.99**
NS18	**16.0000**	**100YR**	**107.90**	**6207.42**	**6209.05**	**6209.05**	**6209.61**	**0.023591**	**6.04**	**17.90**	**16.64**	**1.01**
NS18	**16.0000**	**10YR**	**64.00**	**6207.42**	**6208.68**	**6208.68**	**6209.11**	**0.025686**	**5.25**	**12.18**	**14.40**	**1.01**
NS18	**16.0000**	**2YR**	**32.70**	**6207.42**	**6208.32**	**6208.32**	**6208.62**	**0.027976**	**4.41**	**7.41**	**12.18**	**1.00**
NS18	**15.0000**	**500YR**	**142.00**	**6191.66**	**6193.43**	**6193.43**	**6194.03**	**0.022038**	**6.52**	**24.54**	**22.62**	**1.01**
NS18	**15.0000**	**100YR**	**107.90**	**6191.66**	**6193.21**	**6193.21**	**6193.73**	**0.023704**	**5.99**	**19.92**	**20.46**	**1.01**
NS18	**15.0000**	**10YR**	**64.00**	**6191.66**	**6192.86**	**6192.86**	**6193.26**	**0.025078**	**5.25**	**13.28**	**17.27**	**1.00**
NS18	**15.0000**	**2YR**	**32.70**	**6191.66**	**6192.52**	**6192.52**	**6192.81**	**0.027534**	**4.44**	**7.87**	**14.12**	**1.00**
NS18	**14.0000**	**500YR**	**142.00**	**6172.79**	**6174.30**	**6174.06**	**6174.55**	**0.010009**	**4.67**	**43.40**	**47.66**	**0.69**
NS18	**14.0000**	**100YR**	**107.90**	**6172.79**	**6174.12**	**6173.90**	**6174.33**	**0.010007**	**4.26**	**35.07**	**42.83**	**0.68**
NS18	**14.0000**	**10YR**	**64.00**	**6172.79**	**6173.83**	**6173.65**	**6173.99**	**0.010016**	**3.56**	**23.63**	**36.52**	**0.65**
NS18	**14.0000**	**2YR**	**32.70**	**6172.79**	**6173.55**	**6173.41**	**6173.66**	**0.010012**	**2.82**	**14.33**	**30.80**	**0.61**

D-1. HEC-RAS Post-Project WARM Condition SUMMARY TABLE

Reach	River Sta	Profile	Q Total	Min Ch El		W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope		Vel Chnl	Flow Area
	Top Width		Froude # Chl									
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
NW2	110.0000	500YR	26.20	5864.01	5864.37		5864.39	0.003915	1.13	24.65	81.72	0.34
NW2	110.0000	100YR	19.20	5864.01	5864.32		5864.33	0.003842	1.01	20.11	78.42	0.33
NW2	110.0000	10YR	10.00	5864.01	5864.22	5864.11	5864.23	0.003803	0.79	13.09	71.62	0.31
NW2	110.0000	2YR	3.30	5864.01	5864.07	5864.07	5864.08	0.036590	1.03	3.21	58.43	0.77
NW2	109.5000	500YR	26.20	5861.97	5862.20	5862.20	5862.29	0.067496	3.16	11.45	63.03	1.29
NW2	109.5000	100YR	19.20	5861.97	5862.17	5862.17	5862.24	0.069717	2.87	9.32	61.70	1.27
NW2	109.5000	10YR	10.00	5861.97	5862.11	5862.11	5862.16	0.072688	2.32	6.12	59.71	1.22
NW2	109.5000	2YR	3.30	5861.97	5862.06	5862.06	5862.09	0.107909	1.91	2.67	56.87	1.35
NW2	109.0000	500YR	26.20	5858.01	5858.62	5858.42	5858.67	0.006139	2.01	15.98	41.52	0.47
NW2	109.0000	100YR	19.20	5858.01	5858.53	5858.35	5858.58	0.006065	1.79	12.58	35.70	0.45
NW2	109.0000	10YR	10.00	5858.01	5858.39	5858.24	5858.42	0.005628	1.38	8.00	29.81	0.41
NW2	109.0000	2YR	3.30	5858.01	5858.23	5858.14	5858.25	0.004829	0.86	3.89	22.70	0.35
NW2	108.9		Bridge									
NW2	108.875*	500YR	26.20	5857.51	5857.95		5858.06	0.020846	2.75	9.99	31.88	0.80
NW2	108.875*	100YR	19.20	5857.51	5857.88		5857.98	0.021065	2.46	8.04	29.31	0.78
NW2	108.875*	10YR	10.00	5857.51	5857.78		5857.84	0.020847	1.93	5.18	24.53	0.73
NW2	108.875*	2YR	3.30	5857.51	5857.64		5857.68	0.029428	1.50	2.20	19.34	0.78
NW2	108.75*	500YR	26.20	5857.01	5857.48	5857.39	5857.57	0.013549	2.30	11.76	34.10	0.65
NW2	108.75*	100YR	19.20	5857.01	5857.42	5857.32	5857.48	0.013194	2.04	9.57	31.93	0.63
NW2	108.75*	10YR	10.00	5857.01	5857.30		5857.34	0.013781	1.65	6.08	26.21	0.60
NW2	108.75*	2YR	3.30	5857.01	5857.18	5857.12	5857.19	0.010578	1.04	3.16	22.14	0.49
NW2	108.625*	500YR	26.20	5856.51	5856.90		5857.02	0.026719	2.76	9.48	30.86	0.88
NW2	108.625*	100YR	19.20	5856.51	5856.84		5856.94	0.027776	2.54	7.56	28.76	0.87
NW2	108.625*	10YR	10.00	5856.51	5856.74		5856.80	0.025399	1.99	5.02	25.71	0.79
NW2	108.625*	2YR	3.30	5856.51	5856.62	5856.62	5856.66	0.037836	1.54	2.14	21.63	0.87
NW2	108.5000	500YR	26.20	5856.01	5856.50		5856.56	0.009629	1.94	13.57	37.37	0.55
NW2	108.5000	100YR	19.20	5856.01	5856.43		5856.48	0.009456	1.74	11.06	33.20	0.53
NW2	108.5000	10YR	10.00	5856.01	5856.29		5856.33	0.010748	1.47	6.81	28.86	0.53
NW2	108.5000	2YR	3.30	5856.01	5856.17		5856.19	0.007845	0.91	3.64	25.16	0.42
NW2	108.0000	500YR	37.90	5853.40	5854.14	5854.10	5854.23	0.010515	2.80	22.38	88.23	0.62
NW2	108.0000	100YR	27.60	5853.40	5854.07	5853.97	5854.16	0.010649	2.60	16.20	82.87	0.61
NW2	108.0000	10YR	14.40	5853.40	5853.92		5853.98	0.009930	2.04	8.38	31.71	0.56
NW2	108.0000	2YR	4.70	5853.40	5853.71	5853.64	5853.74	0.013713	1.48	3.19	17.15	0.59
NW2	107.5000	500YR	37.90	5852.01	5852.36		5852.41	0.009649	1.79	21.70	68.78	0.54
NW2	107.5000	100YR	27.60	5852.01	5852.31		5852.34	0.009366	1.57	17.90	66.67	0.51
NW2	107.5000	10YR	14.40	5852.01	5852.21		5852.24	0.009269	1.21	11.97	62.50	0.48
NW2	107.5000	2YR	4.70	5852.01	5852.13		5852.14	0.006197	0.69	6.80	59.19	0.36
NW2	107.0000	500YR	37.90	5848.01	5848.77	5848.77	5848.97	0.021686	4.28	14.28	37.53	0.91
NW2	107.0000	100YR	27.60	5848.01	5848.67	5848.67	5848.84	0.023658	3.99	10.55	31.34	0.92
NW2	107.0000	10YR	14.40	5848.01	5848.50	5848.50	5848.64	0.026155	3.35	5.95	23.30	0.91
NW2	107.0000	2YR	4.70	5848.01	5848.30	5848.30	5848.39	0.035714	2.52	2.16	14.35	0.96
NW	100.0000	500YR	477.00	5912.01	5913.54	5913.54	5914.15	0.020066	6.74	86.61	80.79	0.99
NW	100.0000	100YR	345.50	5912.01	5913.30	5913.30	5913.80	0.020600	6.05	67.92	74.01	0.97
NW	100.0000	10YR	179.40	5912.01	5912.89	5912.89	5913.24	0.023971	4.96	40.61	61.00	0.98
NW	100.0000	2YR	62.60	5912.01	5912.49	5912.48	5912.68	0.027273	3.54	18.97	49.41	0.94
NW	99.5000	500YR	477.00	5909.28	5910.87	5910.87	5911.34	0.023380	7.50	106.96	108.59	1.07
NW	99.5000	100YR	345.50	5909.28	5910.64	5910.64	5911.04	0.024331	6.86	83.21	98.75	1.06
NW	99.5000	10YR	179.40	5909.28	5910.27	5910.27	5910.57	0.026234	5.68	49.99	81.32	1.04
NW	99.5000	2YR	62.60	5909.28	5909.91	5909.91	5910.08	0.024875	3.98	23.55	63.70	0.94
NW	99.0000	500YR	477.00	5906.01	5907.77		5908.18	0.014233	5.54	100.84	83.83	0.83
NW	99.0000	100YR	345.50	5906.01	5907.49		5907.85	0.014892	5.12	78.31	76.49	0.82
NW	99.0000	10YR	179.40	5906.01	5907.06		5907.31	0.014978	4.19	48.52	65.11	0.78
NW	99.0000	2YR	62.60	5906.01	5906.62	5906.52	5906.75	0.014721	2.95	22.78	50.43	0.71

NW	**98.5000**	**500YR**	**477.00**	**5903.51**	**5905.45**	**5905.32**	**5905.85**	**0.015446**	**7.09**	**121.06**	**112.07**	**0.91**
NW	**98.5000**	**100YR**	**345.50**	**5903.51**	**5905.23**		**5905.55**	**0.014235**	**6.26**	**97.06**	**100.52**	**0.85**
NW	**98.5000**	**10YR**	**179.40**	**5903.51**	**5904.79**		**5905.03**	**0.014055**	**5.10**	**58.40**	**78.35**	**0.80**
NW	**98.5000**	**2YR**	**62.60**	**5903.51**	**5904.30**		**5904.45**	**0.014425**	**3.69**	**25.63**	**54.60**	**0.75**
NW	**98.0000**	**500YR**	**477.00**	**5900.13**	**5902.87**	**5902.87**	**5903.44**	**0.013258**	**7.95**	**112.72**	**102.35**	**0.88**
NW	**98.0000**	**100YR**	**345.50**	**5900.13**	**5902.49**	**5902.49**	**5903.06**	**0.015200**	**7.64**	**78.87**	**76.93**	**0.92**
NW	**98.0000**	**10YR**	**179.40**	**5900.13**	**5901.87**	**5901.87**	**5902.36**	**0.017833**	**6.60**	**41.25**	**46.33**	**0.94**
NW	**98.0000**	**2YR**	**62.60**	**5900.13**	**5901.20**	**5901.20**	**5901.52**	**0.021121**	**4.92**	**16.43**	**28.74**	**0.93**
NW	**97.5000**	**500YR**	**477.00**	**5898.01**	**5900.70**		**5901.05**	**0.007140**	**5.58**	**135.91**	**127.39**	**0.64**
NW	**97.5000**	**100YR**	**345.50**	**5898.01**	**5900.44**		**5900.72**	**0.006390**	**4.88**	**105.08**	**109.90**	**0.59**
NW	**97.5000**	**10YR**	**179.40**	**5898.01**	**5899.90**		**5900.08**	**0.005490**	**3.73**	**61.98**	**56.57**	**0.52**
NW	**97.5000**	**2YR**	**62.60**	**5898.01**	**5899.25**		**5899.33**	**0.004629**	**2.40**	**30.53**	**39.45**	**0.44**
NW	**97.0000**	**500YR**	**477.00**	**5896.81**	**5898.61**	**5898.56**	**5899.01**	**0.027120**	**8.92**	**110.32**	**113.30**	**1.18**
NW	**97.0000**	**100YR**	**345.50**	**5896.81**	**5898.35**	**5898.33**	**5898.74**	**0.031285**	**8.61**	**82.48**	**99.80**	**1.24**
NW	**97.0000**	**10YR**	**179.40**	**5896.81**	**5897.94**	**5897.94**	**5898.26**	**0.033508**	**7.23**	**46.87**	**70.55**	**1.22**
NW	**97.0000**	**2YR**	**62.60**	**5896.81**	**5897.55**	**5897.55**	**5897.73**	**0.031993**	**5.25**	**22.37**	**54.58**	**1.10**
NW	**96.5000**	**500YR**	**477.00**	**5894.01**	**5896.24**		**5896.55**	**0.006844**	**5.10**	**132.35**	**98.54**	**0.61**
NW	**96.5000**	**100YR**	**345.50**	**5894.01**	**5895.94**		**5896.19**	**0.006676**	**4.55**	**104.14**	**86.69**	**0.59**
NW	**96.5000**	**10YR**	**179.40**	**5894.01**	**5895.43**		**5895.60**	**0.006160**	**3.53**	**64.92**	**69.39**	**0.54**
NW	**96.5000**	**2YR**	**62.60**	**5894.01**	**5894.85**		**5894.93**	**0.006145**	**2.42**	**29.95**	**50.55**	**0.49**
NW	**96.0000**	**500YR**	**548.70**	**5892.01**	**5894.11**	**5894.11**	**5894.69**	**0.016392**	**7.57**	**118.37**	**103.44**	**0.94**
NW	**96.0000**	**100YR**	**399.20**	**5892.01**	**5893.84**	**5893.84**	**5894.35**	**0.016447**	**6.89**	**91.86**	**93.05**	**0.92**
NW	**96.0000**	**10YR**	**208.00**	**5892.01**	**5893.35**	**5893.35**	**5893.75**	**0.018452**	**5.84**	**51.52**	**69.74**	**0.92**
NW	**96.0000**	**2YR**	**73.00**	**5892.01**	**5892.82**	**5892.81**	**5893.07**	**0.019576**	**4.19**	**21.65**	**45.38**	**0.87**
NW	**95.5000**	**500YR**	**548.70**	**5890.01**	**5891.46**		**5891.63**	**0.005293**	**3.41**	**171.07**	**134.11**	**0.50**
NW	**95.5000**	**100YR**	**399.20**	**5890.01**	**5891.20**		**5891.34**	**0.005475**	**3.05**	**137.87**	**128.97**	**0.50**
NW	**95.5000**	**10YR**	**208.00**	**5890.01**	**5890.81**		**5890.90**	**0.005926**	**2.43**	**88.50**	**119.92**	**0.48**
NW	**95.5000**	**2YR**	**73.00**	**5890.01**	**5890.41**		**5890.46**	**0.007509**	**1.74**	**42.56**	**111.39**	**0.49**
NW	**95.0000**	**500YR**	**548.70**	**5888.01**	**5889.96**	**5889.88**	**5890.41**	**0.013245**	**6.03**	**124.09**	**110.09**	**0.82**
NW	**95.0000**	**100YR**	**399.20**	**5888.01**	**5889.72**	**5889.62**	**5890.10**	**0.013152**	**5.47**	**97.62**	**104.08**	**0.80**
NW	**95.0000**	**10YR**	**208.00**	**5888.01**	**5889.28**	**5889.19**	**5889.56**	**0.013676**	**4.48**	**56.98**	**81.53**	**0.77**
NW	**95.0000**	**2YR**	**73.00**	**5888.01**	**5888.83**		**5888.97**	**0.012697**	**3.06**	**24.61**	**48.59**	**0.68**
NW	**94.5000**	**500YR**	**548.70**	**5886.01**	**5887.76**		**5888.10**	**0.009998**	**5.25**	**138.18**	**110.54**	**0.71**
NW	**94.5000**	**100YR**	**399.20**	**5886.01**	**5887.50**		**5887.78**	**0.010063**	**4.71**	**110.11**	**104.16**	**0.69**
NW	**94.5000**	**10YR**	**208.00**	**5886.01**	**5887.09**		**5887.27**	**0.009561**	**3.72**	**69.92**	**91.13**	**0.64**
NW	**94.5000**	**2YR**	**73.00**	**5886.01**	**5886.61**	**5886.46**	**5886.71**	**0.010118**	**2.61**	**31.96**	**67.13**	**0.60**
NW	**94.0000**	**500YR**	**548.70**	**5884.01**	**5886.31**		**5886.65**	**0.012546**	**6.87**	**145.09**	**113.00**	**0.83**
NW	**94.0000**	**100YR**	**399.20**	**5884.01**	**5886.06**		**5886.35**	**0.012301**	**6.25**	**116.88**	**107.54**	**0.80**
NW	**94.0000**	**10YR**	**208.00**	**5884.01**	**5885.54**		**5885.78**	**0.014368**	**5.43**	**66.81**	**83.89**	**0.82**
NW	**94.0000**	**2YR**	**73.00**	**5884.01**	**5884.99**		**5885.14**	**0.014967**	**3.93**	**29.13**	**55.15**	**0.77**
NW	**93.5000**	**500YR**	**548.70**	**5882.01**	**5884.30**	**5884.10**	**5884.58**	**0.009409**	**6.23**	**170.42**	**142.71**	**0.73**
NW	**93.5000**	**100YR**	**399.20**	**5882.01**	**5884.06**	**5883.69**	**5884.32**	**0.009251**	**5.74**	**136.64**	**138.59**	**0.71**
NW	**93.5000**	**10YR**	**208.00**	**5882.01**	**5883.56**	**5883.18**	**5883.73**	**0.008207**	**4.47**	**80.27**	**89.16**	**0.64**
NW	**93.5000**	**2YR**	**73.00**	**5882.01**	**5882.96**	**5882.76**	**5883.07**	**0.008238**	**3.23**	**35.38**	**60.49**	**0.59**
NW	**93.0000**	**500YR**	**548.70**	**5880.01**	**5881.78**	**5881.62**	**5882.13**	**0.012122**	**5.77**	**147.76**	**150.58**	**0.79**
NW	**93.0000**	**100YR**	**399.20**	**5880.01**	**5881.52**	**5881.39**	**5881.84**	**0.012682**	**5.30**	**112.50**	**132.18**	**0.78**
NW	**93.0000**	**10YR**	**208.00**	**5880.01**	**5881.13**	**5880.97**	**5881.36**	**0.013281**	**4.36**	**65.54**	**102.95**	**0.76**
NW	**93.0000**	**2YR**	**73.00**	**5880.01**	**5880.69**		**5880.80**	**0.012137**	**2.92**	**30.02**	**63.43**	**0.66**
NW	**92.5000**	**500YR**	**548.70**	**5878.01**	**5879.66**		**5879.77**	**0.006295**	**3.83**	**217.29**	**156.89**	**0.55**
NW	**92.5000**	**100YR**	**399.20**	**5878.01**	**5879.40**		**5879.49**	**0.006057**	**3.31**	**178.08**	**149.16**	**0.53**
NW	**92.5000**	**10YR**	**208.00**	**5878.01**	**5878.98**		**5879.03**	**0.005824**	**2.45**	**117.55**	**135.77**	**0.48**
NW	**92.5000**	**2YR**	**73.00**	**5878.01**	**5878.54**		**5878.56**	**0.005907**	**1.48**	**60.32**	**122.43**	**0.43**
NW	**92.0000**	**500YR**	**548.70**	**5875.73**	**5876.81**	**5876.64**	**5876.98**	**0.020466**	**5.45**	**177.82**	**233.31**	**0.94**
NW	**92.0000**	**100YR**	**399.20**	**5875.73**	**5876.68**		**5876.81**	**0.019572**	**4.87**	**146.99**	**227.03**	**0.90**
NW	**92.0000**	**10YR**	**208.00**	**5875.73**	**5876.47**		**5876.55**	**0.017122**	**3.83**	**100.78**	**215.42**	**0.81**

NW	**92.0000**	**2YR**	**73.00**	**5875.73**	**5876.25**	**5876.18**	**5876.29**	**0.013195**	**2.63**	**55.86**	**203.28**	**0.67**
NW	**91.5000**	**500YR**	**548.70**	**5874.01**	**5875.13**		**5875.24**	**0.004838**	**2.75**	**230.57**	**246.93**	**0.46**
NW	**91.5000**	**100YR**	**399.20**	**5874.01**	**5874.94**		**5875.03**	**0.005118**	**2.48**	**183.68**	**239.28**	**0.46**
NW	**91.5000**	**10YR**	**208.00**	**5874.01**	**5874.63**		**5874.70**	**0.005839**	**2.04**	**113.27**	**219.60**	**0.46**
NW	**91.5000**	**2YR**	**73.00**	**5874.01**	**5874.33**		**5874.37**	**0.007240**	**1.47**	**52.06**	**185.59**	**0.46**
NW	**91.0000**	**500YR**	**632.40**	**5872.01**	**5873.47**		**5873.72**	**0.008712**	**4.40**	**187.49**	**190.37**	**0.65**
NW	**91.0000**	**100YR**	**463.70**	**5872.01**	**5873.25**		**5873.46**	**0.008734**	**3.95**	**148.15**	**172.22**	**0.63**
NW	**91.0000**	**10YR**	**243.80**	**5872.01**	**5872.91**		**5873.04**	**0.008370**	**3.09**	**93.42**	**141.60**	**0.58**
NW	**91.0000**	**2YR**	**85.70**	**5872.01**	**5872.53**		**5872.60**	**0.007779**	**2.05**	**45.92**	**111.31**	**0.51**
NW	**90.5000**	**500YR**	**632.40**	**5868.01**	**5869.44**	**5869.44**	**5870.00**	**0.020515**	**6.47**	**117.13**	**107.39**	**0.98**
NW	**90.5000**	**100YR**	**463.70**	**5868.01**	**5869.20**	**5869.20**	**5869.67**	**0.021505**	**5.88**	**92.41**	**98.45**	**0.98**
NW	**90.5000**	**10YR**	**243.80**	**5868.01**	**5868.81**	**5868.81**	**5869.15**	**0.025077**	**4.91**	**56.23**	**85.63**	**0.99**
NW	**90.5000**	**2YR**	**85.70**	**5868.01**	**5868.43**	**5868.43**	**5868.62**	**0.030386**	**3.56**	**26.17**	**74.02**	**0.98**
NW	**90.0000**	**500YR**	**632.40**	**5864.61**	**5866.53**	**5865.89**	**5866.60**	**0.003412**	**3.33**	**362.81**	**317.90**	**0.43**
NW	**90.0000**	**100YR**	**463.70**	**5864.61**	**5866.32**	**5865.79**	**5866.38**	**0.003279**	**3.02**	**297.13**	**304.30**	**0.41**
NW	**90.0000**	**10YR**	**243.80**	**5864.61**	**5865.97**	**5865.54**	**5866.01**	**0.003060**	**2.50**	**193.42**	**274.56**	**0.38**
NW	**90.0000**	**2YR**	**85.70**	**5864.61**	**5865.48**		**5865.51**	**0.003219**	**1.90**	**82.57**	**180.52**	**0.36**
NW	**89.5000**	**500YR**	**632.40**	**5862.01**	**5862.91**	**5862.91**	**5863.21**	**0.053791**	**6.33**	**146.35**	**236.34**	**1.40**
NW	**89.5000**	**100YR**	**463.70**	**5862.01**	**5862.77**	**5862.77**	**5863.04**	**0.059609**	**6.08**	**115.29**	**224.51**	**1.44**
NW	**89.5000**	**10YR**	**243.80**	**5862.01**	**5862.57**	**5862.57**	**5862.77**	**0.069954**	**5.54**	**72.02**	**207.00**	**1.50**
NW	**89.5000**	**2YR**	**85.70**	**5862.01**	**5862.41**	**5862.41**	**5862.49**	**0.040947**	**3.46**	**39.25**	**148.82**	**1.09**
NW	**89.0000**	**500YR**	**1097.00**	**5856.01**	**5857.75**		**5857.89**	**0.003788**	**3.30**	**436.33**	**372.83**	**0.44**
NW	**89.0000**	**100YR**	**805.80**	**5856.01**	**5857.48**		**5857.60**	**0.003870**	**2.98**	**341.45**	**332.06**	**0.43**
NW	**89.0000**	**10YR**	**428.60**	**5856.01**	**5857.05**		**5857.13**	**0.004033**	**2.41**	**210.69**	**270.64**	**0.42**
NW	**89.0000**	**2YR**	**156.40**	**5856.01**	**5856.59**		**5856.63**	**0.004393**	**1.69**	**100.68**	**208.65**	**0.40**
NW	**88.5000**	**500YR**	**1097.00**	**5854.01**	**5855.97**		**5856.09**	**0.003197**	**3.28**	**483.05**	**394.42**	**0.41**
NW	**88.5000**	**100YR**	**805.80**	**5854.01**	**5855.69**		**5855.80**	**0.003143**	**2.94**	**380.42**	**347.76**	**0.40**
NW	**88.5000**	**10YR**	**428.60**	**5854.01**	**5855.22**		**5855.30**	**0.003150**	**2.36**	**233.80**	**275.83**	**0.38**
NW	**88.5000**	**2YR**	**156.40**	**5854.01**	**5854.72**		**5854.76**	**0.003085**	**1.63**	**112.37**	**207.02**	**0.34**
NW	**88.0000**	**500YR**	**1097.00**	**5852.01**	**5853.84**	**5853.84**	**5854.35**	**0.018409**	**7.44**	**257.41**	**270.52**	**0.98**
NW	**88.0000**	**100YR**	**805.80**	**5852.01**	**5853.57**	**5853.57**	**5854.05**	**0.020279**	**6.98**	**189.95**	**219.71**	**1.00**
NW	**88.0000**	**10YR**	**428.60**	**5852.01**	**5853.15**	**5853.15**	**5853.52**	**0.021644**	**5.83**	**111.23**	**161.39**	**0.98**
NW	**88.0000**	**2YR**	**156.40**	**5852.01**	**5852.68**	**5852.68**	**5852.93**	**0.027467**	**4.50**	**46.40**	**108.06**	**1.00**
NW	**87.5000**	**500YR**	**1097.00**	**5850.01**	**5852.42**		**5852.46**	**0.001450**	**2.53**	**852.46**	**710.41**	**0.29**
NW	**87.5000**	**100YR**	**805.80**	**5850.01**	**5852.14**		**5852.18**	**0.001613**	**2.45**	**655.27**	**688.30**	**0.30**
NW	**87.5000**	**10YR**	**428.60**	**5850.01**	**5851.67**		**5851.70**	**0.001354**	**1.90**	**395.36**	**444.42**	**0.26**
NW	**87.5000**	**2YR**	**156.40**	**5850.01**	**5851.11**		**5851.14**	**0.001260**	**1.40**	**179.75**	**324.57**	**0.24**
NW	**87.0000**	**500YR**	**1097.00**	**5847.98**	**5849.33**	**5849.33**	**5849.75**	**0.041303**	**8.98**	**249.12**	**486.37**	**1.39**
NW	**87.0000**	**100YR**	**805.80**	**5847.98**	**5849.34**	**5849.34**	**5849.56**	**0.021846**	**6.55**	**251.49**	**487.74**	**1.01**
NW	**87.0000**	**10YR**	**428.60**	**5847.98**	**5848.80**	**5848.80**	**5849.11**	**0.045468**	**6.63**	**105.44**	**173.95**	**1.34**
NW	**87.0000**	**2YR**	**156.40**	**5847.98**	**5848.45**	**5848.45**	**5848.63**	**0.056212**	**4.87**	**49.52**	**141.97**	**1.34**
NW4	**69.5000**	**500YR**	**8564.10**	**5852.01**	**5860.17**		**5860.63**	**0.004445**	**9.68**	**1870.89**	**461.71**	**0.61**
NW4	**69.5000**	**100YR**	**6190.30**	**5852.01**	**5859.16**		**5859.61**	**0.005117**	**9.48**	**1420.98**	**429.76**	**0.64**
NW4	**69.5000**	**10YR**	**3077.90**	**5852.01**	**5857.51**		**5857.97**	**0.006658**	**9.02**	**773.52**	**342.23**	**0.69**
NW4	**69.5000**	**2YR**	**1100.30**	**5852.01**	**5856.22**	**5856.22**	**5856.66**	**0.006824**	**7.56**	**355.05**	**304.61**	**0.67**
NW4	**69.0000**	**500YR**	**8564.10**	**5852.01**	**5859.53**		**5859.88**	**0.002857**	**7.41**	**2068.41**	**433.60**	**0.48**
NW4	**69.0000**	**100YR**	**6190.30**	**5852.01**	**5858.46**		**5858.77**	**0.003129**	**6.97**	**1611.50**	**416.61**	**0.49**
NW4	**69.0000**	**10YR**	**3077.90**	**5852.01**	**5856.63**		**5856.89**	**0.003924**	**6.19**	**912.65**	**356.80**	**0.52**
NW4	**69.0000**	**2YR**	**1100.30**	**5852.01**	**5855.01**		**5855.24**	**0.005458**	**5.35**	**382.40**	**280.24**	**0.57**
NW4	**68.5000**	**500YR**	**8610.70**	**5850.01**	**5858.15**		**5858.96**	**0.005983**	**11.59**	**1500.53**	**348.34**	**0.72**
NW4	**68.5000**	**100YR**	**6225.20**	**5850.01**	**5857.21**		**5857.85**	**0.005373**	**10.12**	**1202.28**	**299.88**	**0.67**
NW4	**68.5000**	**10YR**	**3097.80**	**5850.01**	**5855.24**		**5855.79**	**0.006273**	**8.82**	**674.65**	**240.20**	**0.68**
NW4	**68.5000**	**2YR**	**1106.00**	**5850.01**	**5853.25**		**5853.74**	**0.008589**	**7.48**	**269.33**	**163.52**	**0.74**
NW4	**68.4166***	**500YR**	**8610.70**	**5849.60**	**5857.88**		**5858.72**	**0.005141**	**10.87**	**1537.67**	**351.74**	**0.67**
NW4	**68.4166***	**100YR**	**6225.20**	**5849.60**	**5856.98**		**5857.64**	**0.004496**	**9.41**	**1243.83**	**307.64**	**0.61**

NW4	**68.4166***	**10YR**	**3097.80**	**5849.60**	**5854.03**	**5853.54**	**5855.33**	**0.013826**	**11.72**	**474.27**	**220.13**	**0.98**
NW4	**68.4166***	**2YR**	**1106.00**	**5849.60**	**5852.53**	**5852.53**	**5853.29**	**0.011621**	**8.13**	**212.54**	**141.90**	**0.84**
NW4	**68.3333***	**500YR**	**8610.70**	**5849.20**	**5857.75**		**5858.50**	**0.003887**	**9.66**	**1645.55**	**356.83**	**0.58**
NW4	**68.3333***	**100YR**	**6225.20**	**5849.20**	**5856.87**		**5857.46**	**0.003336**	**8.32**	**1346.42**	**319.74**	**0.53**
NW4	**68.3333***	**10YR**	**3097.80**	**5849.20**	**5853.49**	**5853.04**	**5854.78**	**0.012401**	**10.86**	**458.46**	**204.27**	**0.93**
NW4	**68.3333***	**2YR**	**1106.00**	**5849.20**	**5851.81**	**5851.81**	**5852.64**	**0.013198**	**8.01**	**188.96**	**129.82**	**0.88**
NW4	**68.25***	**500YR**	**8610.70**	**5848.79**	**5857.70**		**5858.33**	**0.002829**	**8.46**	**1800.82**	**368.68**	**0.50**
NW4	**68.25***	**100YR**	**6225.20**	**5848.79**	**5856.83**		**5857.30**	**0.002357**	**7.21**	**1493.91**	**336.04**	**0.45**
NW4	**68.25***	**10YR**	**3097.80**	**5848.79**	**5853.47**		**5854.25**	**0.006448**	**8.30**	**571.08**	**217.35**	**0.68**
NW4	**68.25***	**2YR**	**1106.00**	**5848.79**	**5851.72**		**5852.16**	**0.005808**	**5.75**	**257.59**	**149.02**	**0.60**
NW4	**68.1666***	**500YR**	**8610.70**	**5848.39**	**5857.69**		**5858.19**	**0.002009**	**7.34**	**1993.97**	**378.61**	**0.43**
NW4	**68.1666***	**100YR**	**6225.20**	**5848.39**	**5856.82**		**5857.19**	**0.001608**	**6.15**	**1681.52**	**347.37**	**0.37**
NW4	**68.1666***	**10YR**	**3097.80**	**5848.39**	**5853.46**		**5853.97**	**0.003651**	**6.59**	**697.29**	**235.63**	**0.52**
NW4	**68.1666***	**2YR**	**1106.00**	**5848.39**	**5851.70**		**5851.93**	**0.002661**	**4.22**	**345.32**	**166.39**	**0.41**
NW4	**68.0833***	**500YR**	**8610.70**	**5847.98**	**5857.68**		**5858.08**	**0.001445**	**6.40**	**2214.05**	**392.82**	**0.36**
NW4	**68.0833***	**100YR**	**6225.20**	**5847.98**	**5856.82**		**5857.11**	**0.001122**	**5.30**	**1889.62**	**361.84**	**0.31**
NW4	**68.0833***	**10YR**	**3097.80**	**5847.98**	**5853.46**		**5853.80**	**0.002175**	**5.35**	**840.08**	**256.87**	**0.40**
NW4	**68.0833***	**2YR**	**1106.00**	**5847.98**	**5851.69**		**5851.83**	**0.001333**	**3.22**	**446.97**	**185.29**	**0.30**
NW4	**68.0000**	**500YR**	**8610.70**	**5847.58**	**5857.69**		**5858.01**	**0.001061**	**5.64**	**2451.25**	**409.32**	**0.31**
NW4	**68.0000**	**100YR**	**6225.20**	**5847.58**	**5856.83**		**5857.05**	**0.000805**	**4.62**	**2111.94**	**378.31**	**0.27**
NW4	**68.0000**	**10YR**	**3097.80**	**5847.58**	**5853.46**		**5853.70**	**0.001370**	**4.45**	**998.27**	**283.56**	**0.32**
NW4	**68.0000**	**2YR**	**1106.00**	**5847.58**	**5851.68**		**5851.77**	**0.000729**	**2.55**	**562.38**	**208.21**	**0.22**
NW4	**67.875***	**500YR**	**8610.70**	**5847.30**	**5857.31**	**5854.75**	**5857.93**	**0.002576**	**7.79**	**1774.27**	**365.09**	**0.47**
NW4	**67.875***	**100YR**	**6225.20**	**5847.30**	**5856.55**	**5853.90**	**5856.99**	**0.002004**	**6.45**	**1509.38**	**334.57**	**0.41**
NW4	**67.875***	**10YR**	**3097.80**	**5847.30**	**5852.72**	**5852.06**	**5853.56**	**0.007845**	**8.08**	**500.18**	**185.33**	**0.72**
NW4	**67.875***	**2YR**	**1106.00**	**5847.30**	**5851.41**	**5850.59**	**5851.71**	**0.004483**	**4.64**	**287.94**	**144.82**	**0.51**
NW4	**67.8**		**Bridge**									
NW4	**67.75***	**500YR**	**8610.70**	**5845.86**	**5853.65**	**5853.65**	**5855.34**	**0.010241**	**11.39**	**1025.48**	**327.89**	**0.87**
NW4	**67.75***	**100YR**	**6225.20**	**5845.86**	**5852.79**	**5852.79**	**5854.31**	**0.011116**	**10.53**	**756.86**	**288.90**	**0.88**
NW4	**67.75***	**10YR**	**3097.80**	**5845.86**	**5851.16**	**5851.16**	**5852.38**	**0.015108**	**9.06**	**379.29**	**181.54**	**0.95**
NW4	**67.75***	**2YR**	**1106.00**	**5845.86**	**5849.56**	**5849.56**	**5850.41**	**0.020698**	**7.40**	**149.42**	**91.24**	**1.02**
NW4	**67.625***	**500YR**	**8610.70**	**5844.51**	**5851.38**	**5851.38**	**5853.06**	**0.014313**	**15.58**	**1060.32**	**303.70**	**1.07**
NW4	**67.625***	**100YR**	**6225.20**	**5844.51**	**5850.57**	**5850.57**	**5852.04**	**0.014287**	**14.26**	**826.46**	**271.02**	**1.04**
NW4	**67.625***	**10YR**	**3097.80**	**5844.51**	**5849.25**	**5849.25**	**5850.32**	**0.013014**	**11.46**	**501.79**	**221.67**	**0.95**
NW4	**67.625***	**2YR**	**1106.00**	**5844.51**	**5847.88**	**5847.85**	**5848.55**	**0.010941**	**8.23**	**235.14**	**163.81**	**0.82**
NW4	**67.5000**	**500YR**	**8610.70**	**5844.01**	**5850.81**	**5850.81**	**5852.45**	**0.014616**	**15.61**	**1084.45**	**321.30**	**1.08**
NW4	**67.5000**	**100YR**	**6225.20**	**5844.01**	**5850.11**	**5850.11**	**5851.49**	**0.013502**	**13.92**	**870.83**	**292.63**	**1.02**
NW4	**67.5000**	**10YR**	**3097.80**	**5844.01**	**5848.91**	**5848.83**	**5849.86**	**0.011313**	**10.93**	**547.09**	**246.85**	**0.89**
NW4	**67.5000**	**2YR**	**1106.00**	**5844.01**	**5847.76**		**5848.25**	**0.006901**	**7.06**	**291.63**	**197.37**	**0.67**
NW4	**67.0000**	**500YR**	**8610.70**	**5844.01**	**5849.25**		**5849.79**	**0.006639**	**9.05**	**1724.84**	**522.37**	**0.70**
NW4	**67.0000**	**100YR**	**6225.20**	**5844.01**	**5848.66**		**5849.09**	**0.006099**	**8.00**	**1421.37**	**502.52**	**0.66**
NW4	**67.0000**	**10YR**	**3097.80**	**5844.01**	**5847.54**		**5847.84**	**0.005867**	**6.51**	**883.29**	**451.64**	**0.62**
NW4	**67.0000**	**2YR**	**1106.00**	**5844.01**	**5846.32**		**5846.58**	**0.007109**	**5.38**	**385.29**	**362.20**	**0.63**
NW4	**66.5000**	**500YR**	**8610.70**	**5842.01**	**5846.38**		**5847.17**	**0.010387**	**10.08**	**1543.88**	**608.96**	**0.85**
NW4	**66.5000**	**100YR**	**6225.20**	**5842.01**	**5845.78**		**5846.51**	**0.011181**	**9.46**	**1186.70**	**565.96**	**0.86**
NW4	**66.5000**	**10YR**	**3097.80**	**5842.01**	**5844.71**		**5845.27**	**0.011790**	**7.77**	**668.44**	**420.77**	**0.84**
NW4	**66.5000**	**2YR**	**1106.00**	**5842.01**	**5843.55**		**5843.82**	**0.010796**	**5.08**	**295.96**	**232.27**	**0.73**
NW4	**66.0000**	**500YR**	**8610.70**	**5840.01**	**5845.19**		**5845.73**	**0.003780**	**6.83**	**1806.54**	**533.29**	**0.53**
NW4	**66.0000**	**100YR**	**6225.20**	**5840.01**	**5843.84**		**5844.51**	**0.006618**	**7.38**	**1140.03**	**450.97**	**0.67**
NW4	**66.0000**	**10YR**	**3097.80**	**5840.01**	**5842.63**		**5843.10**	**0.007250**	**5.98**	**651.41**	**357.15**	**0.65**
NW4	**66.0000**	**2YR**	**1106.00**	**5840.01**	**5841.50**		**5841.74**	**0.007318**	**4.12**	**306.85**	**257.27**	**0.60**
NW4	**65.5000**	**500YR**	**9600.70**	**5836.92**	**5844.75**		**5844.88**	**0.001316**	**5.30**	**3592.05**	**760.03**	**0.33**
NW4	**65.5000**	**100YR**	**6951.20**	**5836.92**	**5842.12**		**5842.39**	**0.004832**	**7.72**	**1817.48**	**603.23**	**0.60**
NW4	**65.5000**	**10YR**	**3461.40**	**5836.92**	**5840.81**		**5840.97**	**0.004665**	**6.24**	**1123.21**	**484.29**	**0.56**
NW4	**65.5000**	**2YR**	**1265.10**	**5836.92**	**5839.55**		**5839.64**	**0.004756**	**4.84**	**568.98**	**403.64**	**0.53**

NW4	**65.0000**	**500YR**	**9600.70**	**5836.01**	**5844.45**		**5844.55**	**0.000759**	**4.21**	**4362.72**	**818.69**	**0.26**
NW4	**65.0000**	**100YR**	**6951.20**	**5836.01**	**5840.37**		**5840.70**	**0.005562**	**7.27**	**1657.71**	**537.63**	**0.62**
NW4	**65.0000**	**10YR**	**3461.40**	**5836.01**	**5839.36**		**5839.54**	**0.004193**	**5.26**	**1138.34**	**489.31**	**0.52**
NW4	**65.0000**	**2YR**	**1265.10**	**5836.01**	**5838.21**		**5838.30**	**0.003617**	**3.66**	**611.88**	**431.27**	**0.45**
NW4	**64.5000**	**500YR**	**9600.70**	**5834.01**	**5844.39**		**5844.43**	**0.000209**	**2.54**	**6956.02**	**1026.28**	**0.14**
NW4	**64.5000**	**100YR**	**6951.20**	**5834.01**	**5838.85**		**5839.23**	**0.004585**	**7.12**	**1780.44**	**630.17**	**0.57**
NW4	**64.5000**	**10YR**	**3461.40**	**5834.01**	**5836.98**	**5836.84**	**5837.58**	**0.011647**	**8.15**	**738.31**	**476.94**	**0.84**
NW4	**64.5000**	**2YR**	**1265.10**	**5834.01**	**5835.80**	**5835.71**	**5836.32**	**0.016335**	**6.81**	**273.03**	**260.13**	**0.91**
NW4	**64.0000**	**500YR**	**9600.70**	**5830.01**	**5844.35**		**5844.38**	**0.000102**	**2.20**	**8359.82**	**890.35**	**0.10**
NW4	**64.0000**	**100YR**	**6951.20**	**5830.01**	**5838.57**		**5838.66**	**0.000757**	**4.25**	**3427.77**	**732.87**	**0.26**
NW4	**64.0000**	**10YR**	**3461.40**	**5830.01**	**5834.50**		**5834.87**	**0.006341**	**7.97**	**939.86**	**447.73**	**0.67**
NW4	**64.0000**	**2YR**	**1265.10**	**5830.01**	**5833.19**		**5833.44**	**0.005583**	**5.91**	**444.90**	**314.62**	**0.59**
NW4	**63.5000**	**500YR**	**9600.70**	**5828.01**	**5844.34**		**5844.35**	**0.000046**	**1.61**	**10659.12**	**900.97**	**0.07**
NW4	**63.5000**	**100YR**	**6951.20**	**5828.01**	**5838.50**		**5838.53**	**0.000200**	**2.49**	**5487.21**	**873.10**	**0.14**
NW4	**63.5000**	**10YR**	**3461.40**	**5828.01**	**5831.85**		**5832.40**	**0.010189**	**8.92**	**837.69**	**531.67**	**0.82**
NW4	**63.5000**	**2YR**	**1265.10**	**5828.01**	**5830.83**	**5830.83**	**5831.26**	**0.009077**	**6.79**	**383.40**	**399.37**	**0.73**
NW4	**63.0000**	**500YR**	**9600.70**	**5826.01**	**5844.34**		**5844.35**	**0.000023**	**1.21**	**13688.77**	**1020.36**	**0.05**
NW4	**63.0000**	**100YR**	**6951.20**	**5826.01**	**5838.49**		**5838.50**	**0.000069**	**1.63**	**7847.53**	**979.63**	**0.08**
NW4	**63.0000**	**10YR**	**3461.40**	**5826.01**	**5830.13**		**5830.59**	**0.006268**	**7.18**	**897.13**	**510.14**	**0.65**
NW4	**63.0000**	**2YR**	**1265.10**	**5826.01**	**5828.83**	**5828.66**	**5829.19**	**0.006483**	**5.54**	**372.22**	**338.26**	**0.61**
NW4	**62.5000**	**500YR**	**9600.70**	**5824.01**	**5844.33**		**5844.34**	**0.000017**	**1.13**	**14569.46**	**925.19**	**0.04**
NW4	**62.5000**	**100YR**	**6951.20**	**5824.01**	**5838.48**		**5838.49**	**0.000041**	**1.38**	**9153.62**	**916.10**	**0.06**
NW4	**62.5000**	**10YR**	**3461.40**	**5824.01**	**5828.02**	**5827.65**	**5828.44**	**0.007986**	**7.98**	**920.01**	**545.25**	**0.73**
NW4	**62.5000**	**2YR**	**1265.10**	**5824.01**	**5827.11**	**5826.88**	**5827.35**	**0.005368**	**5.44**	**491.08**	**436.76**	**0.57**
NW4	**62.0000**	**500YR**	**9600.70**	**5822.01**	**5844.33**		**5844.33**	**0.000005**	**0.66**	**23805.84**	**1251.52**	**0.02**
NW4	**62.0000**	**100YR**	**6951.20**	**5822.01**	**5838.48**		**5838.48**	**0.000009**	**0.71**	**16476.38**	**1251.52**	**0.03**
NW4	**62.0000**	**10YR**	**3461.40**	**5822.01**	**5824.46**	**5823.95**	**5824.84**	**0.016740**	**8.29**	**823.55**	**658.72**	**0.97**
NW4	**62.0000**	**2YR**	**1265.10**	**5822.01**	**5823.28**	**5823.28**	**5823.68**	**0.038112**	**7.67**	**275.87**	**336.38**	**1.29**
NW3	**79.5000**	**500YR**	**1134.80**	**5846.01**	**5848.23**		**5848.36**	**0.004179**	**4.01**	**505.55**	**399.00**	**0.48**
NW3	**79.5000**	**100YR**	**833.40**	**5846.01**	**5847.94**		**5848.05**	**0.004194**	**3.65**	**396.64**	**353.26**	**0.47**
NW3	**79.5000**	**10YR**	**443.00**	**5846.01**	**5847.48**		**5847.57**	**0.004649**	**3.17**	**241.49**	**313.26**	**0.47**
NW3	**79.5000**	**2YR**	**161.10**	**5846.01**	**5846.97**		**5847.04**	**0.005072**	**2.46**	**98.89**	**211.97**	**0.46**
NW3	**79.0000**	**500YR**	**1134.80**	**5844.01**	**5846.94**		**5847.17**	**0.005203**	**5.03**	**382.76**	**272.13**	**0.55**
NW3	**79.0000**	**100YR**	**833.40**	**5844.01**	**5846.57**		**5846.79**	**0.005868**	**4.82**	**287.21**	**238.62**	**0.57**
NW3	**79.0000**	**10YR**	**443.00**	**5844.01**	**5845.94**		**5846.13**	**0.006863**	**4.18**	**156.72**	**150.21**	**0.58**
NW3	**79.0000**	**2YR**	**161.10**	**5844.01**	**5845.14**		**5845.30**	**0.009508**	**3.52**	**60.84**	**90.75**	**0.63**
NW3	**78.5000**	**500YR**	**1134.80**	**5842.01**	**5845.63**		**5845.87**	**0.003686**	**5.02**	**388.67**	**218.69**	**0.49**
NW3	**78.5000**	**100YR**	**833.40**	**5842.01**	**5845.26**		**5845.47**	**0.003444**	**4.49**	**312.58**	**200.69**	**0.46**
NW3	**78.5000**	**10YR**	**443.00**	**5842.01**	**5844.59**		**5844.75**	**0.003310**	**3.71**	**188.96**	**167.69**	**0.43**
NW3	**78.5000**	**2YR**	**161.10**	**5842.01**	**5843.77**		**5843.86**	**0.002833**	**2.55**	**79.22**	**81.99**	**0.37**
NW3	**78.0000**	**500YR**	**1468.90**	**5842.01**	**5844.70**		**5844.96**	**0.003864**	**4.42**	**430.49**	**260.76**	**0.48**
NW3	**78.0000**	**100YR**	**1076.00**	**5842.01**	**5844.01**		**5844.31**	**0.006445**	**4.66**	**275.23**	**189.28**	**0.59**
NW3	**78.0000**	**10YR**	**566.10**	**5842.01**	**5843.42**		**5843.62**	**0.006514**	**3.69**	**172.99**	**159.67**	**0.56**
NW3	**78.0000**	**2YR**	**192.70**	**5842.01**	**5842.84**		**5842.92**	**0.005375**	**2.30**	**88.30**	**129.22**	**0.46**
NW3	**77.5000**	**500YR**	**1468.90**	**5840.01**	**5844.46**		**5844.56**	**0.001053**	**3.16**	**777.78**	**397.46**	**0.27**
NW3	**77.5000**	**100YR**	**1076.00**	**5840.01**	**5842.40**		**5842.84**	**0.008799**	**5.88**	**239.03**	**166.36**	**0.70**
NW3	**77.5000**	**10YR**	**566.10**	**5840.01**	**5841.71**		**5842.04**	**0.010284**	**4.94**	**138.69**	**125.07**	**0.71**
NW3	**77.5000**	**2YR**	**192.70**	**5840.01**	**5840.85**	**5840.79**	**5841.11**	**0.019744**	**4.22**	**50.05**	**80.79**	**0.87**
NW3	**77.0000**	**500YR**	**1490.90**	**5838.01**	**5844.42**		**5844.45**	**0.000343**	**2.35**	**1270.36**	**383.78**	**0.16**
NW3	**77.0000**	**100YR**	**1091.60**	**5838.01**	**5841.61**		**5841.85**	**0.004040**	**5.44**	**367.34**	**202.88**	**0.51**
NW3	**77.0000**	**10YR**	**574.40**	**5838.01**	**5840.90**		**5841.08**	**0.003577**	**4.41**	**235.08**	**171.54**	**0.46**
NW3	**77.0000**	**2YR**	**196.00**	**5838.01**	**5839.96**		**5840.07**	**0.002969**	**3.05**	**93.24**	**80.57**	**0.39**
NW3	**76.5000**	**500YR**	**1490.90**	**5838.01**	**5844.38**		**5844.40**	**0.000191**	**1.76**	**1491.15**	**365.88**	**0.12**
NW3	**76.5000**	**100YR**	**1091.60**	**5838.01**	**5841.06**		**5841.20**	**0.002710**	**4.04**	**458.59**	**256.65**	**0.41**
NW3	**76.5000**	**10YR**	**574.40**	**5838.01**	**5840.32**		**5840.45**	**0.002969**	**3.51**	**275.80**	**240.26**	**0.41**

NW3	**76.5000**	**2YR**	**196.00**	**5838.01**	**5839.51**		**5839.57**	**0.002253**	**2.28**	**123.90**	**136.54**	**0.33**
NW3	**76.0000**	**500YR**	**1490.90**	**5838.01**	**5844.35**		**5844.37**	**0.000137**	**1.48**	**1639.73**	**445.47**	**0.10**
NW3	**76.0000**	**100YR**	**1091.60**	**5838.01**	**5839.73**	**5839.59**	**5840.27**	**0.014341**	**6.28**	**211.12**	**172.99**	**0.85**
NW3	**76.0000**	**10YR**	**574.40**	**5838.01**	**5839.53**		**5839.74**	**0.006359**	**3.84**	**177.43**	**161.46**	**0.56**
NW3	**76.0000**	**2YR**	**196.00**	**5838.01**	**5838.84**		**5838.95**	**0.007054**	**2.65**	**79.72**	**121.10**	**0.53**
NW3	**75.5000**	**500YR**	**1490.90**	**5835.60**	**5844.34**		**5844.35**	**0.000046**	**1.07**	**2598.05**	**418.43**	**0.06**
NW3	**75.5000**	**100YR**	**1091.60**	**5835.60**	**5838.57**		**5838.65**	**0.002744**	**4.02**	**534.74**	**284.03**	**0.41**
NW3	**75.5000**	**10YR**	**574.40**	**5835.60**	**5837.32**		**5837.45**	**0.010688**	**5.49**	**212.91**	**214.94**	**0.74**
NW3	**75.5000**	**2YR**	**196.00**	**5835.60**	**5836.73**		**5836.79**	**0.008577**	**3.72**	**105.20**	**153.60**	**0.62**
NW3	**75.0000**	**500YR**	**1490.90**	**5833.31**	**5844.34**		**5844.34**	**0.000018**	**0.78**	**3569.14**	**483.03**	**0.04**
NW3	**75.0000**	**100YR**	**1091.60**	**5833.31**	**5838.50**		**5838.52**	**0.000224**	**1.66**	**1184.85**	**326.62**	**0.13**
NW3	**75.0000**	**10YR**	**574.40**	**5833.31**	**5834.84**		**5835.03**	**0.013224**	**5.62**	**188.49**	**195.99**	**0.81**
NW3	**75.0000**	**2YR**	**196.00**	**5833.31**	**5834.25**		**5834.39**	**0.016959**	**4.57**	**82.94**	**162.38**	**0.84**
NW3	**74.5000**	**500YR**	**1490.90**	**5831.30**	**5844.34**		**5844.34**	**0.000011**	**0.69**	**4172.42**	**486.50**	**0.03**
NW3	**74.5000**	**100YR**	**1091.60**	**5831.30**	**5838.49**		**5838.49**	**0.000064**	**1.10**	**1772.53**	**338.37**	**0.07**
NW3	**74.5000**	**10YR**	**574.40**	**5831.30**	**5833.07**		**5833.17**	**0.006190**	**4.23**	**246.81**	**204.95**	**0.57**
NW3	**74.5000**	**2YR**	**196.00**	**5831.30**	**5832.45**		**5832.49**	**0.005358**	**2.94**	**127.60**	**180.08**	**0.49**
NW3	**74.0000**	**500YR**	**1490.90**	**5828.71**	**5844.33**		**5844.34**	**0.000004**	**0.44**	**6905.26**	**716.63**	**0.02**
NW3	**74.0000**	**100YR**	**1091.60**	**5828.71**	**5838.48**		**5838.48**	**0.000015**	**0.65**	**3267.71**	**504.48**	**0.04**
NW3	**74.0000**	**10YR**	**574.40**	**5828.71**	**5830.32**		**5830.45**	**0.010386**	**5.17**	**221.31**	**227.63**	**0.72**
NW3	**74.0000**	**2YR**	**196.00**	**5828.71**	**5829.74**		**5829.83**	**0.012163**	**4.13**	**99.14**	**180.39**	**0.72**
NW3	**73.5000**	**500YR**	**1490.90**	**5828.01**	**5844.33**		**5844.34**	**0.000002**	**0.34**	**8527.31**	**820.91**	**0.01**
NW3	**73.5000**	**100YR**	**1091.60**	**5828.01**	**5838.48**		**5838.48**	**0.000007**	**0.48**	**4204.42**	**607.88**	**0.03**
NW3	**73.5000**	**10YR**	**574.40**	**5828.01**	**5829.60**		**5829.67**	**0.003868**	**3.14**	**307.97**	**271.76**	**0.44**
NW3	**73.5000**	**2YR**	**196.00**	**5828.01**	**5828.94**		**5828.97**	**0.003961**	**2.21**	**144.68**	**217.12**	**0.41**
NW3	**73.375***	**500YR**	**1490.90**	**5827.56**	**5844.33**		**5844.34**	**0.000002**	**0.35**	**8398.02**	**793.79**	**0.01**
NW3	**73.375***	**100YR**	**1091.60**	**5827.56**	**5838.48**		**5838.48**	**0.000008**	**0.50**	**4169.90**	**605.71**	**0.03**
NW3	**73.375***	**10YR**	**574.40**	**5827.56**	**5829.47**		**5829.56**	**0.003992**	**3.58**	**290.98**	**255.24**	**0.46**
NW3	**73.375***	**2YR**	**196.00**	**5827.56**	**5828.83**		**5828.88**	**0.003156**	**2.42**	**145.04**	**204.39**	**0.38**
NW3	**73.25***	**500YR**	**1490.90**	**5827.12**	**5844.33**	**5829.40**	**5844.34**	**0.000002**	**0.35**	**8374.15**	**770.38**	**0.01**
NW3	**73.25***	**100YR**	**1091.60**	**5827.12**	**5838.48**	**5829.20**	**5838.48**	**0.000008**	**0.52**	**4172.52**	**608.05**	**0.03**
NW3	**73.25***	**10YR**	**574.40**	**5827.12**	**5829.36**	**5828.77**	**5829.45**	**0.003463**	**3.70**	**293.40**	**234.86**	**0.44**
NW3	**73.25***	**2YR**	**196.00**	**5827.12**	**5828.76**	**5828.27**	**5828.80**	**0.002100**	**2.33**	**161.16**	**204.00**	**0.32**
NW3	**73.2**		**Bridge**									
NW3	**73.125***	**500YR**	**1490.90**	**5826.67**	**5844.33**		**5844.34**	**0.000002**	**0.35**	**8394.65**	**762.05**	**0.01**
NW3	**73.125***	**100YR**	**1091.60**	**5826.67**	**5838.48**		**5838.48**	**0.000008**	**0.54**	**4189.72**	**619.00**	**0.03**
NW3	**73.125***	**10YR**	**574.40**	**5826.67**	**5828.96**		**5829.16**	**0.006779**	**5.20**	**224.04**	**212.32**	**0.62**
NW3	**73.125***	**2YR**	**196.00**	**5826.67**	**5828.40**		**5828.51**	**0.004304**	**3.41**	**115.14**	**173.68**	**0.47**
NW3	**73.0000**	**500YR**	**604.60**	**5826.22**	**5844.34**		**5844.34**	**0.000000**	**0.15**	**8432.04**	**759.22**	**0.01**
NW3	**73.0000**	**100YR**	**557.20**	**5826.22**	**5838.48**		**5838.48**	**0.000002**	**0.28**	**4216.18**	**623.84**	**0.01**
NW3	**73.0000**	**10YR**	**500.30**	**5826.22**	**5828.73**		**5828.96**	**0.007428**	**5.67**	**189.01**	**185.98**	**0.65**
NW3	**73.0000**	**2YR**	**196.80**	**5826.22**	**5828.14**		**5828.35**	**0.007276**	**4.63**	**89.33**	**153.82**	**0.61**
NW3	**72.5000**	**500YR**	**604.60**	**5826.01**	**5844.34**		**5844.34**	**0.000000**	**0.11**	**10076.10**	**817.54**	**0.00**
NW3	**72.5000**	**100YR**	**557.20**	**5826.01**	**5838.48**		**5838.48**	**0.000001**	**0.20**	**5465.70**	**739.13**	**0.01**
NW3	**72.5000**	**10YR**	**500.30**	**5826.01**	**5828.07**	**5827.49**	**5828.23**	**0.004418**	**3.90**	**212.35**	**209.34**	**0.49**
NW3	**72.5000**	**2YR**	**196.80**	**5826.01**	**5827.12**		**5827.30**	**0.009735**	**3.76**	**70.54**	**106.55**	**0.65**
NW3	**72.0000**	**500YR**	**604.60**	**5824.01**	**5844.34**		**5844.34**	**0.000000**	**0.06**	**15622.91**	**962.62**	**0.00**
NW3	**72.0000**	**100YR**	**557.20**	**5824.01**	**5838.48**		**5838.48**	**0.000000**	**0.09**	**10083.02**	**926.25**	**0.00**
NW3	**72.0000**	**10YR**	**500.30**	**5824.01**	**5824.71**	**5824.67**	**5824.96**	**0.029364**	**4.99**	**136.94**	**224.87**	**1.06**
NW3	**72.0000**	**2YR**	**196.80**	**5824.01**	**5824.67**		**5824.72**	**0.005532**	**2.09**	**128.52**	**222.99**	**0.45**
NW3	**71.5000**	**500YR**	**604.60**	**5822.01**	**5844.34**		**5844.34**	**0.000000**	**0.04**	**24905.71**	**1363.00**	**0.00**
NW3	**71.5000**	**100YR**	**557.20**	**5822.01**	**5838.48**		**5838.48**	**0.000000**	**0.06**	**17002.09**	**1336.94**	**0.00**
NW3	**71.5000**	**10YR**	**500.30**	**5822.01**	**5824.75**		**5824.76**	**0.000226**	**1.06**	**996.34**	**851.30**	**0.12**
NW3	**71.5000**	**2YR**	**196.80**	**5822.01**	**5822.80**	**5822.80**	**5823.03**	**0.020872**	**4.24**	**60.77**	**143.07**	**0.89**

W1	**49.5000**	**500YR**	**1639.70**	**5989.65**	**5993.17**	**5993.17**	**5994.48**	**0.023866**	**12.86**	**203.19**	**79.91**	**1.24**
W1	**49.5000**	**100YR**	**1065.00**	**5989.65**	**5992.44**	**5992.44**	**5993.48**	**0.025574**	**11.29**	**146.88**	**72.42**	**1.23**
W1	**49.5000**	**10YR**	**483.10**	**5989.65**	**5991.42**	**5991.42**	**5992.13**	**0.030682**	**8.93**	**79.61**	**59.52**	**1.24**
W1	**49.5000**	**2YR**	**241.20**	**5989.65**	**5990.83**	**5990.83**	**5991.32**	**0.037024**	**7.24**	**46.76**	**51.45**	**1.26**
W1	**49.0000**	**500YR**	**1639.70**	**5980.99**	**5984.09**	**5984.09**	**5985.26**	**0.033362**	**14.28**	**202.49**	**89.36**	**1.44**
W1	**49.0000**	**100YR**	**1065.00**	**5980.99**	**5983.49**	**5983.49**	**5984.39**	**0.034102**	**12.46**	**150.28**	**82.94**	**1.40**
W1	**49.0000**	**10YR**	**483.10**	**5980.99**	**5982.68**	**5982.68**	**5983.26**	**0.036461**	**9.88**	**86.98**	**74.30**	**1.36**
W1	**49.0000**	**2YR**	**241.20**	**5980.99**	**5982.24**	**5982.24**	**5982.62**	**0.036216**	**7.98**	**55.09**	**69.32**	**1.28**
W1	**48.5000**	**500YR**	**1639.70**	**5972.01**	**5975.82**	**5975.82**	**5976.88**	**0.017659**	**11.63**	**245.04**	**108.05**	**1.07**
W1	**48.5000**	**100YR**	**1065.00**	**5972.01**	**5975.24**	**5975.24**	**5976.07**	**0.016763**	**10.09**	**184.18**	**100.88**	**1.02**
W1	**48.5000**	**10YR**	**483.10**	**5972.01**	**5974.46**	**5974.46**	**5975.01**	**0.014691**	**7.76**	**109.50**	**90.60**	**0.91**
W1	**48.5000**	**2YR**	**241.20**	**5972.01**	**5974.00**	**5974.00**	**5974.38**	**0.011920**	**6.02**	**69.53**	**83.56**	**0.79**
W1	**48.0000**	**500YR**	**1639.70**	**5964.02**	**5967.68**	**5967.68**	**5968.65**	**0.021296**	**11.69**	**243.76**	**114.23**	**1.14**
W1	**48.0000**	**100YR**	**1065.00**	**5964.02**	**5967.18**	**5967.18**	**5967.92**	**0.019907**	**10.11**	**187.66**	**110.95**	**1.08**
W1	**48.0000**	**10YR**	**483.10**	**5964.02**	**5965.97**	**5965.97**	**5967.74**	**0.080258**	**13.76**	**59.27**	**73.01**	**1.96**
W1	**48.0000**	**2YR**	**241.20**	**5964.02**	**5965.97**	**5965.97**	**5966.41**	**0.020123**	**6.88**	**59.13**	**72.91**	**0.98**
W1	**47.5000**	**500YR**	**1639.70**	**5956.02**	**5960.11**	**5960.11**	**5961.29**	**0.017436**	**11.37**	**232.36**	**99.47**	**1.06**
W1	**47.5000**	**100YR**	**1065.00**	**5956.02**	**5959.50**	**5959.50**	**5960.40**	**0.016625**	**9.78**	**173.52**	**91.28**	**1.00**
W1	**47.5000**	**10YR**	**483.10**	**5956.02**	**5958.68**	**5958.68**	**5959.26**	**0.014795**	**7.42**	**102.46**	**82.09**	**0.90**
W1	**47.5000**	**2YR**	**241.20**	**5956.02**	**5957.78**	**5957.78**	**5958.35**	**0.026216**	**6.87**	**45.35**	**45.15**	**1.09**
W1	**47.25**		**Lat Struct**									
W1	**47.0000**	**500YR**	**1639.70**	**5942.10**	**5954.94**	**5951.92**	**5955.10**	**0.001214**	**4.23**	**682.55**	**212.23**	**0.26**
W1	**47.0000**	**100YR**	**1065.00**	**5942.10**	**5954.19**	**5950.99**	**5954.31**	**0.000912**	**3.44**	**531.83**	**192.83**	**0.22**
W1	**47.0000**	**10YR**	**483.10**	**5942.10**	**5952.96**	**5948.67**	**5953.02**	**0.000455**	**2.16**	**344.66**	**130.16**	**0.15**
W1	**47.0000**	**2YR**	**241.20**	**5942.10**	**5951.91**	**5945.86**	**5951.94**	**0.000283**	**1.50**	**224.72**	**98.87**	**0.12**
W1	**46.75**		**Culvert**									
W1	**46.5000**	**500YR**	**1639.70**	**5938.06**	**5945.64**	**5945.64**	**5946.72**	**0.016542**	**10.19**	**245.46**	**117.82**	**0.92**
W1	**46.5000**	**100YR**	**1065.00**	**5938.06**	**5945.03**	**5945.03**	**5945.91**	**0.015132**	**8.89**	**178.02**	**101.31**	**0.86**
W1	**46.5000**	**10YR**	**483.10**	**5938.06**	**5944.05**	**5944.05**	**5944.74**	**0.013445**	**7.14**	**92.02**	**76.14**	**0.77**
W1	**46.5000**	**2YR**	**241.20**	**5938.06**	**5942.84**	**5942.84**	**5943.67**	**0.024951**	**7.34**	**33.28**	**25.98**	**0.97**
W1	**46.0000**	**500YR**	**1639.70**	**5935.43**	**5937.93**	**5937.93**	**5938.90**	**0.036432**	**13.00**	**217.74**	**112.55**	**1.45**
W1	**46.0000**	**100YR**	**1065.00**	**5935.43**	**5937.43**	**5937.43**	**5938.17**	**0.038818**	**11.53**	**161.98**	**108.21**	**1.44**
W1	**46.0000**	**10YR**	**483.10**	**5935.43**	**5936.81**	**5936.81**	**5937.26**	**0.040877**	**9.21**	**96.60**	**102.47**	**1.39**
W1	**46.0000**	**2YR**	**241.20**	**5935.43**	**5936.47**	**5936.47**	**5936.76**	**0.040686**	**7.58**	**62.40**	**98.99**	**1.32**
W1	**45.5000**	**500YR**	**1639.70**	**5922.01**	**5924.06**	**5924.06**	**5924.81**	**0.029485**	**9.86**	**262.06**	**170.86**	**1.25**
W1	**45.5000**	**100YR**	**1065.00**	**5922.01**	**5923.67**	**5923.67**	**5924.25**	**0.030618**	**8.66**	**196.77**	**166.05**	**1.23**
W1	**45.5000**	**10YR**	**483.10**	**5922.01**	**5923.19**	**5923.19**	**5923.54**	**0.030477**	**6.73**	**118.69**	**158.44**	**1.15**
W1	**45.5000**	**2YR**	**241.20**	**5922.01**	**5922.93**	**5922.93**	**5923.16**	**0.028041**	**5.34**	**77.69**	**154.42**	**1.05**
W1	**45.0000**	**500YR**	**231.00**	**5911.54**	**5913.21**	**5913.21**	**5913.78**	**0.022173**	**7.22**	**45.76**	**42.78**	**1.04**
W1	**45.0000**	**100YR**	**221.20**	**5911.54**	**5913.18**	**5913.18**	**5913.73**	**0.022234**	**7.12**	**44.31**	**42.31**	**1.04**
W1	**45.0000**	**10YR**	**209.00**	**5911.54**	**5913.14**	**5913.14**	**5913.67**	**0.022012**	**6.95**	**42.68**	**41.78**	**1.03**
W1	**45.0000**	**2YR**	**200.00**	**5911.54**	**5913.10**	**5913.10**	**5913.62**	**0.022325**	**6.88**	**41.14**	**41.27**	**1.03**
W1	**44.5000**	**500YR**	**231.00**	**5896.01**	**5897.70**	**5897.70**	**5898.32**	**0.018825**	**6.61**	**40.67**	**35.93**	**0.95**
W1	**44.5000**	**100YR**	**221.20**	**5896.01**	**5897.66**	**5897.66**	**5898.27**	**0.018869**	**6.51**	**39.38**	**35.46**	**0.95**
W1	**44.5000**	**10YR**	**209.00**	**5896.01**	**5897.61**	**5897.61**	**5898.20**	**0.019438**	**6.44**	**37.40**	**34.66**	**0.96**
W1	**44.5000**	**2YR**	**200.00**	**5896.01**	**5897.56**	**5897.56**	**5898.15**	**0.020052**	**6.41**	**35.79**	**33.96**	**0.97**
W1	**44.0000**	**500YR**	**252.10**	**5886.67**	**5888.11**	**5888.11**	**5888.63**	**0.031653**	**7.37**	**49.55**	**54.19**	**1.19**
W1	**44.0000**	**100YR**	**236.40**	**5886.67**	**5888.08**	**5888.08**	**5888.57**	**0.030732**	**7.13**	**47.79**	**53.10**	**1.17**
W1	**44.0000**	**10YR**	**217.00**	**5886.67**	**5888.01**	**5888.01**	**5888.49**	**0.032008**	**6.99**	**44.26**	**51.07**	**1.18**
W1	**44.0000**	**2YR**	**202.70**	**5886.67**	**5887.96**	**5887.96**	**5888.42**	**0.032923**	**6.86**	**41.70**	**49.59**	**1.19**
W1	**43.5000**	**500YR**	**252.10**	**5878.01**	**5880.41**	**5880.41**	**5881.15**	**0.015490**	**7.03**	**40.64**	**34.60**	**0.90**
W1	**43.5000**	**100YR**	**236.40**	**5878.01**	**5880.33**	**5880.33**	**5881.06**	**0.016075**	**6.95**	**37.83**	**32.97**	**0.91**
W1	**43.5000**	**10YR**	**217.00**	**5878.01**	**5880.19**	**5880.19**	**5880.93**	**0.018069**	**6.99**	**33.48**	**28.82**	**0.95**
W1	**43.5000**	**2YR**	**202.70**	**5878.01**	**5880.10**	**5880.10**	**5880.83**	**0.018867**	**6.90**	**31.15**	**26.22**	**0.96**

W1	**43.0000**	**500YR**	**252.10**	**5872.88**	**5874.45**	**5874.45**	**5874.97**	**0.025662**	**7.58**	**51.54**	**50.02**	**1.11**
W1	**43.0000**	**100YR**	**236.40**	**5872.88**	**5874.40**	**5874.40**	**5874.90**	**0.025668**	**7.41**	**49.23**	**49.33**	**1.11**
W1	**43.0000**	**10YR**	**217.00**	**5872.88**	**5874.33**	**5874.33**	**5874.82**	**0.026298**	**7.26**	**45.92**	**48.24**	**1.11**
W1	**43.0000**	**2YR**	**202.70**	**5872.88**	**5874.28**	**5874.28**	**5874.75**	**0.026895**	**7.14**	**43.38**	**47.31**	**1.12**
W1	**42.5000**	**500YR**	**252.10**	**5866.01**	**5866.89**	**5866.87**	**5867.14**	**0.019435**	**4.25**	**73.06**	**134.28**	**0.87**
W1	**42.5000**	**100YR**	**236.40**	**5866.01**	**5866.87**	**5866.85**	**5867.10**	**0.019041**	**4.15**	**70.12**	**133.49**	**0.86**
W1	**42.5000**	**10YR**	**217.00**	**5866.01**	**5866.84**	**5866.82**	**5867.06**	**0.019142**	**4.06**	**65.52**	**132.25**	**0.85**
W1	**42.5000**	**2YR**	**202.70**	**5866.01**	**5866.81**	**5866.74**	**5867.03**	**0.018852**	**3.96**	**62.49**	**131.43**	**0.84**
W1	**42.0000**	**500YR**	**252.10**	**5860.42**	**5861.32**	**5861.32**	**5861.61**	**0.026705**	**5.47**	**70.93**	**116.43**	**1.04**
W1	**42.0000**	**100YR**	**236.40**	**5860.42**	**5861.29**	**5861.29**	**5861.57**	**0.027417**	**5.41**	**67.30**	**115.50**	**1.05**
W1	**42.0000**	**10YR**	**217.00**	**5860.42**	**5861.26**	**5861.26**	**5861.52**	**0.027369**	**5.26**	**63.54**	**114.51**	**1.04**
W1	**42.0000**	**2YR**	**202.70**	**5860.42**	**5861.23**	**5861.23**	**5861.49**	**0.027818**	**5.17**	**60.31**	**113.54**	**1.04**
W1	**41.5000**	**500YR**	**252.10**	**5852.23**	**5853.28**	**5853.28**	**5853.54**	**0.018508**	**4.80**	**79.68**	**149.67**	**0.88**
W1	**41.5000**	**100YR**	**236.40**	**5852.23**	**5853.28**	**5853.26**	**5853.51**	**0.015852**	**4.46**	**80.48**	**149.97**	**0.81**
W1	**41.5000**	**10YR**	**217.00**	**5852.23**	**5853.24**	**5853.22**	**5853.47**	**0.016738**	**4.43**	**73.80**	**147.46**	**0.83**
W1	**41.5000**	**2YR**	**202.70**	**5852.23**	**5853.20**	**5853.19**	**5853.43**	**0.018023**	**4.46**	**67.89**	**144.05**	**0.85**
W1	**41.0000**	**500YR**	**296.60**	**5841.51**	**5844.33**		**5844.33**	**0.000063**	**0.58**	**959.15**	**511.25**	**0.06**
W1	**41.0000**	**100YR**	**267.00**	**5841.51**	**5842.39**	**5842.39**	**5842.56**	**0.029514**	**5.69**	**109.43**	**299.32**	**1.09**
W1	**41.0000**	**10YR**	**231.10**	**5841.51**	**5842.36**	**5842.36**	**5842.51**	**0.028162**	**5.42**	**100.06**	**291.72**	**1.06**
W1	**41.0000**	**2YR**	**208.40**	**5841.51**	**5842.35**	**5842.35**	**5842.48**	**0.025953**	**5.14**	**95.80**	**290.08**	**1.02**
W1	**40.5000**	**500YR**	**296.60**	**5831.44**	**5844.33**		**5844.33**	**0.000000**	**0.07**	**7463.98**	**772.48**	**0.00**
W1	**40.5000**	**100YR**	**267.00**	**5831.44**	**5838.47**		**5838.47**	**0.000001**	**0.14**	**3209.54**	**623.33**	**0.01**
W1	**40.5000**	**10YR**	**231.10**	**5831.44**	**5832.40**	**5832.40**	**5832.56**	**0.017418**	**4.42**	**104.18**	**288.47**	**0.84**
W1	**40.5000**	**2YR**	**208.40**	**5831.44**	**5832.37**	**5832.37**	**5832.53**	**0.016795**	**4.26**	**97.44**	**286.98**	**0.82**
W1	**40.0000**	**500YR**	**459.80**	**5820.01**	**5844.33**		**5844.33**	**0.000000**	**0.06**	**12943.88**	**680.37**	**0.00**
W1	**40.0000**	**100YR**	**384.00**	**5820.01**	**5838.47**		**5838.47**	**0.000000**	**0.07**	**9063.11**	**650.11**	**0.00**
W1	**40.0000**	**10YR**	**289.90**	**5820.01**	**5824.31**		**5824.33**	**0.000209**	**1.36**	**455.64**	**334.38**	**0.12**
W1	**40.0000**	**2YR**	**225.10**	**5820.01**	**5821.48**	**5821.48**	**5822.07**	**0.021061**	**6.20**	**37.79**	**34.69**	**0.98**
W1	**39.5000**	**500YR**	**246.80**	**5814.02**	**5844.33**		**5844.33**	**0.000000**	**0.02**	**19884.95**	**816.93**	**0.00**
W1	**39.5000**	**100YR**	**244.30**	**5814.02**	**5838.47**		**5838.47**	**0.000000**	**0.03**	**15216.23**	**781.22**	**0.00**
W1	**39.5000**	**10YR**	**239.70**	**5814.02**	**5824.32**		**5824.32**	**0.000000**	**0.11**	**4410.23**	**746.02**	**0.01**
W1	**39.5000**	**2YR**	**212.40**	**5814.02**	**5816.45**		**5816.48**	**0.000852**	**1.83**	**209.33**	**214.48**	**0.22**
W1	**39.0000**	**500YR**	**246.80**	**5808.01**	**5844.33**		**5844.33**	**0.000000**	**0.01**	**34133.67**	**1264.92**	**0.00**
W1	**39.0000**	**100YR**	**244.30**	**5808.01**	**5838.47**		**5838.47**	**0.000000**	**0.02**	**26949.88**	**1194.47**	**0.00**
W1	**39.0000**	**10YR**	**239.70**	**5808.01**	**5824.32**		**5824.32**	**0.000000**	**0.05**	**10566.61**	**1123.08**	**0.00**
W1	**39.0000**	**2YR**	**212.40**	**5808.01**	**5816.47**		**5816.47**	**0.000001**	**0.15**	**3008.61**	**694.48**	**0.01**
NW5	**59.5000**	**500YR**	**7744.50**	**5818.15**	**5844.33**		**5844.33**	**0.000010**	**1.03**	**13915.56**	**721.67**	**0.04**
NW5	**59.5000**	**100YR**	**6206.10**	**5818.15**	**5838.47**		**5838.48**	**0.000018**	**1.19**	**9826.74**	**676.62**	**0.05**
NW5	**59.5000**	**10YR**	**3838.10**	**5818.15**	**5824.66**		**5824.75**	**0.001390**	**4.82**	**1639.78**	**415.93**	**0.33**
NW5	**59.5000**	**2YR**	**1451.90**	**5818.15**	**5821.87**		**5821.98**	**0.003763**	**5.45**	**606.05**	**324.44**	**0.50**
NW5	**59.0000**	**500YR**	**7744.50**	**5818.01**	**5844.33**		**5844.33**	**0.000006**	**0.83**	**15466.61**	**769.16**	**0.03**
NW5	**59.0000**	**100YR**	**6206.10**	**5818.01**	**5838.47**		**5838.48**	**0.000011**	**0.94**	**11066.83**	**733.65**	**0.04**
NW5	**59.0000**	**10YR**	**3838.10**	**5818.01**	**5824.44**		**5824.53**	**0.000589**	**3.11**	**1933.87**	**426.83**	**0.22**
NW5	**59.0000**	**2YR**	**1451.90**	**5818.01**	**5820.61**		**5820.89**	**0.004824**	**4.85**	**457.04**	**348.89**	**0.53**
NW5	**58.5000**	**500YR**	**7744.50**	**5816.01**	**5844.33**		**5844.33**	**0.000003**	**0.64**	**20682.06**	**940.77**	**0.02**
NW5	**58.5000**	**100YR**	**6206.10**	**5816.01**	**5838.47**		**5838.47**	**0.000006**	**0.70**	**15297.87**	**898.54**	**0.03**
NW5	**58.5000**	**10YR**	**3838.10**	**5816.01**	**5824.40**		**5824.43**	**0.000186**	**2.08**	**3334.78**	**653.60**	**0.13**
NW5	**58.5000**	**2YR**	**1451.90**	**5816.01**	**5818.74**	**5818.67**	**5819.21**	**0.008098**	**6.44**	**388.75**	**357.67**	**0.69**
NW5	**58.0000**	**500YR**	**7744.50**	**5814.01**	**5844.33**		**5844.33**	**0.000003**	**0.60**	**23303.57**	**1060.24**	**0.02**
NW5	**58.0000**	**100YR**	**6206.10**	**5814.01**	**5838.47**		**5838.47**	**0.000004**	**0.65**	**17306.89**	**991.87**	**0.02**
NW5	**58.0000**	**10YR**	**3838.10**	**5814.01**	**5824.37**		**5824.39**	**0.000104**	**1.78**	**4340.39**	**746.53**	**0.10**
NW5	**58.0000**	**2YR**	**1451.90**	**5814.01**	**5817.47**		**5817.64**	**0.003237**	**4.70**	**598.46**	**358.54**	**0.45**
NW5	**57.5000**	**500YR**	**7786.70**	**5812.01**	**5844.33**		**5844.33**	**0.000003**	**0.63**	**22521.70**	**1096.11**	**0.02**
NW5	**57.5000**	**100YR**	**6241.00**	**5812.01**	**5838.47**		**5838.47**	**0.000005**	**0.68**	**16608.51**	**941.13**	**0.02**
NW5	**57.5000**	**10YR**	**3863.30**	**5812.01**	**5824.34**		**5824.36**	**0.000101**	**1.90**	**4430.81**	**797.45**	**0.10**
NW5	**57.5000**	**2YR**	**1464.10**	**5812.01**	**5816.75**		**5816.88**	**0.002335**	**4.61**	**697.99**	**392.23**	**0.39**

NW5	**57.0000**	**500YR**	**7786.70**	**5812.01**	**5844.33**		**5844.33**	**0.000002**	**0.55**	**24705.58**	**1107.39**	**0.02**
NW5	**57.0000**	**100YR**	**6241.00**	**5812.01**	**5838.47**		**5838.47**	**0.000003**	**0.60**	**18259.64**	**1076.35**	**0.02**
NW5	**57.0000**	**10YR**	**3863.30**	**5812.01**	**5824.33**		**5824.34**	**0.000038**	**1.23**	**5683.97**	**763.83**	**0.06**
NW5	**57.0000**	**2YR**	**1464.10**	**5812.01**	**5816.54**		**5816.59**	**0.000468**	**2.19**	**1104.54**	**452.44**	**0.18**
NW5	**56.5000**	**500YR**	**7814.60**	**5808.01**	**5844.33**		**5844.33**	**0.000002**	**0.50**	**29051.85**	**1165.82**	**0.01**
NW5	**56.5000**	**100YR**	**6264.40**	**5808.01**	**5838.47**		**5838.47**	**0.000002**	**0.55**	**22220.29**	**1165.82**	**0.02**
NW5	**56.5000**	**10YR**	**3880.30**	**5808.01**	**5824.32**		**5824.33**	**0.000024**	**1.16**	**7299.25**	**862.37**	**0.05**
NW5	**56.5000**	**2YR**	**1472.80**	**5808.01**	**5816.50**		**5816.51**	**0.000134**	**1.75**	**1817.97**	**442.73**	**0.11**
NW5	**56.0000**	**500YR**	**10636.00**	**5806.02**	**5844.33**		**5844.33**	**0.000002**	**0.52**	**37766.95**	**1364.52**	**0.01**
NW5	**56.0000**	**100YR**	**8335.70**	**5806.02**	**5838.47**		**5838.47**	**0.000002**	**0.53**	**29771.05**	**1364.52**	**0.02**
NW5	**56.0000**	**10YR**	**4942.70**	**5806.02**	**5824.31**		**5824.32**	**0.000018**	**1.07**	**10723.48**	**1251.41**	**0.04**
NW5	**56.0000**	**2YR**	**1982.60**	**5806.02**	**5816.45**		**5816.47**	**0.000139**	**2.01**	**2553.24**	**703.03**	**0.11**
MAIN	**39.5000**	**500YR**	**8463.00**	**5806.01**	**5844.32**		**5844.33**	**0.000002**	**0.58**	**27342.55**	**1050.27**	**0.02**
MAIN	**39.5000**	**100YR**	**7077.00**	**5806.01**	**5838.46**		**5838.47**	**0.000003**	**0.63**	**21298.52**	**1004.19**	**0.02**
MAIN	**39.5000**	**10YR**	**4442.10**	**5806.01**	**5824.31**		**5824.32**	**0.000023**	**1.22**	**7790.43**	**853.17**	**0.05**
MAIN	**39.5000**	**2YR**	**2142.90**	**5806.01**	**5816.43**		**5816.47**	**0.000172**	**2.28**	**2070.91**	**546.24**	**0.13**
MAIN	**39.375***	**500YR**	**8463.00**	**5806.01**	**5844.32**		**5844.33**	**0.000002**	**0.65**	**24881.20**	**997.26**	**0.02**
MAIN	**39.375***	**100YR**	**7077.00**	**5806.01**	**5838.46**		**5838.47**	**0.000004**	**0.72**	**19155.51**	**948.03**	**0.02**
MAIN	**39.375***	**10YR**	**4442.10**	**5806.01**	**5824.31**		**5824.32**	**0.000037**	**1.55**	**6477.59**	**793.93**	**0.06**
MAIN	**39.375***	**2YR**	**2142.90**	**5806.01**	**5816.38**		**5816.46**	**0.000302**	**3.01**	**1486.09**	**404.96**	**0.17**
MAIN	**39.25***	**500YR**	**8463.00**	**5806.01**	**5844.32**	**5816.96**	**5844.33**	**0.000003**	**0.73**	**22632.19**	**944.24**	**0.02**
MAIN	**39.25***	**100YR**	**7077.00**	**5806.01**	**5838.46**	**5816.30**	**5838.47**	**0.000005**	**0.82**	**17230.60**	**890.54**	**0.03**
MAIN	**39.25***	**10YR**	**4442.10**	**5806.01**	**5824.30**	**5814.55**	**5824.32**	**0.000057**	**1.91**	**5440.04**	**720.82**	**0.08**
MAIN	**39.25***	**2YR**	**2142.90**	**5806.01**	**5816.28**	**5811.08**	**5816.44**	**0.000550**	**4.04**	**1078.81**	**329.66**	**0.22**
MAIN	**39.2**		**Bridge**									
MAIN	**39.125***	**500YR**	**8463.00**	**5806.01**	**5844.32**		**5844.33**	**0.000004**	**0.82**	**20596.54**	**891.23**	**0.02**
MAIN	**39.125***	**100YR**	**7077.00**	**5806.01**	**5838.46**		**5838.47**	**0.000006**	**0.93**	**15533.16**	**827.11**	**0.03**
MAIN	**39.125***	**10YR**	**4442.10**	**5806.01**	**5824.28**		**5824.31**	**0.000081**	**2.29**	**4676.74**	**654.43**	**0.09**
MAIN	**39.125***	**2YR**	**2142.90**	**5806.01**	**5815.78**		**5816.19**	**0.001255**	**5.90**	**672.27**	**245.28**	**0.34**
MAIN	**39.0000**	**500YR**	**8463.00**	**5806.01**	**5844.32**	**5818.98**	**5844.33**	**0.000005**	**0.91**	**18774.51**	**838.21**	**0.03**
MAIN	**39.0000**	**100YR**	**7077.00**	**5806.01**	**5838.46**	**5818.59**	**5838.47**	**0.000008**	**1.03**	**14094.67**	**755.64**	**0.03**
MAIN	**39.0000**	**10YR**	**4442.10**	**5806.01**	**5824.27**	**5814.64**	**5824.31**	**0.000118**	**2.75**	**4083.13**	**623.93**	**0.11**
MAIN	**39.0000**	**2YR**	**2142.90**	**5806.01**	**5815.28**	**5811.92**	**5816.11**	**0.002491**	**8.01**	**414.68**	**144.63**	**0.47**
MAIN	**38.75**		**Culvert**									
MAIN	**38.5000**	**500YR**	**8463.00**	**5804.96**	**5814.35**		**5815.61**	**0.007262**	**12.58**	**1261.06**	**303.06**	**0.78**
MAIN	**38.5000**	**100YR**	**7077.00**	**5804.96**	**5813.83**		**5815.01**	**0.007138**	**11.93**	**1106.18**	**292.69**	**0.76**
MAIN	**38.5000**	**10YR**	**4442.10**	**5804.96**	**5812.63**		**5813.66**	**0.007051**	**10.57**	**770.24**	**265.67**	**0.74**
MAIN	**38.5000**	**2YR**	**2142.90**	**5804.96**	**5811.09**	**5811.09**	**5812.07**	**0.007595**	**9.12**	**387.05**	**229.07**	**0.73**
MAIN	**38.0000**	**500YR**	**8463.00**	**5804.24**	**5814.98**	**5811.97**	**5815.15**	**0.001002**	**5.27**	**3463.09**	**804.27**	**0.30**
MAIN	**38.0000**	**100YR**	**7077.00**	**5804.24**	**5814.41**	**5811.61**	**5814.57**	**0.001001**	**5.06**	**3014.47**	**763.47**	**0.30**
MAIN	**38.0000**	**10YR**	**4442.10**	**5804.24**	**5813.11**	**5810.70**	**5813.26**	**0.001001**	**4.57**	**2078.38**	**667.13**	**0.29**
MAIN	**38.0000**	**2YR**	**2142.90**	**5804.24**	**5811.40**	**5809.34**	**5811.53**	**0.001000**	**3.87**	**1076.11**	**465.74**	**0.28**
SP2	**189.5000**	**500YR**	**142.70**	**6082.02**	**6084.36**	**6084.36**	**6085.12**	**0.019710**	**7.15**	**21.44**	**14.86**	**0.97**
SP2	**189.5000**	**100YR**	**100.10**	**6082.02**	**6083.97**	**6083.97**	**6084.62**	**0.021266**	**6.57**	**15.98**	**13.08**	**0.98**
SP2	**189.5000**	**10YR**	**42.50**	**6082.02**	**6083.28**	**6083.28**	**6083.71**	**0.026208**	**5.28**	**8.08**	**9.88**	**1.01**
SP2	**189.5000**	**2YR**	**12.80**	**6082.02**	**6082.72**	**6082.72**	**6082.95**	**0.032109**	**3.90**	**3.29**	**7.15**	**1.01**
SP2	**189.0000**	**500YR**	**142.70**	**6064.54**	**6066.75**	**6066.75**	**6067.44**	**0.022463**	**7.26**	**23.21**	**16.80**	**1.03**
SP2	**189.0000**	**100YR**	**100.10**	**6064.54**	**6066.41**	**6066.41**	**6066.99**	**0.022832**	**6.64**	**17.76**	**15.21**	**1.01**
SP2	**189.0000**	**10YR**	**42.50**	**6064.54**	**6065.76**	**6065.76**	**6066.16**	**0.025144**	**5.40**	**9.06**	**11.66**	**1.00**
SP2	**189.0000**	**2YR**	**12.80**	**6064.54**	**6065.20**	**6065.20**	**6065.43**	**0.029672**	**3.97**	**3.53**	**8.16**	**0.99**
SP2	**188.5000**	**500YR**	**194.70**	**6041.85**	**6044.08**	**6044.08**	**6044.88**	**0.035304**	**8.57**	**28.54**	**19.87**	**1.26**
SP2	**188.5000**	**100YR**	**135.80**	**6041.85**	**6043.74**	**6043.74**	**6044.38**	**0.034258**	**7.59**	**22.27**	**17.84**	**1.21**
SP2	**188.5000**	**10YR**	**59.40**	**6041.85**	**6043.09**	**6043.09**	**6043.51**	**0.038508**	**6.21**	**11.84**	**13.89**	**1.21**
SP2	**188.5000**	**2YR**	**17.70**	**6041.85**	**6042.50**	**6042.50**	**6042.74**	**0.047268**	**4.62**	**4.78**	**10.32**	**1.22**

SP2	**188.0000**	**500YR**	**194.70**	**6021.78**	**6024.02**	**6024.02**	**6024.79**	**0.025058**	**7.74**	**29.82**	**20.79**	**1.10**
SP2	**188.0000**	**100YR**	**135.80**	**6021.78**	**6023.68**	**6023.68**	**6024.30**	**0.024408**	**6.93**	**23.16**	**18.82**	**1.06**
SP2	**188.0000**	**10YR**	**59.40**	**6021.78**	**6023.02**	**6023.02**	**6023.45**	**0.027784**	**5.72**	**12.11**	**14.57**	**1.06**
SP2	**188.0000**	**2YR**	**17.70**	**6021.78**	**6022.44**	**6022.44**	**6022.68**	**0.032361**	**4.21**	**4.81**	**10.44**	**1.04**
SP2	**187.5000**	**500YR**	**194.70**	**6010.01**	**6011.71**	**6011.71**	**6012.34**	**0.020573**	**6.46**	**31.79**	**27.49**	**0.98**
SP2	**187.5000**	**100YR**	**135.80**	**6010.01**	**6011.40**	**6011.40**	**6011.93**	**0.022171**	**5.88**	**23.81**	**24.18**	**0.98**
SP2	**187.5000**	**10YR**	**59.40**	**6010.01**	**6011.08**		**6011.28**	**0.012099**	**3.62**	**16.53**	**20.88**	**0.70**
SP2	**187.5000**	**2YR**	**17.70**	**6010.01**	**6010.44**	**6010.44**	**6010.62**	**0.033108**	**3.37**	**5.25**	**14.86**	**1.00**
SP2	**187.375***	**500YR**	**194.70**	**6008.30**	**6011.63**		**6011.72**	**0.001222**	**2.66**	**96.58**	**51.44**	**0.27**
SP2	**187.375***	**100YR**	**135.80**	**6008.30**	**6011.45**		**6011.51**	**0.000754**	**2.01**	**87.88**	**49.19**	**0.21**
SP2	**187.375***	**10YR**	**59.40**	**6008.30**	**6011.20**		**6011.21**	**0.000210**	**0.99**	**75.68**	**45.68**	**0.11**
SP2	**187.375***	**2YR**	**17.70**	**6008.30**	**6008.77**	**6008.77**	**6008.96**	**0.033809**	**3.49**	**5.08**	**13.85**	**1.01**
SP2	**187.25***	**500YR**	**194.70**	**6006.60**	**6011.67**		**6011.69**	**0.000179**	**1.40**	**220.92**	**77.83**	**0.11**
SP2	**187.25***	**100YR**	**135.80**	**6006.60**	**6011.48**		**6011.49**	**0.000104**	**1.04**	**206.26**	**75.62**	**0.09**
SP2	**187.25***	**10YR**	**59.40**	**6006.60**	**6011.20**		**6011.21**	**0.000026**	**0.50**	**185.83**	**72.26**	**0.04**
SP2	**187.25***	**2YR**	**17.70**	**6006.60**	**6007.62**		**6007.64**	**0.001911**	**1.37**	**13.71**	**20.78**	**0.27**
SP2	**187.125***	**500YR**	**194.70**	**6004.90**	**6011.68**	**6006.73**	**6011.68**	**0.000043**	**0.85**	**408.67**	**106.86**	**0.06**
SP2	**187.125***	**100YR**	**135.80**	**6004.90**	**6011.48**	**6006.42**	**6011.49**	**0.000024**	**0.62**	**388.12**	**104.55**	**0.04**
SP2	**187.125***	**10YR**	**59.40**	**6004.90**	**6011.20**	**6005.87**	**6011.20**	**0.000006**	**0.29**	**359.29**	**101.14**	**0.02**
SP2	**187.125***	**2YR**	**17.70**	**6004.90**	**6007.63**	**6005.44**	**6007.63**	**0.000023**	**0.33**	**81.62**	**53.36**	**0.04**
SP2	**187.1**		**Culvert**									
SP2	**187.0000**	**500YR**	**194.70**	**6003.19**	**6004.91**	**6004.91**	**6005.43**	**0.018183**	**6.90**	**43.06**	**43.17**	**0.96**
SP2	**187.0000**	**100YR**	**135.80**	**6003.19**	**6004.64**	**6004.64**	**6005.09**	**0.019312**	**6.28**	**31.78**	**38.05**	**0.95**
SP2	**187.0000**	**10YR**	**59.40**	**6003.19**	**6004.16**	**6004.16**	**6004.47**	**0.021090**	**4.91**	**16.13**	**28.40**	**0.93**
SP2	**187.0000**	**2YR**	**17.70**	**6003.19**	**6003.73**	**6003.73**	**6003.90**	**0.026307**	**3.45**	**5.87**	**18.73**	**0.92**
SP2	**186.5000**	**500YR**	**194.70**	**5977.77**	**5980.02**	**5980.02**	**5980.74**	**0.021216**	**6.83**	**28.91**	**21.38**	**1.00**
SP2	**186.5000**	**100YR**	**135.80**	**5977.77**	**5979.67**	**5979.67**	**5980.27**	**0.023039**	**6.22**	**21.84**	**18.38**	**1.01**
SP2	**186.5000**	**10YR**	**59.40**	**5977.77**	**5979.04**	**5979.04**	**5979.45**	**0.026026**	**5.14**	**11.55**	**14.24**	**1.01**
SP2	**186.5000**	**2YR**	**17.70**	**5977.77**	**5978.48**	**5978.48**	**5978.70**	**0.031027**	**3.84**	**4.61**	**10.12**	**1.00**
SP2	**186.0000**	**500YR**	**194.70**	**5962.23**	**5964.32**	**5964.32**	**5965.03**	**0.017107**	**7.18**	**33.34**	**26.30**	**0.94**
SP2	**186.0000**	**100YR**	**135.80**	**5962.23**	**5963.98**	**5963.98**	**5964.57**	**0.018202**	**6.44**	**24.81**	**23.23**	**0.94**
SP2	**186.0000**	**10YR**	**59.40**	**5962.23**	**5963.38**	**5963.38**	**5963.77**	**0.022699**	**5.08**	**12.54**	**17.79**	**0.96**
SP2	**186.0000**	**2YR**	**17.70**	**5962.23**	**5962.88**	**5962.88**	**5963.08**	**0.031727**	**3.63**	**4.88**	**11.93**	**1.00**
SP2	**185.5000**	**500YR**	**203.40**	**5947.58**	**5949.45**	**5949.45**	**5950.07**	**0.022446**	**7.10**	**36.75**	**32.92**	**1.04**
SP2	**185.5000**	**100YR**	**141.90**	**5947.58**	**5949.15**	**5949.15**	**5949.67**	**0.025055**	**6.42**	**27.36**	**29.22**	**1.06**
SP2	**185.5000**	**10YR**	**61.80**	**5947.58**	**5948.67**	**5948.67**	**5948.99**	**0.028871**	**5.02**	**14.73**	**23.15**	**1.05**
SP2	**185.5000**	**2YR**	**19.20**	**5947.58**	**5948.26**	**5948.26**	**5948.44**	**0.027834**	**3.57**	**6.38**	**18.08**	**0.95**
SP2	**185.0000**	**500YR**	**203.40**	**5938.02**	**5939.86**	**5939.86**	**5940.46**	**0.020664**	**6.52**	**35.93**	**32.08**	**0.98**
SP2	**185.0000**	**100YR**	**141.90**	**5938.02**	**5939.57**	**5939.57**	**5940.07**	**0.020950**	**5.90**	**27.15**	**28.29**	**0.97**
SP2	**185.0000**	**10YR**	**61.80**	**5938.02**	**5939.03**	**5939.03**	**5939.38**	**0.024783**	**4.84**	**13.65**	**21.14**	**0.98**
SP2	**185.0000**	**2YR**	**19.20**	**5938.02**	**5938.57**	**5938.57**	**5938.77**	**0.033033**	**3.55**	**5.43**	**14.87**	**1.01**
SP2	**184.5000**	**500YR**	**203.40**	**5924.07**	**5925.58**	**5925.58**	**5926.12**	**0.024422**	**7.48**	**41.62**	**39.77**	**1.09**
SP2	**184.5000**	**100YR**	**141.90**	**5924.07**	**5925.33**	**5925.33**	**5925.77**	**0.024743**	**6.65**	**32.09**	**36.77**	**1.06**
SP2	**184.5000**	**10YR**	**61.80**	**5924.07**	**5924.88**	**5924.88**	**5925.17**	**0.029030**	**5.25**	**16.77**	**29.85**	**1.06**
SP2	**184.5000**	**2YR**	**19.20**	**5924.07**	**5924.52**	**5924.52**	**5924.67**	**0.032440**	**3.60**	**7.09**	**23.93**	**1.01**
SP2	**184.0000**	**500YR**	**203.40**	**5908.28**	**5909.80**	**5909.80**	**5910.24**	**0.020960**	**6.50**	**46.50**	**52.43**	**0.99**
SP2	**184.0000**	**100YR**	**141.90**	**5908.28**	**5909.55**	**5909.55**	**5909.94**	**0.023206**	**5.97**	**34.20**	**46.57**	**1.01**
SP2	**184.0000**	**10YR**	**61.80**	**5908.28**	**5909.16**	**5909.16**	**5909.42**	**0.024859**	**4.60**	**18.03**	**37.00**	**0.97**
SP2	**184.0000**	**2YR**	**19.20**	**5908.28**	**5908.81**	**5908.81**	**5908.96**	**0.030071**	**3.35**	**6.91**	**23.67**	**0.96**
SP2	**183.5000**	**500YR**	**203.40**	**5895.98**	**5897.61**	**5897.16**	**5897.76**	**0.009999**	**5.10**	**78.40**	**85.38**	**0.71**
SP2	**183.5000**	**100YR**	**141.90**	**5895.98**	**5897.35**	**5896.98**	**5897.48**	**0.010007**	**4.54**	**58.47**	**69.90**	**0.69**
SP2	**183.5000**	**10YR**	**61.80**	**5895.98**	**5896.90**	**5896.61**	**5896.98**	**0.010009**	**3.44**	**31.27**	**51.37**	**0.64**
SP2	**183.5000**	**2YR**	**19.20**	**5895.98**	**5896.49**	**5896.31**	**5896.53**	**0.010000**	**2.29**	**13.51**	**36.68**	**0.58**
SP1	**199.0000**	**500YR**	**1172.00**	**5882.02**	**5886.40**		**5887.03**	**0.009105**	**9.25**	**241.80**	**106.51**	**0.79**

SP1	**199.0000**	**100YR**	**862.00**	**5882.02**	**5885.84**		**5886.44**	**0.009903**	**8.77**	**184.66**	**95.21**	**0.81**
SP1	**199.0000**	**10YR**	**461.60**	**5882.02**	**5884.85**	**5884.71**	**5885.42**	**0.012333**	**7.94**	**102.51**	**71.39**	**0.85**
SP1	**199.0000**	**2YR**	**180.20**	**5882.02**	**5883.87**	**5883.81**	**5884.31**	**0.014689**	**6.39**	**44.22**	**46.95**	**0.86**
SP1	**198.5000**	**500YR**	**1172.00**	**5880.01**	**5883.64**	**5883.64**	**5884.80**	**0.013072**	**9.47**	**165.45**	**78.73**	**0.91**
SP1	**198.5000**	**100YR**	**862.00**	**5880.01**	**5883.16**	**5883.10**	**5884.14**	**0.012972**	**8.51**	**129.90**	**70.41**	**0.89**
SP1	**198.5000**	**10YR**	**461.60**	**5880.01**	**5882.44**	**5882.24**	**5883.05**	**0.011232**	**6.53**	**84.05**	**57.70**	**0.79**
SP1	**198.5000**	**2YR**	**180.20**	**5880.01**	**5881.64**		**5881.93**	**0.009468**	**4.38**	**43.80**	**41.82**	**0.67**
SP1	**198.0000**	**500YR**	**1172.00**	**5876.72**	**5879.28**	**5879.28**	**5880.00**	**0.030842**	**12.01**	**193.62**	**127.64**	**1.34**
SP1	**198.0000**	**100YR**	**862.00**	**5876.72**	**5878.96**	**5878.96**	**5879.60**	**0.032502**	**11.24**	**153.50**	**118.98**	**1.34**
SP1	**198.0000**	**10YR**	**461.60**	**5876.72**	**5878.44**	**5878.44**	**5878.92**	**0.032996**	**9.45**	**97.08**	**99.36**	**1.29**
SP1	**198.0000**	**2YR**	**180.20**	**5876.72**	**5877.84**	**5877.84**	**5878.17**	**0.035463**	**7.28**	**45.59**	**67.64**	**1.24**
SP1	**197.5000**	**500YR**	**1172.00**	**5874.01**	**5878.11**		**5878.39**	**0.003029**	**5.21**	**360.91**	**149.48**	**0.46**
SP1	**197.5000**	**100YR**	**862.00**	**5874.01**	**5877.24**		**5877.56**	**0.004524**	**5.43**	**241.94**	**123.42**	**0.53**
SP1	**197.5000**	**10YR**	**461.60**	**5874.01**	**5876.01**		**5876.40**	**0.009520**	**5.68**	**111.78**	**86.85**	**0.71**
SP1	**197.5000**	**2YR**	**180.20**	**5874.01**	**5875.22**		**5875.47**	**0.010390**	**4.23**	**52.49**	**62.70**	**0.69**
SP1	**197.375***	**500YR**	**1172.00**	**5873.51**	**5878.12**	**5876.28**	**5878.30**	**0.001556**	**4.00**	**448.80**	**170.43**	**0.33**
SP1	**197.375***	**100YR**	**862.00**	**5873.51**	**5877.25**	**5875.84**	**5877.44**	**0.002078**	**4.01**	**311.81**	**143.24**	**0.37**
SP1	**197.375***	**10YR**	**461.60**	**5873.51**	**5876.01**	**5875.12**	**5876.20**	**0.003213**	**3.78**	**158.12**	**102.47**	**0.43**
SP1	**197.375***	**2YR**	**180.20**	**5873.51**	**5875.23**	**5874.44**	**5875.31**	**0.002167**	**2.39**	**88.44**	**76.28**	**0.33**
SP1	**197.3**		**Bridge**									
SP1	**197.25***	**500YR**	**1172.00**	**5873.01**	**5875.59**	**5875.59**	**5876.54**	**0.014978**	**8.18**	**170.35**	**103.84**	**0.93**
SP1	**197.25***	**100YR**	**862.00**	**5873.01**	**5875.18**	**5875.18**	**5876.00**	**0.016067**	**7.49**	**130.64**	**90.09**	**0.93**
SP1	**197.25***	**10YR**	**461.60**	**5873.01**	**5874.49**	**5874.49**	**5875.11**	**0.020261**	**6.36**	**76.06**	**69.50**	**0.98**
SP1	**197.25***	**2YR**	**180.20**	**5873.01**	**5873.92**	**5873.86**	**5874.23**	**0.020096**	**4.41**	**40.89**	**54.69**	**0.89**
SP1	**197.125***	**500YR**	**1172.00**	**5872.51**	**5874.92**	**5874.92**	**5875.87**	**0.016217**	**7.94**	**161.44**	**100.26**	**0.95**
SP1	**197.125***	**100YR**	**862.00**	**5872.51**	**5874.53**	**5874.53**	**5875.33**	**0.017694**	**7.26**	**124.77**	**86.64**	**0.96**
SP1	**197.125***	**10YR**	**461.60**	**5872.51**	**5873.90**	**5873.90**	**5874.47**	**0.022225**	**6.09**	**76.14**	**69.42**	**1.00**
SP1	**197.125***	**2YR**	**180.20**	**5872.51**	**5873.33**	**5873.30**	**5873.64**	**0.023075**	**4.46**	**40.41**	**57.45**	**0.94**
SP1	**197.0000**	**500YR**	**1172.00**	**5872.01**	**5874.27**	**5874.27**	**5875.19**	**0.017690**	**7.72**	**156.53**	**95.59**	**0.97**
SP1	**197.0000**	**100YR**	**862.00**	**5872.01**	**5873.89**	**5873.89**	**5874.67**	**0.019821**	**7.08**	**122.81**	**84.00**	**0.99**
SP1	**197.0000**	**10YR**	**461.60**	**5872.01**	**5873.35**	**5873.32**	**5873.87**	**0.020942**	**5.73**	**80.53**	**73.00**	**0.96**
SP1	**197.0000**	**2YR**	**180.20**	**5872.01**	**5872.85**	**5872.74**	**5873.09**	**0.016683**	**3.89**	**46.33**	**63.39**	**0.80**
SP1	**196.5000**	**500YR**	**1172.00**	**5868.01**	**5869.74**	**5869.74**	**5870.43**	**0.019888**	**6.76**	**181.30**	**144.25**	**0.98**
SP1	**196.5000**	**100YR**	**862.00**	**5868.01**	**5869.47**	**5869.47**	**5870.05**	**0.021491**	**6.14**	**144.24**	**131.43**	**0.99**
SP1	**196.5000**	**10YR**	**461.60**	**5868.01**	**5869.02**	**5869.02**	**5869.43**	**0.024282**	**5.20**	**90.11**	**110.43**	**0.99**
SP1	**196.5000**	**2YR**	**180.20**	**5868.01**	**5868.57**	**5868.57**	**5868.82**	**0.029687**	**4.01**	**45.02**	**92.08**	**1.00**
SP1	**196.0000**	**500YR**	**1172.00**	**5862.01**	**5865.01**		**5865.27**	**0.008172**	**6.15**	**351.39**	**238.04**	**0.69**
SP1	**196.0000**	**100YR**	**862.00**	**5862.01**	**5864.72**		**5864.95**	**0.008138**	**5.67**	**285.39**	**230.01**	**0.67**
SP1	**196.0000**	**10YR**	**461.60**	**5862.01**	**5864.27**	**5863.63**	**5864.46**	**0.008346**	**4.91**	**182.81**	**217.19**	**0.65**
SP1	**196.0000**	**2YR**	**180.20**	**5862.01**	**5863.74**		**5863.87**	**0.006499**	**3.55**	**86.46**	**124.47**	**0.55**
SP1	**195.5000**	**500YR**	**1172.00**	**5859.11**	**5860.45**	**5860.45**	**5860.79**	**0.031017**	**7.85**	**298.36**	**395.61**	**1.21**
SP1	**195.5000**	**100YR**	**862.00**	**5859.11**	**5860.33**	**5860.33**	**5860.61**	**0.028654**	**7.08**	**250.63**	**389.96**	**1.14**
SP1	**195.5000**	**10YR**	**461.60**	**5859.11**	**5860.14**	**5860.14**	**5860.33**	**0.023723**	**5.73**	**176.75**	**383.33**	**1.01**
SP1	**195.5000**	**2YR**	**180.20**	**5859.11**	**5859.79**	**5859.79**	**5859.98**	**0.032031**	**5.00**	**66.49**	**193.06**	**1.09**
SP1	**195.0000**	**500YR**	**1172.00**	**5854.01**	**5855.57**	**5855.15**	**5855.69**	**0.010005**	**3.32**	**444.76**	**443.37**	**0.50**
SP1	**195.0000**	**100YR**	**862.00**	**5854.01**	**5855.38**	**5855.02**	**5855.47**	**0.010014**	**3.00**	**361.49**	**421.27**	**0.49**
SP1	**195.0000**	**10YR**	**461.60**	**5854.01**	**5855.07**	**5854.82**	**5855.14**	**0.010013**	**2.48**	**238.41**	**390.03**	**0.47**
SP1	**195.0000**	**2YR**	**180.20**	**5854.01**	**5854.77**	**5854.59**	**5854.81**	**0.010000**	**1.89**	**125.95**	**349.73**	**0.45**
NS18	**20.0000**	**500YR**	**113.40**	**6274.72**	**6276.52**	**6276.52**	**6277.06**	**0.020467**	**6.03**	**20.24**	**19.88**	**0.96**
NS18	**20.0000**	**100YR**	**79.30**	**6274.72**	**6276.22**	**6276.22**	**6276.70**	**0.022772**	**5.59**	**14.81**	**16.97**	**0.98**
NS18	**20.0000**	**10YR**	**31.40**	**6274.72**	**6275.69**	**6275.69**	**6276.00**	**0.029191**	**4.43**	**7.09**	**12.13**	**1.01**
NS18	**20.0000**	**2YR**	**11.20**	**6274.72**	**6275.32**	**6275.32**	**6275.51**	**0.034959**	**3.49**	**3.21**	**8.89**	**1.03**
NS18	**19.0000**	**500YR**	**113.40**	**6261.80**	**6263.54**	**6263.54**	**6264.09**	**0.023837**	**5.98**	**18.95**	**17.43**	**1.01**
NS18	**19.0000**	**100YR**	**79.30**	**6261.80**	**6263.26**	**6263.26**	**6263.73**	**0.025226**	**5.50**	**14.41**	**15.67**	**1.01**
NS18	**19.0000**	**10YR**	**31.40**	**6261.80**	**6262.74**	**6262.74**	**6263.04**	**0.028522**	**4.40**	**7.14**	**11.98**	**1.00**

NS18	**19.0000**	**2YR**	**11.20**	**6261.80**	**6262.37**	**6262.37**	**6262.55**	**0.033189**	**3.44**	**3.25**	**8.86**	**1.00**
NS18	**18.0000**	**500YR**	**113.40**	**6245.73**	**6248.15**	**6247.61**	**6248.43**	**0.006394**	**4.24**	**28.10**	**19.74**	**0.56**
NS18	**18.0000**	**100YR**	**79.30**	**6245.73**	**6247.84**	**6247.32**	**6248.05**	**0.006100**	**3.63**	**22.31**	**17.66**	**0.53**
NS18	**18.0000**	**10YR**	**31.40**	**6245.73**	**6246.75**	**6246.75**	**6247.07**	**0.028013**	**4.57**	**6.87**	**10.67**	**1.00**
NS18	**18.0000**	**2YR**	**11.20**	**6245.73**	**6246.35**	**6246.35**	**6246.55**	**0.032697**	**3.58**	**3.13**	**7.91**	**1.00**
NS18	**17.8**		**Bridge**									
NS18	**17.75***	**500YR**	**113.40**	**6240.01**	**6241.83**	**6241.83**	**6242.42**	**0.023688**	**6.16**	**18.45**	**16.51**	**1.01**
NS18	**17.75***	**100YR**	**79.30**	**6240.01**	**6241.56**	**6241.56**	**6242.04**	**0.024829**	**5.60**	**14.16**	**14.76**	**1.01**
NS18	**17.75***	**10YR**	**31.40**	**6240.01**	**6241.00**	**6241.00**	**6241.31**	**0.028535**	**4.53**	**6.93**	**11.09**	**1.01**
NS18	**17.75***	**2YR**	**11.20**	**6240.01**	**6240.61**	**6240.61**	**6240.80**	**0.031978**	**3.50**	**3.20**	**8.23**	**0.99**
NS18	**17.5***	**500YR**	**113.40**	**6234.29**	**6236.04**	**6236.04**	**6236.61**	**0.022927**	**6.06**	**18.86**	**17.54**	**1.00**
NS18	**17.5***	**100YR**	**79.30**	**6234.29**	**6235.78**	**6235.78**	**6236.25**	**0.024834**	**5.48**	**14.46**	**15.73**	**1.00**
NS18	**17.5***	**10YR**	**31.40**	**6234.29**	**6235.24**	**6235.24**	**6235.55**	**0.029068**	**4.47**	**7.03**	**11.68**	**1.01**
NS18	**17.5***	**2YR**	**11.20**	**6234.29**	**6234.86**	**6234.86**	**6235.05**	**0.034423**	**3.53**	**3.17**	**8.54**	**1.02**
NS18	**17.25***	**500YR**	**113.40**	**6228.57**	**6230.24**	**6230.24**	**6230.80**	**0.022927**	**6.00**	**19.28**	**19.02**	**1.00**
NS18	**17.25***	**100YR**	**79.30**	**6228.57**	**6229.98**	**6229.98**	**6230.44**	**0.025422**	**5.47**	**14.56**	**16.89**	**1.01**
NS18	**17.25***	**10YR**	**31.40**	**6228.57**	**6229.48**	**6229.48**	**6229.78**	**0.029245**	**4.35**	**7.21**	**12.53**	**1.01**
NS18	**17.25***	**2YR**	**11.20**	**6228.57**	**6229.13**	**6229.13**	**6229.30**	**0.033050**	**3.39**	**3.30**	**9.19**	**1.00**
NS18	**17.0000**	**500YR**	**113.40**	**6222.85**	**6224.45**	**6224.45**	**6224.97**	**0.022306**	**5.86**	**20.20**	**21.28**	**0.98**
NS18	**17.0000**	**100YR**	**79.30**	**6222.85**	**6224.20**	**6224.20**	**6224.64**	**0.024162**	**5.32**	**15.21**	**18.95**	**0.99**
NS18	**17.0000**	**10YR**	**31.40**	**6222.85**	**6223.73**	**6223.73**	**6224.00**	**0.029391**	**4.20**	**7.48**	**13.84**	**1.01**
NS18	**17.0000**	**2YR**	**11.20**	**6222.85**	**6223.38**	**6223.38**	**6223.55**	**0.033919**	**3.32**	**3.37**	**9.87**	**1.00**
NS18	**16.0000**	**500YR**	**113.40**	**6207.42**	**6209.08**	**6209.08**	**6209.67**	**0.023421**	**6.15**	**18.50**	**16.86**	**1.01**
NS18	**16.0000**	**100YR**	**79.30**	**6207.42**	**6208.82**	**6208.82**	**6209.30**	**0.024765**	**5.52**	**14.35**	**15.28**	**1.00**
NS18	**16.0000**	**10YR**	**31.40**	**6207.42**	**6208.30**	**6208.30**	**6208.60**	**0.028678**	**4.40**	**7.14**	**12.04**	**1.01**
NS18	**16.0000**	**2YR**	**11.20**	**6207.42**	**6207.94**	**6207.94**	**6208.12**	**0.033091**	**3.36**	**3.33**	**9.43**	**1.00**
NS18	**15.0000**	**500YR**	**113.40**	**6191.66**	**6193.25**	**6193.25**	**6193.78**	**0.023085**	**6.06**	**20.76**	**20.86**	**1.01**
NS18	**15.0000**	**100YR**	**79.30**	**6191.66**	**6193.00**	**6193.00**	**6193.44**	**0.024284**	**5.53**	**15.72**	**18.50**	**1.00**
NS18	**15.0000**	**10YR**	**31.40**	**6191.66**	**6192.50**	**6192.50**	**6192.79**	**0.027039**	**4.36**	**7.69**	**13.99**	**0.99**
NS18	**15.0000**	**2YR**	**11.20**	**6191.66**	**6192.16**	**6192.16**	**6192.33**	**0.032659**	**3.36**	**3.42**	**10.48**	**0.99**
NS18	**14.0000**	**500YR**	**113.40**	**6172.79**	**6174.15**	**6173.93**	**6174.37**	**0.010004**	**4.33**	**36.44**	**43.61**	**0.68**
NS18	**14.0000**	**100YR**	**79.30**	**6172.79**	**6173.94**	**6173.75**	**6174.12**	**0.010008**	**3.83**	**27.79**	**38.97**	**0.66**
NS18	**14.0000**	**10YR**	**31.40**	**6172.79**	**6173.54**	**6173.40**	**6173.64**	**0.009992**	**2.78**	**13.91**	**30.45**	**0.61**

NS18 14.0000 **2YR**
11.20 6172.79 **6173.26**
6173.15 **6173.31**
0.010007 **1.92**
6.46 23.02 **0.55**

D-2. HEC-RAS Post-Project FROZEN Condition SUMMARY TABLE

Reach	River Sta Top Width	Profile	Q Total Froude # Chl	Min Ch El		W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope		Vel Chnl	Flow Area
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
NW2	110.0000	500YR	28.51	5864.01	5864.39		5864.41	0.003903	1.17	26.14	82.99	0.34
NW2	110.0000	100YR	21.47	5864.01	5864.33		5864.35	0.003881	1.05	21.61	79.75	0.33
NW2	110.0000	10YR	12.38	5864.01	5864.25	5864.13	5864.26	0.003567	0.84	15.39	73.26	0.31
NW2	110.0000	2YR	6.10	5864.01	5864.17	5864.07	5864.18	0.003577	0.64	9.69	66.32	0.29
NW2	109.5000	500YR	28.51	5861.97	5862.21	5862.21	5862.31	0.068036	3.26	12.10	64.17	1.30
NW2	109.5000	100YR	21.47	5861.97	5862.18	5862.18	5862.26	0.066721	2.94	10.14	62.20	1.26
NW2	109.5000	10YR	12.38	5861.97	5862.12	5862.12	5862.19	0.097333	2.75	6.38	59.88	1.43
NW2	109.5000	2YR	6.10	5861.97	5862.08	5862.08	5862.12	0.093753	2.18	4.13	58.11	1.33
NW2	109.0000	500YR	28.51	5858.01	5858.65	5858.44	5858.71	0.006076	2.07	17.16	43.10	0.47
NW2	109.0000	100YR	21.47	5858.01	5858.56	5858.37	5858.61	0.006098	1.87	13.69	37.78	0.46
NW2	109.0000	10YR	12.38	5858.01	5858.43	5858.27	5858.46	0.005773	1.50	9.26	31.53	0.42
NW2	109.0000	2YR	6.10	5858.01	5858.31	5858.18	5858.33	0.005179	1.11	5.80	26.47	0.38
NW2	108.9		Bridge									
NW2	108.875*	500YR	28.51	5857.51	5857.97		5858.09	0.021009	2.84	10.56	32.76	0.81
NW2	108.875*	100YR	21.47	5857.51	5857.90		5858.01	0.021681	2.58	8.60	29.93	0.80
NW2	108.875*	10YR	12.38	5857.51	5857.81		5857.88	0.021776	2.12	5.88	26.58	0.76
NW2	108.875*	2YR	6.10	5857.51	5857.72		5857.76	0.021168	1.65	3.69	21.86	0.71
NW2	108.75*	500YR	28.51	5857.01	5857.51	5857.41	5857.59	0.013227	2.35	12.59	34.97	0.65
NW2	108.75*	100YR	21.47	5857.01	5857.45	5857.35	5857.51	0.012488	2.09	10.53	32.90	0.62
NW2	108.75*	10YR	12.38	5857.01	5857.34		5857.38	0.013323	1.74	7.10	27.76	0.60
NW2	108.75*	2YR	6.10	5857.01	5857.23		5857.26	0.013652	1.40	4.36	23.90	0.58
NW2	108.625*	500YR	28.51	5856.51	5856.91	5856.89	5857.04	0.028377	2.91	9.82	32.03	0.91
NW2	108.625*	100YR	21.47	5856.51	5856.85	5856.83	5856.96	0.030222	2.71	7.93	29.17	0.92
NW2	108.625*	10YR	12.38	5856.51	5856.77	5856.75	5856.84	0.027782	2.20	5.62	26.46	0.84
NW2	108.625*	2YR	6.10	5856.51	5856.69		5856.73	0.024754	1.67	3.65	23.91	0.75
NW2	108.5000	500YR	28.51	5856.01	5856.53		5856.59	0.008800	1.94	14.82	38.50	0.53
NW2	108.5000	100YR	21.47	5856.01	5856.47		5856.51	0.008729	1.75	12.28	34.34	0.52
NW2	108.5000	10YR	12.38	5856.01	5856.33		5856.37	0.010121	1.54	8.02	30.16	0.53
NW2	108.5000	2YR	6.10	5856.01	5856.22		5856.24	0.011726	1.28	4.76	26.53	0.53
NW2	108.0000	500YR	41.46	5853.40	5854.15	5854.13	5854.25	0.011332	2.94	23.46	88.68	0.65
NW2	108.0000	100YR	31.14	5853.40	5854.09	5854.08	5854.18	0.011403	2.75	17.75	83.74	0.64
NW2	108.0000	10YR	18.07	5853.40	5853.97		5854.04	0.010180	2.22	9.95	33.75	0.58
NW2	108.0000	2YR	8.92	5853.40	5853.83	5853.73	5853.87	0.009592	1.70	5.78	25.97	0.53
NW2	107.5000	500YR	41.46	5852.01	5852.39		5852.44	0.008821	1.80	23.66	69.79	0.52
NW2	107.5000	100YR	31.14	5852.01	5852.33		5852.37	0.008863	1.62	19.67	67.73	0.51
NW2	107.5000	10YR	18.07	5852.01	5852.24		5852.27	0.009355	1.32	13.72	63.73	0.49
NW2	107.5000	2YR	8.92	5852.01	5852.17		5852.18	0.009170	1.00	8.96	60.52	0.46
NW2	107.0000	500YR	41.46	5848.01	5848.78	5848.78	5849.00	0.024874	4.62	14.54	37.95	0.97
NW2	107.0000	100YR	31.14	5848.01	5848.69	5848.69	5848.89	0.025733	4.27	11.25	32.36	0.97
NW2	107.0000	10YR	18.07	5848.01	5848.55	5848.55	5848.70	0.024866	3.55	7.31	26.02	0.91
NW2	107.0000	2YR	8.92	5848.01	5848.40	5848.40	5848.52	0.028130	2.92	3.94	19.08	0.91
NW	100.0000	500YR	527.62	5912.01	5913.65	5913.65	5914.28	0.018861	6.86	95.69	85.19	0.97
NW	100.0000	100YR	398.19	5912.01	5913.41	5913.41	5913.95	0.019578	6.26	76.64	77.08	0.96
NW	100.0000	10YR	235.60	5912.01	5913.04	5913.04	5913.45	0.022595	5.40	50.00	65.30	0.98
NW	100.0000	2YR	120.49	5912.01	5912.71	5912.70	5912.99	0.026412	4.39	30.04	54.61	0.98
NW	99.5000	500YR	527.62	5909.28	5910.91	5910.91	5911.43	0.025187	7.94	111.92	110.04	1.12
NW	99.5000	100YR	398.19	5909.28	5910.73	5910.73	5911.16	0.024345	7.17	92.01	101.54	1.08
NW	99.5000	10YR	235.60	5909.28	5910.41	5910.41	5910.75	0.025289	6.14	62.02	88.70	1.05
NW	99.5000	2YR	120.49	5909.28	5910.11	5910.11	5910.36	0.025982	5.00	37.81	75.98	1.01
NW	99.0000	500YR	527.62	5906.01	5907.86	5907.68	5908.30	0.014145	5.69	108.97	86.71	0.83
NW	99.0000	100YR	398.19	5906.01	5907.61		5907.99	0.014439	5.28	87.86	79.61	0.82
NW	99.0000	10YR	235.60	5906.01	5907.23		5907.52	0.014583	4.52	59.71	69.59	0.79
NW	99.0000	2YR	120.49	5906.01	5906.88		5907.07	0.014069	3.61	37.18	59.93	0.74

NW	**98.5000**	**500YR**	**527.62**	**5903.51**	**5905.54**	**5905.38**	**5905.96**	**0.015642**	**7.35**	**130.79**	**117.66**	**0.92**
NW	**98.5000**	**100YR**	**398.19**	**5903.51**	**5905.32**	**5905.16**	**5905.68**	**0.014952**	**6.64**	**106.31**	**104.69**	**0.88**
NW	**98.5000**	**10YR**	**235.60**	**5903.51**	**5904.95**	**5904.81**	**5905.23**	**0.014521**	**5.61**	**71.30**	**86.28**	**0.83**
NW	**98.5000**	**2YR**	**120.49**	**5903.51**	**5904.56**	**5904.48**	**5904.77**	**0.015130**	**4.61**	**41.64**	**66.93**	**0.81**
NW	**98.0000**	**500YR**	**527.62**	**5900.13**	**5902.97**	**5902.97**	**5903.55**	**0.013063**	**8.11**	**123.80**	**106.62**	**0.88**
NW	**98.0000**	**100YR**	**398.19**	**5900.13**	**5902.66**	**5902.66**	**5903.22**	**0.014073**	**7.73**	**92.87**	**87.46**	**0.89**
NW	**98.0000**	**10YR**	**235.60**	**5900.13**	**5902.12**	**5902.12**	**5902.64**	**0.016111**	**6.96**	**54.55**	**57.86**	**0.91**
NW	**98.0000**	**2YR**	**120.49**	**5900.13**	**5901.60**	**5901.60**	**5902.00**	**0.017802**	**5.80**	**29.83**	**39.08**	**0.91**
NW	**97.5000**	**500YR**	**527.62**	**5898.01**	**5900.78**		**5901.15**	**0.007430**	**5.82**	**146.73**	**132.93**	**0.65**
NW	**97.5000**	**100YR**	**398.19**	**5898.01**	**5900.54**		**5900.86**	**0.006852**	**5.22**	**116.62**	**117.28**	**0.62**
NW	**97.5000**	**10YR**	**235.60**	**5898.01**	**5900.11**		**5900.33**	**0.006029**	**4.23**	**75.07**	**74.45**	**0.56**
NW	**97.5000**	**2YR**	**120.49**	**5898.01**	**5899.63**		**5899.76**	**0.005045**	**3.14**	**47.38**	**49.38**	**0.49**
NW	**97.0000**	**500YR**	**527.62**	**5896.81**	**5898.70**	**5898.63**	**5899.10**	**0.025637**	**8.97**	**120.77**	**116.53**	**1.16**
NW	**97.0000**	**100YR**	**398.19**	**5896.81**	**5898.47**	**5898.45**	**5898.86**	**0.027888**	**8.59**	**95.80**	**107.11**	**1.19**
NW	**97.0000**	**10YR**	**235.60**	**5896.81**	**5898.15**	**5898.15**	**5898.46**	**0.029204**	**7.57**	**63.57**	**89.41**	**1.17**
NW	**97.0000**	**2YR**	**120.49**	**5896.81**	**5897.76**	**5897.76**	**5898.03**	**0.034613**	**6.51**	**34.68**	**62.94**	**1.20**
NW	**96.5000**	**500YR**	**527.62**	**5894.01**	**5896.34**		**5896.67**	**0.006967**	**5.30**	**142.04**	**101.93**	**0.62**
NW	**96.5000**	**100YR**	**398.19**	**5894.01**	**5896.05**		**5896.33**	**0.007002**	**4.84**	**114.07**	**90.37**	**0.61**
NW	**96.5000**	**10YR**	**235.60**	**5894.01**	**5895.64**		**5895.83**	**0.006096**	**3.87**	**79.98**	**75.37**	**0.55**
NW	**96.5000**	**2YR**	**120.49**	**5894.01**	**5895.17**		**5895.30**	**0.006147**	**3.06**	**48.08**	**59.73**	**0.52**
NW	**96.0000**	**500YR**	**607.31**	**5892.01**	**5894.21**	**5894.21**	**5894.80**	**0.016221**	**7.77**	**128.70**	**107.03**	**0.94**
NW	**96.0000**	**100YR**	**459.96**	**5892.01**	**5893.98**	**5893.98**	**5894.50**	**0.015643**	**7.07**	**105.07**	**99.02**	**0.91**
NW	**96.0000**	**10YR**	**273.65**	**5892.01**	**5893.51**	**5893.51**	**5893.98**	**0.018781**	**6.41**	**63.85**	**76.99**	**0.95**
NW	**96.0000**	**2YR**	**140.34**	**5892.01**	**5893.13**	**5893.13**	**5893.46**	**0.018394**	**5.13**	**37.48**	**59.74**	**0.89**
NW	**95.5000**	**500YR**	**607.31**	**5890.01**	**5891.55**		**5891.73**	**0.005227**	**3.54**	**183.46**	**135.81**	**0.51**
NW	**95.5000**	**100YR**	**459.96**	**5890.01**	**5891.31**		**5891.47**	**0.005387**	**3.20**	**151.77**	**131.07**	**0.50**
NW	**95.5000**	**10YR**	**273.65**	**5890.01**	**5890.95**		**5891.06**	**0.005786**	**2.68**	**106.29**	**123.91**	**0.49**
NW	**95.5000**	**2YR**	**140.34**	**5890.01**	**5890.63**		**5890.70**	**0.006453**	**2.14**	**67.22**	**116.58**	**0.48**
NW	**95.0000**	**500YR**	**607.31**	**5888.01**	**5890.05**	**5889.94**	**5890.52**	**0.013178**	**6.21**	**134.39**	**113.18**	**0.82**
NW	**95.0000**	**100YR**	**459.96**	**5888.01**	**5889.82**	**5889.69**	**5890.23**	**0.013200**	**5.72**	**108.85**	**107.47**	**0.81**
NW	**95.0000**	**10YR**	**273.65**	**5888.01**	**5889.45**	**5889.37**	**5889.77**	**0.013403**	**4.87**	**71.73**	**91.03**	**0.78**
NW	**95.0000**	**2YR**	**140.34**	**5888.01**	**5889.09**	**5889.00**	**5889.31**	**0.013280**	**3.90**	**42.06**	**74.74**	**0.74**
NW	**94.5000**	**500YR**	**607.31**	**5886.01**	**5887.85**		**5888.20**	**0.010066**	**5.45**	**147.84**	**111.85**	**0.72**
NW	**94.5000**	**100YR**	**459.96**	**5886.01**	**5887.61**		**5887.91**	**0.010077**	**4.95**	**121.82**	**107.62**	**0.70**
NW	**94.5000**	**10YR**	**273.65**	**5886.01**	**5887.25**		**5887.47**	**0.009765**	**4.11**	**84.94**	**97.53**	**0.66**
NW	**94.5000**	**2YR**	**140.34**	**5886.01**	**5886.88**		**5887.03**	**0.009809**	**3.27**	**51.86**	**82.28**	**0.63**
NW	**94.0000**	**500YR**	**607.31**	**5884.01**	**5886.41**		**5886.76**	**0.012600**	**7.08**	**155.56**	**114.97**	**0.84**
NW	**94.0000**	**100YR**	**459.96**	**5884.01**	**5886.17**		**5886.48**	**0.012361**	**6.51**	**128.88**	**109.87**	**0.81**
NW	**94.0000**	**10YR**	**273.65**	**5884.01**	**5885.74**		**5886.00**	**0.013438**	**5.77**	**84.68**	**93.42**	**0.81**
NW	**94.0000**	**2YR**	**140.34**	**5884.01**	**5885.30**		**5885.51**	**0.014717**	**4.84**	**48.59**	**71.17**	**0.81**
NW	**93.5000**	**500YR**	**607.31**	**5882.01**	**5884.39**	**5884.16**	**5884.68**	**0.009483**	**6.41**	**182.39**	**143.88**	**0.74**
NW	**93.5000**	**100YR**	**459.96**	**5882.01**	**5884.16**	**5883.69**	**5884.43**	**0.009400**	**5.97**	**150.56**	**140.71**	**0.72**
NW	**93.5000**	**10YR**	**273.65**	**5882.01**	**5883.76**	**5883.34**	**5883.97**	**0.008542**	**4.96**	**99.74**	**104.47**	**0.66**
NW	**93.5000**	**2YR**	**140.34**	**5882.01**	**5883.31**	**5882.97**	**5883.46**	**0.008107**	**3.95**	**59.41**	**77.74**	**0.61**
NW	**93.0000**	**500YR**	**607.31**	**5880.01**	**5881.87**	**5881.70**	**5882.24**	**0.011844**	**5.91**	**161.73**	**157.07**	**0.78**
NW	**93.0000**	**100YR**	**459.96**	**5880.01**	**5881.64**	**5881.49**	**5881.97**	**0.012160**	**5.46**	**127.93**	**139.69**	**0.78**
NW	**93.0000**	**10YR**	**273.65**	**5880.01**	**5881.28**	**5881.17**	**5881.55**	**0.013217**	**4.76**	**81.87**	**114.48**	**0.77**
NW	**93.0000**	**2YR**	**140.34**	**5880.01**	**5880.93**		**5881.12**	**0.013093**	**3.77**	**47.71**	**81.18**	**0.73**
NW	**92.5000**	**500YR**	**607.31**	**5878.01**	**5879.75**		**5879.86**	**0.006435**	**4.02**	**230.73**	**159.26**	**0.56**
NW	**92.5000**	**100YR**	**459.96**	**5878.01**	**5879.50**		**5879.60**	**0.006303**	**3.55**	**192.77**	**151.57**	**0.54**
NW	**92.5000**	**10YR**	**273.65**	**5878.01**	**5879.15**		**5879.21**	**0.005853**	**2.78**	**140.50**	**141.32**	**0.50**
NW	**92.5000**	**2YR**	**140.34**	**5878.01**	**5878.78**		**5878.82**	**0.005790**	**2.03**	**91.36**	**129.26**	**0.46**
NW	**92.0000**	**500YR**	**607.31**	**5875.73**	**5876.86**	**5876.67**	**5877.04**	**0.020292**	**5.62**	**190.30**	**235.48**	**0.95**
NW	**92.0000**	**100YR**	**459.96**	**5875.73**	**5876.75**		**5876.89**	**0.018818**	**5.02**	**163.21**	**230.90**	**0.89**
NW	**92.0000**	**10YR**	**273.65**	**5875.73**	**5876.55**		**5876.65**	**0.018410**	**4.26**	**117.85**	**221.70**	**0.85**

NW	**92.0000**	**2YR**	**140.34**	**5875.73**	**5876.38**	**5876.27**	**5876.44**	**0.015569**	**3.32**	**80.87**	**211.43**	**0.75**
NW	**91.5000**	**500YR**	**607.31**	**5874.01**	**5875.20**		**5875.31**	**0.004825**	**2.85**	**246.68**	**249.38**	**0.47**
NW	**91.5000**	**100YR**	**459.96**	**5874.01**	**5875.01**		**5875.11**	**0.005226**	**2.63**	**200.23**	**242.12**	**0.47**
NW	**91.5000**	**10YR**	**273.65**	**5874.01**	**5874.75**		**5874.82**	**0.005488**	**2.21**	**139.04**	**226.77**	**0.46**
NW	**91.5000**	**2YR**	**140.34**	**5874.01**	**5874.50**		**5874.55**	**0.006331**	**1.81**	**84.45**	**203.50**	**0.46**
NW	**91.0000**	**500YR**	**699.31**	**5872.01**	**5873.55**		**5873.81**	**0.008664**	**4.55**	**202.57**	**195.59**	**0.65**
NW	**91.0000**	**100YR**	**532.88**	**5872.01**	**5873.37**		**5873.59**	**0.008150**	**4.05**	**168.81**	**181.71**	**0.62**
NW	**91.0000**	**10YR**	**318.10**	**5872.01**	**5873.04**		**5873.20**	**0.008603**	**3.43**	**112.62**	**154.22**	**0.61**
NW	**91.0000**	**2YR**	**163.05**	**5872.01**	**5872.74**		**5872.84**	**0.008268**	**2.66**	**70.45**	**129.72**	**0.56**
NW	**90.5000**	**500YR**	**699.31**	**5868.01**	**5869.52**	**5869.52**	**5870.12**	**0.020368**	**6.68**	**126.03**	**109.62**	**0.99**
NW	**90.5000**	**100YR**	**532.88**	**5868.01**	**5869.26**	**5869.26**	**5869.81**	**0.023894**	**6.39**	**98.13**	**100.09**	**1.04**
NW	**90.5000**	**10YR**	**318.10**	**5868.01**	**5868.96**	**5868.96**	**5869.35**	**0.023160**	**5.27**	**69.45**	**91.56**	**0.98**
NW	**90.5000**	**2YR**	**163.05**	**5868.01**	**5868.64**	**5868.64**	**5868.91**	**0.026317**	**4.30**	**42.20**	**80.50**	**0.98**
NW	**90.0000**	**500YR**	**699.31**	**5864.61**	**5866.61**	**5865.97**	**5866.68**	**0.003459**	**3.44**	**386.71**	**322.10**	**0.43**
NW	**90.0000**	**100YR**	**532.88**	**5864.61**	**5866.41**	**5865.80**	**5866.47**	**0.003382**	**3.17**	**323.20**	**309.13**	**0.42**
NW	**90.0000**	**10YR**	**318.10**	**5864.61**	**5866.10**	**5865.64**	**5866.14**	**0.003259**	**2.74**	**229.74**	**290.34**	**0.40**
NW	**90.0000**	**2YR**	**163.05**	**5864.61**	**5865.76**	**5865.37**	**5865.80**	**0.003069**	**2.24**	**140.83**	**234.54**	**0.37**
NW	**89.5000**	**500YR**	**699.31**	**5862.01**	**5862.96**	**5862.96**	**5863.28**	**0.052244**	**6.43**	**158.04**	**240.84**	**1.39**
NW	**89.5000**	**100YR**	**532.88**	**5862.01**	**5862.84**	**5862.84**	**5863.11**	**0.053333**	**6.05**	**131.60**	**233.09**	**1.38**
NW	**89.5000**	**10YR**	**318.10**	**5862.01**	**5862.67**	**5862.67**	**5862.87**	**0.055855**	**5.41**	**92.24**	**216.39**	**1.37**
NW	**89.5000**	**2YR**	**163.05**	**5862.01**	**5862.51**	**5862.51**	**5862.65**	**0.059555**	**4.75**	**58.51**	**201.18**	**1.36**
NW	**89.0000**	**500YR**	**1206.50**	**5856.01**	**5857.84**		**5857.99**	**0.003770**	**3.41**	**470.32**	**385.62**	**0.44**
NW	**89.0000**	**100YR**	**918.25**	**5856.01**	**5857.59**		**5857.72**	**0.003859**	**3.12**	**377.81**	**348.85**	**0.44**
NW	**89.0000**	**10YR**	**545.97**	**5856.01**	**5857.19**		**5857.29**	**0.004021**	**2.62**	**250.99**	**285.15**	**0.43**
NW	**89.0000**	**2YR**	**279.82**	**5856.01**	**5856.83**		**5856.89**	**0.003948**	**2.04**	**156.38**	**239.90**	**0.40**
NW	**88.5000**	**500YR**	**1206.50**	**5854.01**	**5856.07**		**5856.20**	**0.003186**	**3.38**	**522.05**	**411.18**	**0.42**
NW	**88.5000**	**100YR**	**918.25**	**5854.01**	**5855.82**		**5855.93**	**0.003080**	**3.05**	**426.57**	**373.39**	**0.40**
NW	**88.5000**	**10YR**	**545.97**	**5854.01**	**5855.40**		**5855.48**	**0.003070**	**2.55**	**283.95**	**301.83**	**0.38**
NW	**88.5000**	**2YR**	**279.82**	**5854.01**	**5854.97**		**5855.02**	**0.003342**	**2.07**	**166.90**	**244.01**	**0.38**
NW	**88.0000**	**500YR**	**1206.50**	**5852.01**	**5853.90**	**5853.90**	**5854.44**	**0.019082**	**7.73**	**273.03**	**278.32**	**1.00**
NW	**88.0000**	**100YR**	**918.25**	**5852.01**	**5853.65**	**5853.65**	**5854.17**	**0.021177**	**7.39**	**208.33**	**234.16**	**1.03**
NW	**88.0000**	**10YR**	**545.97**	**5852.01**	**5853.28**	**5853.28**	**5853.71**	**0.022568**	**6.40**	**132.60**	**177.27**	**1.02**
NW	**88.0000**	**2YR**	**279.82**	**5852.01**	**5852.96**	**5852.96**	**5853.24**	**0.020007**	**4.94**	**82.42**	**141.49**	**0.91**
NW	**87.5000**	**500YR**	**1206.50**	**5850.01**	**5852.50**		**5852.55**	**0.001454**	**2.59**	**910.62**	**716.03**	**0.29**
NW	**87.5000**	**100YR**	**918.25**	**5850.01**	**5852.24**		**5852.29**	**0.001557**	**2.49**	**730.26**	**695.14**	**0.30**
NW	**87.5000**	**10YR**	**545.97**	**5850.01**	**5851.86**		**5851.90**	**0.001376**	**2.07**	**487.66**	**530.54**	**0.27**
NW	**87.5000**	**2YR**	**279.82**	**5850.01**	**5851.41**		**5851.43**	**0.001319**	**1.67**	**284.23**	**388.63**	**0.25**
NW	**87.0000**	**500YR**	**1206.50**	**5847.98**	**5849.37**	**5849.37**	**5849.81**	**0.042636**	**9.31**	**268.33**	**497.33**	**1.42**
NW	**87.0000**	**100YR**	**918.25**	**5847.98**	**5849.35**	**5849.35**	**5849.62**	**0.027316**	**7.36**	**256.03**	**490.34**	**1.13**
NW	**87.0000**	**10YR**	**545.97**	**5847.98**	**5848.92**	**5848.92**	**5849.26**	**0.044220**	**7.18**	**125.77**	**183.21**	**1.35**
NW	**87.0000**	**2YR**	**279.82**	**5847.98**	**5848.63**	**5848.63**	**5848.87**	**0.048747**	**5.78**	**76.74**	**157.36**	**1.32**
NW4	**69.5000**	**500YR**	**10035.00**	**5852.01**	**5860.70**		**5861.18**	**0.004222**	**9.86**	**2122.14**	**474.68**	**0.60**
NW4	**69.5000**	**100YR**	**7695.90**	**5852.01**	**5859.80**		**5860.27**	**0.004691**	**9.64**	**1705.01**	**450.77**	**0.62**
NW4	**69.5000**	**10YR**	**4740.10**	**5852.01**	**5858.41**		**5858.89**	**0.006114**	**9.60**	**1107.07**	**404.54**	**0.68**
NW4	**69.5000**	**2YR**	**2480.30**	**5852.01**	**5857.15**		**5857.61**	**0.006998**	**8.82**	**651.89**	**331.92**	**0.70**
NW4	**69.0000**	**500YR**	**10035.00**	**5852.01**	**5860.07**		**5860.46**	**0.002848**	**7.77**	**2306.27**	**444.27**	**0.49**
NW4	**69.0000**	**100YR**	**7695.90**	**5852.01**	**5859.14**		**5859.48**	**0.002968**	**7.28**	**1900.36**	**427.52**	**0.49**
NW4	**69.0000**	**10YR**	**4740.10**	**5852.01**	**5857.61**		**5857.91**	**0.003539**	**6.72**	**1273.55**	**380.02**	**0.51**
NW4	**69.0000**	**2YR**	**2480.30**	**5852.01**	**5856.22**		**5856.47**	**0.004190**	**5.98**	**767.34**	**347.61**	**0.53**
NW4	**68.5000**	**500YR**	**10083.00**	**5850.01**	**5858.66**		**5859.52**	**0.006066**	**12.15**	**1680.40**	**364.80**	**0.73**
NW4	**68.5000**	**100YR**	**7739.90**	**5850.01**	**5857.85**		**5858.57**	**0.005523**	**10.86**	**1401.05**	**320.25**	**0.68**
NW4	**68.5000**	**10YR**	**4760.70**	**5850.01**	**5856.11**		**5856.81**	**0.006931**	**10.28**	**892.54**	**263.55**	**0.74**
NW4	**68.5000**	**2YR**	**2495.40**	**5850.01**	**5854.74**	**5853.83**	**5855.28**	**0.006864**	**8.62**	**556.15**	**227.26**	**0.70**
NW4	**68.4166***	**500YR**	**10083.00**	**5849.60**	**5858.36**		**5859.28**	**0.005337**	**11.50**	**1710.52**	**367.99**	**0.69**
NW4	**68.4166***	**100YR**	**7739.90**	**5849.60**	**5857.57**		**5858.35**	**0.004907**	**10.35**	**1431.65**	**333.78**	**0.65**

NW4	**68.4166***	**10YR**	**4760.70**	**5849.60**	**5855.75**		**5856.52**	**0.006287**	**9.84**	**888.30**	**265.58**	**0.70**
NW4	**68.4166***	**2YR**	**2495.40**	**5849.60**	**5853.53**	**5853.51**	**5854.79**	**0.014962**	**11.25**	**370.33**	**173.83**	**1.00**
NW4	**68.3333***	**500YR**	**10083.00**	**5849.20**	**5858.22**		**5859.06**	**0.004152**	**10.34**	**1814.47**	**373.05**	**0.61**
NW4	**68.3333***	**100YR**	**7739.90**	**5849.20**	**5857.44**		**5858.14**	**0.003758**	**9.26**	**1535.92**	**347.37**	**0.57**
NW4	**68.3333***	**10YR**	**4760.70**	**5849.20**	**5855.57**		**5856.27**	**0.004697**	**8.72**	**956.82**	**278.71**	**0.61**
NW4	**68.3333***	**2YR**	**2495.40**	**5849.20**	**5853.06**	**5853.01**	**5854.18**	**0.012050**	**9.97**	**378.23**	**166.39**	**0.90**
NW4	**68.25***	**500YR**	**10083.00**	**5848.79**	**5858.15**		**5858.87**	**0.003088**	**9.14**	**1970.45**	**384.27**	**0.53**
NW4	**68.25***	**100YR**	**7739.90**	**5848.79**	**5857.40**		**5857.97**	**0.002676**	**8.04**	**1690.77**	**357.38**	**0.48**
NW4	**68.25***	**10YR**	**4760.70**	**5848.79**	**5855.53**		**5856.05**	**0.003039**	**7.28**	**1091.20**	**290.85**	**0.50**
NW4	**68.25***	**2YR**	**2495.40**	**5848.79**	**5852.92**		**5853.69**	**0.007157**	**8.04**	**456.43**	**192.16**	**0.70**
NW4	**68.1666***	**500YR**	**10083.00**	**5848.39**	**5858.13**		**5858.71**	**0.002238**	**7.99**	**2165.97**	**394.14**	**0.45**
NW4	**68.1666***	**100YR**	**7739.90**	**5848.39**	**5857.39**		**5857.84**	**0.001875**	**6.93**	**1882.17**	**367.68**	**0.41**
NW4	**68.1666***	**10YR**	**4760.70**	**5848.39**	**5855.53**		**5855.91**	**0.001955**	**6.07**	**1260.35**	**305.89**	**0.40**
NW4	**68.1666***	**2YR**	**2495.40**	**5848.39**	**5852.90**		**5853.38**	**0.003889**	**6.29**	**571.18**	**215.89**	**0.52**
NW4	**68.0833***	**500YR**	**10083.00**	**5847.98**	**5858.13**		**5858.60**	**0.001639**	**7.02**	**2391.28**	**409.99**	**0.39**
NW4	**68.0833***	**100YR**	**7739.90**	**5847.98**	**5857.39**		**5857.74**	**0.001336**	**6.03**	**2098.19**	**382.28**	**0.35**
NW4	**68.0833***	**10YR**	**4760.70**	**5847.98**	**5855.53**		**5855.81**	**0.001296**	**5.13**	**1448.59**	**322.97**	**0.33**
NW4	**68.0833***	**2YR**	**2495.40**	**5847.98**	**5852.90**		**5853.21**	**0.002210**	**5.02**	**701.51**	**235.92**	**0.40**
NW4	**68.0000**	**500YR**	**10083.00**	**5847.58**	**5858.13**		**5858.51**	**0.001215**	**6.21**	**2636.25**	**426.21**	**0.34**
NW4	**68.0000**	**100YR**	**7739.90**	**5847.58**	**5857.39**		**5857.67**	**0.000973**	**5.29**	**2330.04**	**398.63**	**0.30**
NW4	**68.0000**	**10YR**	**4760.70**	**5847.58**	**5855.54**		**5855.75**	**0.000887**	**4.39**	**1650.82**	**340.27**	**0.28**
NW4	**68.0000**	**2YR**	**2495.40**	**5847.58**	**5852.89**		**5853.10**	**0.001343**	**4.12**	**845.12**	**261.00**	**0.32**
NW4	**67.875***	**500YR**	**10083.00**	**5847.30**	**5857.69**	**5855.25**	**5858.43**	**0.002897**	**8.51**	**1917.74**	**376.91**	**0.50**
NW4	**67.875***	**100YR**	**7739.90**	**5847.30**	**5857.04**	**5854.47**	**5857.60**	**0.002381**	**7.33**	**1679.46**	**354.23**	**0.45**
NW4	**67.875***	**10YR**	**4760.70**	**5847.30**	**5855.22**	**5852.94**	**5855.68**	**0.002553**	**6.42**	**1100.88**	**280.31**	**0.45**
NW4	**67.875***	**2YR**	**2495.40**	**5847.30**	**5852.19**	**5851.67**	**5852.97**	**0.008689**	**7.71**	**407.90**	**165.12**	**0.74**
NW4	**67.8**		**Bridge**									
NW4	**67.75***	**500YR**	**10083.00**	**5845.86**	**5854.07**	**5854.07**	**5855.89**	**0.010244**	**11.98**	**1167.31**	**359.26**	**0.88**
NW4	**67.75***	**100YR**	**7739.90**	**5845.86**	**5853.36**	**5853.36**	**5854.99**	**0.010517**	**11.10**	**929.15**	**315.34**	**0.88**
NW4	**67.75***	**10YR**	**4760.70**	**5845.86**	**5852.03**	**5852.03**	**5853.51**	**0.013279**	**10.17**	**557.41**	**234.17**	**0.93**
NW4	**67.75***	**2YR**	**2495.40**	**5845.86**	**5850.80**	**5850.80**	**5851.89**	**0.015998**	**8.50**	**316.88**	**163.82**	**0.96**
NW4	**67.625***	**500YR**	**10083.00**	**5844.51**	**5851.79**	**5851.79**	**5853.61**	**0.014616**	**16.39**	**1188.75**	**320.25**	**1.09**
NW4	**67.625***	**100YR**	**7739.90**	**5844.51**	**5851.11**	**5851.11**	**5852.71**	**0.014128**	**15.06**	**980.67**	**292.09**	**1.05**
NW4	**67.625***	**10YR**	**4760.70**	**5844.51**	**5850.03**	**5850.03**	**5851.31**	**0.013605**	**13.04**	**686.30**	**251.30**	**1.00**
NW4	**67.625***	**2YR**	**2495.40**	**5844.51**	**5848.91**	**5848.91**	**5849.88**	**0.012640**	**10.72**	**429.01**	**209.69**	**0.93**
NW4	**67.5000**	**500YR**	**10083.00**	**5844.01**	**5851.28**	**5851.28**	**5852.98**	**0.014228**	**16.14**	**1240.76**	**344.25**	**1.07**
NW4	**67.5000**	**100YR**	**7739.90**	**5844.01**	**5850.59**	**5850.59**	**5852.13**	**0.014082**	**14.98**	**1014.71**	**313.45**	**1.05**
NW4	**67.5000**	**10YR**	**4760.70**	**5844.01**	**5849.58**	**5849.58**	**5850.80**	**0.013072**	**12.84**	**718.87**	**271.80**	**0.98**
NW4	**67.5000**	**2YR**	**2495.40**	**5844.01**	**5848.62**	**5848.57**	**5849.46**	**0.010415**	**10.04**	**477.32**	**234.42**	**0.85**
NW4	**67.0000**	**500YR**	**10083.00**	**5844.01**	**5849.35**		**5850.04**	**0.008310**	**10.27**	**1779.33**	**525.54**	**0.79**
NW4	**67.0000**	**100YR**	**7739.90**	**5844.01**	**5848.80**		**5849.40**	**0.008174**	**9.45**	**1492.31**	**506.61**	**0.77**
NW4	**67.0000**	**10YR**	**4760.70**	**5844.01**	**5848.18**		**5848.56**	**0.006060**	**7.41**	**1184.00**	**486.38**	**0.64**
NW4	**67.0000**	**2YR**	**2495.40**	**5844.01**	**5847.26**		**5847.54**	**0.005811**	**6.13**	**759.29**	**434.98**	**0.61**
NW4	**66.5000**	**500YR**	**10083.00**	**5842.01**	**5847.30**		**5847.83**	**0.005766**	**8.53**	**2119.19**	**653.28**	**0.66**
NW4	**66.5000**	**100YR**	**7739.90**	**5842.01**	**5846.75**		**5847.22**	**0.005683**	**7.87**	**1769.87**	**626.35**	**0.64**
NW4	**66.5000**	**10YR**	**4760.70**	**5842.01**	**5845.32**		**5845.97**	**0.011320**	**8.72**	**941.49**	**483.17**	**0.85**
NW4	**66.5000**	**2YR**	**2495.40**	**5842.01**	**5844.45**	**5844.28**	**5844.96**	**0.011931**	**7.30**	**563.04**	**390.74**	**0.83**
NW4	**66.0000**	**500YR**	**10083.00**	**5840.01**	**5846.75**		**5847.08**	**0.001803**	**5.62**	**2713.53**	**635.31**	**0.38**
NW4	**66.0000**	**100YR**	**7739.90**	**5840.01**	**5846.34**		**5846.58**	**0.001374**	**4.70**	**2457.75**	**608.60**	**0.33**
NW4	**66.0000**	**10YR**	**4760.70**	**5840.01**	**5843.29**		**5843.90**	**0.007069**	**6.88**	**906.34**	**405.33**	**0.67**
NW4	**66.0000**	**2YR**	**2495.40**	**5840.01**	**5842.33**		**5842.76**	**0.007390**	**5.58**	**550.99**	**333.99**	**0.65**
NW4	**65.5000**	**500YR**	**11231.00**	**5836.92**	**5846.54**		**5846.63**	**0.000717**	**4.49**	**5103.32**	**933.67**	**0.26**
NW4	**65.5000**	**100YR**	**8605.10**	**5836.92**	**5846.19**		**5846.25**	**0.000503**	**3.67**	**4778.23**	**907.01**	**0.21**
NW4	**65.5000**	**10YR**	**5289.70**	**5836.92**	**5841.55**		**5841.77**	**0.004663**	**7.01**	**1498.73**	**529.88**	**0.58**
NW4	**65.5000**	**2YR**	**2775.40**	**5836.92**	**5840.47**		**5840.62**	**0.004683**	**5.88**	**965.35**	**461.33**	**0.55**

NW4	**65.0000**	**500YR**	**11231.00**	**5836.01**	**5846.39**		**5846.46**	**0.000381**	**3.43**	**5958.14**	**827.25**	**0.19**
NW4	**65.0000**	**100YR**	**8605.10**	**5836.01**	**5846.09**		**5846.13**	**0.000257**	**2.76**	**5705.56**	**825.42**	**0.15**
NW4	**65.0000**	**10YR**	**5289.70**	**5836.01**	**5840.01**		**5840.25**	**0.004628**	**6.25**	**1466.92**	**521.82**	**0.56**
NW4	**65.0000**	**2YR**	**2775.40**	**5836.01**	**5839.06**		**5839.21**	**0.004018**	**4.83**	**994.53**	**472.79**	**0.50**
NW4	**64.5000**	**500YR**	**11231.00**	**5834.01**	**5846.36**		**5846.39**	**0.000127**	**2.22**	**8985.07**	**1033.66**	**0.11**
NW4	**64.5000**	**100YR**	**8605.10**	**5834.01**	**5846.06**		**5846.08**	**0.000083**	**1.77**	**8681.95**	**1032.23**	**0.09**
NW4	**64.5000**	**10YR**	**5289.70**	**5834.01**	**5837.65**		**5838.29**	**0.010175**	**8.75**	**1079.94**	**538.22**	**0.81**
NW4	**64.5000**	**2YR**	**2775.40**	**5834.01**	**5836.69**	**5836.60**	**5837.27**	**0.012316**	**7.81**	**604.15**	**445.68**	**0.85**
NW4	**64.0000**	**500YR**	**11231.00**	**5830.01**	**5846.33**		**5846.36**	**0.000076**	**2.07**	**10133.92**	**902.35**	**0.09**
NW4	**64.0000**	**100YR**	**8605.10**	**5830.01**	**5846.05**		**5846.06**	**0.000048**	**1.63**	**9877.40**	**899.93**	**0.07**
NW4	**64.0000**	**10YR**	**5289.70**	**5830.01**	**5835.18**	**5834.44**	**5835.63**	**0.006862**	**9.11**	**1262.66**	**509.74**	**0.71**
NW4	**64.0000**	**2YR**	**2775.40**	**5830.01**	**5834.18**		**5834.52**	**0.006232**	**7.51**	**799.10**	**419.33**	**0.65**
NW4	**63.5000**	**500YR**	**11231.00**	**5828.01**	**5846.32**		**5846.34**	**0.000038**	**1.58**	**12454.99**	**910.08**	**0.07**
NW4	**63.5000**	**100YR**	**8605.10**	**5828.01**	**5846.04**		**5846.05**	**0.000024**	**1.24**	**12199.67**	**908.73**	**0.05**
NW4	**63.5000**	**10YR**	**5289.70**	**5828.01**	**5832.39**		**5833.01**	**0.010543**	**9.93**	**1141.55**	**586.51**	**0.85**
NW4	**63.5000**	**2YR**	**2775.40**	**5828.01**	**5831.53**		**5832.06**	**0.010305**	**8.45**	**682.67**	**458.39**	**0.81**
NW4	**63.0000**	**500YR**	**11231.00**	**5826.01**	**5846.32**		**5846.33**	**0.000020**	**1.22**	**15730.16**	**1030.89**	**0.05**
NW4	**63.0000**	**100YR**	**8605.10**	**5826.01**	**5846.04**		**5846.05**	**0.000012**	**0.95**	**15441.74**	**1030.89**	**0.04**
NW4	**63.0000**	**10YR**	**5289.70**	**5826.01**	**5831.14**		**5831.51**	**0.004146**	**6.83**	**1443.56**	**567.77**	**0.55**
NW4	**63.0000**	**2YR**	**2775.40**	**5826.01**	**5829.71**	**5829.38**	**5830.17**	**0.006780**	**6.91**	**706.53**	**426.91**	**0.66**
NW4	**62.5000**	**500YR**	**11231.00**	**5824.01**	**5846.32**		**5846.32**	**0.000016**	**1.16**	**16404.93**	**925.19**	**0.04**
NW4	**62.5000**	**100YR**	**8605.10**	**5824.01**	**5846.04**		**5846.04**	**0.000010**	**0.91**	**16147.89**	**925.19**	**0.03**
NW4	**62.5000**	**10YR**	**5289.70**	**5824.01**	**5830.84**		**5830.92**	**0.000903**	**3.90**	**2673.83**	**695.78**	**0.27**
NW4	**62.5000**	**2YR**	**2775.40**	**5824.01**	**5827.93**	**5827.44**	**5828.23**	**0.005762**	**6.67**	**874.11**	**521.49**	**0.61**
NW4	**62.0000**	**500YR**	**11231.00**	**5822.01**	**5846.32**		**5846.32**	**0.000005**	**0.70**	**26288.71**	**1251.52**	**0.03**
NW4	**62.0000**	**100YR**	**8605.10**	**5822.01**	**5846.04**		**5846.04**	**0.000003**	**0.54**	**25941.00**	**1251.52**	**0.02**
NW4	**62.0000**	**10YR**	**5289.70**	**5822.01**	**5830.83**		**5830.84**	**0.000076**	**1.36**	**7099.51**	**1176.79**	**0.08**
NW4	**62.0000**	**2YR**	**2775.40**	**5822.01**	**5823.85**	**5823.85**	**5824.47**	**0.034061**	**9.59**	**476.24**	**370.09**	**1.31**
NW3	**79.5000**	**500YR**	**1247.90**	**5846.01**	**5848.31**		**5848.45**	**0.004267**	**4.16**	**539.46**	**410.89**	**0.49**
NW3	**79.5000**	**100YR**	**949.40**	**5846.01**	**5848.04**		**5848.16**	**0.004456**	**3.89**	**431.76**	**375.25**	**0.49**
NW3	**79.5000**	**10YR**	**564.03**	**5846.01**	**5847.65**		**5847.75**	**0.004210**	**3.27**	**298.38**	**327.43**	**0.46**
NW3	**79.5000**	**2YR**	**288.73**	**5846.01**	**5847.23**		**5847.32**	**0.005133**	**2.94**	**168.38**	**292.00**	**0.48**
NW3	**79.0000**	**500YR**	**1247.90**	**5844.01**	**5847.18**		**5847.38**	**0.004117**	**4.76**	**451.54**	**291.05**	**0.50**
NW3	**79.0000**	**100YR**	**949.40**	**5844.01**	**5846.82**		**5847.01**	**0.004563**	**4.57**	**350.57**	**262.82**	**0.51**
NW3	**79.0000**	**10YR**	**564.03**	**5844.01**	**5846.18**		**5846.39**	**0.006788**	**4.55**	**200.47**	**206.31**	**0.59**
NW3	**79.0000**	**2YR**	**288.73**	**5844.01**	**5845.58**		**5845.75**	**0.007492**	**3.80**	**106.99**	**120.48**	**0.59**
NW3	**78.5000**	**500YR**	**1247.90**	**5842.01**	**5846.57**		**5846.69**	**0.001412**	**3.67**	**658.74**	**346.47**	**0.31**
NW3	**78.5000**	**100YR**	**949.40**	**5842.01**	**5846.23**		**5846.33**	**0.001284**	**3.31**	**545.01**	**321.69**	**0.29**
NW3	**78.5000**	**10YR**	**564.03**	**5842.01**	**5844.82**		**5845.00**	**0.003382**	**4.00**	**229.38**	**179.02**	**0.44**
NW3	**78.5000**	**2YR**	**288.73**	**5842.01**	**5844.23**		**5844.36**	**0.003098**	**3.20**	**132.09**	**149.48**	**0.41**
NW3	**78.0000**	**500YR**	**1620.20**	**5842.01**	**5846.40**		**5846.47**	**0.000606**	**2.43**	**1008.58**	**411.41**	**0.21**
NW3	**78.0000**	**100YR**	**1227.10**	**5842.01**	**5846.10**		**5846.15**	**0.000477**	**2.06**	**886.17**	**390.01**	**0.18**
NW3	**78.0000**	**10YR**	**727.31**	**5842.01**	**5843.63**		**5843.86**	**0.006483**	**4.04**	**206.56**	**167.27**	**0.57**
NW3	**78.0000**	**2YR**	**368.89**	**5842.01**	**5843.12**		**5843.27**	**0.006604**	**3.15**	**127.84**	**144.71**	**0.54**
NW3	**77.5000**	**500YR**	**1620.20**	**5840.01**	**5846.37**		**5846.39**	**0.000207**	**1.80**	**1582.55**	**453.91**	**0.13**
NW3	**77.5000**	**100YR**	**1227.10**	**5840.01**	**5846.07**		**5846.09**	**0.000149**	**1.47**	**1450.97**	**438.95**	**0.11**
NW3	**77.5000**	**10YR**	**727.31**	**5840.01**	**5841.96**		**5842.33**	**0.009656**	**5.30**	**171.18**	**137.59**	**0.71**
NW3	**77.5000**	**2YR**	**368.89**	**5840.01**	**5841.36**		**5841.63**	**0.011243**	**4.34**	**98.47**	**106.45**	**0.71**
NW3	**77.0000**	**500YR**	**1644.10**	**5838.01**	**5846.35**		**5846.37**	**0.000109**	**1.58**	**2067.54**	**444.62**	**0.10**
NW3	**77.0000**	**100YR**	**1246.80**	**5838.01**	**5846.06**		**5846.07**	**0.000074**	**1.27**	**1940.60**	**431.82**	**0.08**
NW3	**77.0000**	**10YR**	**738.74**	**5838.01**	**5841.15**		**5841.35**	**0.003795**	**4.80**	**278.93**	**181.79**	**0.48**
NW3	**77.0000**	**2YR**	**374.88**	**5838.01**	**5840.50**		**5840.66**	**0.003519**	**3.94**	**169.17**	**155.95**	**0.45**
NW3	**76.5000**	**500YR**	**1644.10**	**5838.01**	**5846.34**		**5846.35**	**0.000075**	**1.32**	**2264.15**	**438.48**	**0.08**
NW3	**76.5000**	**100YR**	**1246.80**	**5838.01**	**5846.05**		**5846.06**	**0.000050**	**1.06**	**2140.66**	**429.29**	**0.07**
NW3	**76.5000**	**10YR**	**738.74**	**5838.01**	**5840.57**		**5840.70**	**0.002946**	**3.75**	**335.12**	**246.05**	**0.41**

NW3	**76.5000**	**2YR**	**374.88**	**5838.01**	**5839.96**		**5840.05**	**0.002758**	**3.01**	**192.45**	**171.28**	**0.38**
NW3	**76.0000**	**500YR**	**1644.10**	**5838.01**	**5846.33**		**5846.34**	**0.000051**	**1.09**	**2621.09**	**560.74**	**0.07**
NW3	**76.0000**	**100YR**	**1246.80**	**5838.01**	**5846.05**		**5846.05**	**0.000034**	**0.86**	**2467.40**	**535.05**	**0.05**
NW3	**76.0000**	**10YR**	**738.74**	**5838.01**	**5839.81**		**5840.03**	**0.005542**	**4.02**	**224.69**	**176.61**	**0.54**
NW3	**76.0000**	**2YR**	**374.88**	**5838.01**	**5839.21**		**5839.37**	**0.006496**	**3.30**	**129.10**	**142.63**	**0.54**
NW3	**75.5000**	**500YR**	**1644.10**	**5835.60**	**5846.32**		**5846.33**	**0.000024**	**0.89**	**3458.84**	**453.27**	**0.05**
NW3	**75.5000**	**100YR**	**1246.80**	**5835.60**	**5846.04**		**5846.05**	**0.000015**	**0.69**	**3332.74**	**445.52**	**0.04**
NW3	**75.5000**	**10YR**	**738.74**	**5835.60**	**5837.34**		**5837.56**	**0.016522**	**6.89**	**218.08**	**216.69**	**0.92**
NW3	**75.5000**	**2YR**	**374.88**	**5835.60**	**5837.06**		**5837.16**	**0.009811**	**4.71**	**160.49**	**187.62**	**0.69**
NW3	**75.0000**	**500YR**	**1644.10**	**5833.31**	**5846.32**		**5846.32**	**0.000011**	**0.68**	**4577.56**	**531.12**	**0.03**
NW3	**75.0000**	**100YR**	**1246.80**	**5833.31**	**5846.04**		**5846.04**	**0.000007**	**0.53**	**4429.49**	**527.41**	**0.03**
NW3	**75.0000**	**10YR**	**738.74**	**5833.31**	**5835.26**		**5835.41**	**0.007166**	**4.88**	**276.03**	**216.78**	**0.62**
NW3	**75.0000**	**2YR**	**374.88**	**5833.31**	**5834.56**		**5834.72**	**0.014541**	**5.14**	**135.93**	**178.87**	**0.82**
NW3	**74.5000**	**500YR**	**1644.10**	**5831.30**	**5846.32**		**5846.32**	**0.000008**	**0.62**	**5191.43**	**542.44**	**0.03**
NW3	**74.5000**	**100YR**	**1246.80**	**5831.30**	**5846.04**		**5846.04**	**0.000005**	**0.48**	**5041.17**	**535.16**	**0.02**
NW3	**74.5000**	**10YR**	**738.74**	**5831.30**	**5832.85**	**5832.62**	**5833.10**	**0.018513**	**6.69**	**202.80**	**195.98**	**0.96**
NW3	**74.5000**	**2YR**	**374.88**	**5831.30**	**5832.78**		**5832.86**	**0.005794**	**3.64**	**190.16**	**193.33**	**0.53**
NW3	**74.0000**	**500YR**	**1644.10**	**5828.71**	**5846.32**		**5846.32**	**0.000002**	**0.39**	**8341.24**	**729.89**	**0.02**
NW3	**74.0000**	**100YR**	**1246.80**	**5828.71**	**5846.04**		**5846.04**	**0.000002**	**0.30**	**8137.63**	**728.17**	**0.01**
NW3	**74.0000**	**10YR**	**738.74**	**5828.71**	**5831.14**		**5831.19**	**0.002527**	**3.35**	**421.52**	**265.46**	**0.38**
NW3	**74.0000**	**2YR**	**374.88**	**5828.71**	**5830.06**		**5830.17**	**0.011022**	**4.73**	**163.74**	**216.03**	**0.72**
NW3	**73.5000**	**500YR**	**1644.10**	**5828.01**	**5846.32**		**5846.32**	**0.000001**	**0.31**	**10179.96**	**843.20**	**0.01**
NW3	**73.5000**	**100YR**	**1246.80**	**5828.01**	**5846.04**		**5846.04**	**0.000001**	**0.24**	**9945.16**	**841.04**	**0.01**
NW3	**73.5000**	**10YR**	**738.74**	**5828.01**	**5831.05**		**5831.06**	**0.000451**	**1.65**	**756.34**	**338.51**	**0.17**
NW3	**73.5000**	**2YR**	**374.88**	**5828.01**	**5829.29**		**5829.35**	**0.004005**	**2.76**	**227.10**	**250.76**	**0.43**
NW3	**73.375***	**500YR**	**1644.10**	**5827.56**	**5846.32**		**5846.32**	**0.000001**	**0.32**	**10000.72**	**822.08**	**0.01**
NW3	**73.375***	**100YR**	**1246.80**	**5827.56**	**5846.04**		**5846.04**	**0.000001**	**0.25**	**9772.08**	**818.15**	**0.01**
NW3	**73.375***	**10YR**	**738.74**	**5827.56**	**5831.03**		**5831.05**	**0.000418**	**1.74**	**764.30**	**333.09**	**0.16**
NW3	**73.375***	**2YR**	**374.88**	**5827.56**	**5829.17**		**5829.24**	**0.003694**	**3.07**	**218.59**	**228.46**	**0.43**
NW3	**73.25***	**500YR**	**1644.10**	**5827.12**	**5846.32**	**5829.46**	**5846.32**	**0.000001**	**0.32**	**9924.16**	**793.16**	**0.01**
NW3	**73.25***	**100YR**	**1246.80**	**5827.12**	**5846.04**	**5829.27**	**5846.04**	**0.000001**	**0.25**	**9703.55**	**789.22**	**0.01**
NW3	**73.25***	**10YR**	**738.74**	**5827.12**	**5831.02**	**5828.91**	**5831.04**	**0.000381**	**1.79**	**782.22**	**329.23**	**0.16**
NW3	**73.25***	**2YR**	**374.88**	**5827.12**	**5829.07**	**5828.57**	**5829.15**	**0.002987**	**3.13**	**228.37**	**222.66**	**0.40**
NW3	**73.2**		**Bridge**									
NW3	**73.125***	**500YR**	**1644.10**	**5826.67**	**5846.32**		**5846.32**	**0.000001**	**0.32**	**9922.23**	**777.14**	**0.01**
NW3	**73.125***	**100YR**	**1246.80**	**5826.67**	**5846.04**		**5846.04**	**0.000001**	**0.25**	**9705.81**	**775.17**	**0.01**
NW3	**73.125***	**10YR**	**738.74**	**5826.67**	**5830.85**		**5830.88**	**0.000447**	**2.01**	**737.91**	**322.77**	**0.18**
NW3	**73.125***	**2YR**	**374.88**	**5826.67**	**5828.71**		**5828.86**	**0.005699**	**4.40**	**172.62**	**195.02**	**0.55**
NW3	**73.0000**	**500YR**	**638.13**	**5826.22**	**5846.32**		**5846.32**	**0.000000**	**0.13**	**9950.33**	**771.81**	**0.00**
NW3	**73.0000**	**100YR**	**580.14**	**5826.22**	**5846.04**		**5846.04**	**0.000000**	**0.12**	**9735.43**	**769.77**	**0.00**
NW3	**73.0000**	**10YR**	**521.65**	**5826.22**	**5830.85**		**5830.86**	**0.000227**	**1.52**	**732.46**	**322.71**	**0.13**
NW3	**73.0000**	**2YR**	**340.64**	**5826.22**	**5828.50**		**5828.69**	**0.006530**	**4.96**	**147.68**	**173.79**	**0.60**
NW3	**72.5000**	**500YR**	**638.13**	**5826.01**	**5846.32**		**5846.32**	**0.000000**	**0.10**	**11723.53**	**841.38**	**0.00**
NW3	**72.5000**	**100YR**	**580.14**	**5826.01**	**5846.04**		**5846.04**	**0.000000**	**0.09**	**11489.25**	**839.17**	**0.00**
NW3	**72.5000**	**10YR**	**521.65**	**5826.01**	**5830.84**		**5830.85**	**0.000079**	**0.94**	**1026.41**	**369.78**	**0.08**
NW3	**72.5000**	**2YR**	**340.64**	**5826.01**	**5827.43**	**5827.24**	**5827.68**	**0.010217**	**4.58**	**106.36**	**127.23**	**0.70**
NW3	**72.0000**	**500YR**	**638.13**	**5824.01**	**5846.32**		**5846.32**	**0.000000**	**0.06**	**17541.29**	**971.01**	**0.00**
NW3	**72.0000**	**100YR**	**580.14**	**5824.01**	**5846.04**		**5846.04**	**0.000000**	**0.06**	**17270.74**	**969.76**	**0.00**
NW3	**72.0000**	**10YR**	**521.65**	**5824.01**	**5830.84**		**5830.84**	**0.000004**	**0.26**	**3559.67**	**772.04**	**0.02**
NW3	**72.0000**	**2YR**	**340.64**	**5824.01**	**5824.90**		**5824.97**	**0.005769**	**2.60**	**180.92**	**235.67**	**0.49**
NW3	**71.5000**	**500YR**	**638.13**	**5822.01**	**5846.32**		**5846.32**	**0.000000**	**0.04**	**27619.66**	**1372.32**	**0.00**
NW3	**71.5000**	**100YR**	**580.14**	**5822.01**	**5846.04**		**5846.04**	**0.000000**	**0.04**	**27237.23**	**1371.01**	**0.00**
NW3	**71.5000**	**10YR**	**521.65**	**5822.01**	**5830.84**		**5830.84**	**0.000001**	**0.13**	**7352.17**	**1189.20**	**0.01**
NW3	**71.5000**	**2YR**	**340.64**	**5822.01**	**5823.05**	**5823.05**	**5823.32**	**0.018235**	**4.76**	**103.26**	**193.42**	**0.87**

W1	**49.5000**	**500YR**	**2691.20**	**5989.65**	**5994.28**	**5994.28**	**5995.94**	**0.021943**	**14.90**	**297.65**	**91.30**	**1.24**
W1	**49.5000**	**100YR**	**1968.10**	**5989.65**	**5993.53**	**5993.53**	**5994.98**	**0.023547**	**13.66**	**232.11**	**83.48**	**1.25**
W1	**49.5000**	**10YR**	**1104.20**	**5989.65**	**5992.49**	**5992.49**	**5993.56**	**0.025648**	**11.44**	**150.46**	**72.94**	**1.23**
W1	**49.5000**	**2YR**	**587.62**	**5989.65**	**5991.63**	**5991.63**	**5992.42**	**0.029696**	**9.52**	**92.24**	**62.63**	**1.24**
W1	**49.0000**	**500YR**	**2691.20**	**5980.99**	**5985.07**	**5985.07**	**5986.54**	**0.030343**	**16.40**	**296.30**	**102.08**	**1.44**
W1	**49.0000**	**100YR**	**1968.10**	**5980.99**	**5984.44**	**5984.44**	**5985.69**	**0.031570**	**14.93**	**234.43**	**93.87**	**1.43**
W1	**49.0000**	**10YR**	**1104.20**	**5980.99**	**5983.53**	**5983.53**	**5984.45**	**0.034409**	**12.65**	**153.53**	**83.39**	**1.41**
W1	**49.0000**	**2YR**	**587.62**	**5980.99**	**5982.85**	**5982.85**	**5983.49**	**0.035636**	**10.43**	**99.78**	**76.23**	**1.36**
W1	**48.5000**	**500YR**	**2691.20**	**5972.01**	**5976.68**	**5976.68**	**5978.07**	**0.018382**	**13.64**	**340.67**	**116.26**	**1.13**
W1	**48.5000**	**100YR**	**1968.10**	**5972.01**	**5976.11**	**5976.11**	**5977.28**	**0.017948**	**12.33**	**276.68**	**111.09**	**1.10**
W1	**48.5000**	**10YR**	**1104.20**	**5972.01**	**5975.29**	**5975.29**	**5976.13**	**0.016842**	**10.21**	**188.63**	**101.42**	**1.02**
W1	**48.5000**	**2YR**	**587.62**	**5972.01**	**5974.64**	**5974.62**	**5975.23**	**0.014731**	**8.18**	**126.17**	**92.96**	**0.92**
W1	**48.0000**	**500YR**	**2691.20**	**5964.02**	**5968.44**	**5968.44**	**5969.77**	**0.022359**	**13.79**	**333.71**	**122.00**	**1.21**
W1	**48.0000**	**100YR**	**1968.10**	**5964.02**	**5967.93**	**5967.93**	**5969.02**	**0.021939**	**12.46**	**272.28**	**116.30**	**1.18**
W1	**48.0000**	**10YR**	**1104.20**	**5964.02**	**5967.22**	**5967.22**	**5967.97**	**0.020138**	**10.25**	**191.45**	**111.16**	**1.08**
W1	**48.0000**	**2YR**	**587.62**	**5964.02**	**5965.98**	**5965.98**	**5968.54**	**0.114888**	**16.55**	**60.09**	**73.68**	**2.35**
W1	**47.5000**	**500YR**	**2691.20**	**5956.02**	**5961.13**	**5961.13**	**5962.61**	**0.016693**	**13.15**	**342.41**	**118.52**	**1.08**
W1	**47.5000**	**100YR**	**1968.10**	**5956.02**	**5960.42**	**5960.42**	**5961.74**	**0.017756**	**12.13**	**263.88**	**104.57**	**1.09**
W1	**47.5000**	**10YR**	**1104.20**	**5956.02**	**5959.53**	**5959.53**	**5960.47**	**0.016895**	**9.94**	**177.00**	**91.70**	**1.01**
W1	**47.5000**	**2YR**	**587.62**	**5956.02**	**5958.85**	**5958.85**	**5959.50**	**0.015359**	**7.96**	**116.66**	**84.05**	**0.93**
W1	**47.25**		**Lat Struct**									
W1	**47.0000**	**500YR**	**235.02**	**5942.10**	**5951.85**	**5945.79**	**5951.88**	**0.000285**	**1.50**	**218.73**	**97.48**	**0.12**
W1	**47.0000**	**100YR**	**225.51**	**5942.10**	**5951.73**	**5945.70**	**5951.75**	**0.000294**	**1.50**	**207.07**	**94.29**	**0.12**
W1	**47.0000**	**10YR**	**213.06**	**5942.10**	**5951.59**	**5945.58**	**5951.62**	**0.000300**	**1.48**	**194.46**	**90.96**	**0.12**
W1	**47.0000**	**2YR**	**204.19**	**5942.10**	**5951.45**	**5945.49**	**5951.48**	**0.000316**	**1.49**	**181.78**	**87.31**	**0.12**
W1	**46.75**		**Culvert**									
W1	**46.5000**	**500YR**	**235.02**	**5938.06**	**5942.77**	**5942.77**	**5943.63**	**0.026749**	**7.44**	**31.66**	**20.52**	**1.00**
W1	**46.5000**	**100YR**	**225.51**	**5938.06**	**5942.70**	**5942.70**	**5943.56**	**0.027852**	**7.44**	**30.33**	**18.69**	**1.01**
W1	**46.5000**	**10YR**	**213.06**	**5938.06**	**5942.64**	**5942.64**	**5943.47**	**0.027674**	**7.30**	**29.21**	**17.84**	**1.00**
W1	**46.5000**	**2YR**	**204.19**	**5938.06**	**5942.56**	**5942.56**	**5943.40**	**0.028239**	**7.36**	**27.75**	**16.77**	**1.01**
W1	**46.0000**	**500YR**	**235.02**	**5935.43**	**5936.46**	**5936.46**	**5936.74**	**0.040991**	**7.55**	**61.24**	**98.87**	**1.33**
W1	**46.0000**	**100YR**	**225.51**	**5935.43**	**5936.44**	**5936.44**	**5936.72**	**0.040502**	**7.44**	**59.89**	**98.73**	**1.32**
W1	**46.0000**	**10YR**	**213.06**	**5935.43**	**5936.42**	**5936.42**	**5936.69**	**0.041057**	**7.37**	**57.53**	**98.48**	**1.32**
W1	**46.0000**	**2YR**	**204.19**	**5935.43**	**5936.41**	**5936.41**	**5936.67**	**0.038931**	**7.15**	**56.96**	**98.42**	**1.28**
W1	**45.5000**	**500YR**	**235.02**	**5922.01**	**5922.93**	**5922.93**	**5923.15**	**0.027343**	**5.26**	**77.01**	**154.36**	**1.04**
W1	**45.5000**	**100YR**	**225.51**	**5922.01**	**5922.91**	**5922.91**	**5923.13**	**0.027473**	**5.21**	**74.83**	**154.15**	**1.04**
W1	**45.5000**	**10YR**	**213.06**	**5922.01**	**5922.91**	**5922.91**	**5923.11**	**0.024977**	**4.95**	**74.37**	**154.11**	**0.99**
W1	**45.5000**	**2YR**	**204.19**	**5922.01**	**5922.90**	**5922.90**	**5923.09**	**0.024481**	**4.86**	**72.79**	**153.95**	**0.98**
W1	**45.0000**	**500YR**	**235.02**	**5911.54**	**5913.23**	**5913.23**	**5913.80**	**0.021746**	**7.21**	**46.66**	**43.07**	**1.03**
W1	**45.0000**	**100YR**	**225.51**	**5911.54**	**5913.20**	**5913.20**	**5913.75**	**0.021952**	**7.13**	**45.13**	**42.58**	**1.03**
W1	**45.0000**	**10YR**	**213.06**	**5911.54**	**5913.15**	**5913.15**	**5913.69**	**0.021959**	**7.00**	**43.32**	**41.99**	**1.03**
W1	**45.0000**	**2YR**	**204.19**	**5911.54**	**5913.12**	**5913.12**	**5913.65**	**0.022254**	**6.92**	**41.81**	**41.49**	**1.03**
W1	**44.5000**	**500YR**	**235.02**	**5896.01**	**5897.72**	**5897.72**	**5898.34**	**0.018586**	**6.63**	**41.38**	**36.18**	**0.95**
W1	**44.5000**	**100YR**	**225.51**	**5896.01**	**5897.68**	**5897.68**	**5898.29**	**0.018844**	**6.56**	**39.96**	**35.67**	**0.95**
W1	**44.5000**	**10YR**	**213.06**	**5896.01**	**5897.62**	**5897.62**	**5898.22**	**0.019410**	**6.48**	**37.94**	**34.89**	**0.96**
W1	**44.5000**	**2YR**	**204.19**	**5896.01**	**5897.58**	**5897.58**	**5898.17**	**0.019737**	**6.42**	**36.57**	**34.30**	**0.96**
W1	**44.0000**	**500YR**	**258.22**	**5886.67**	**5888.13**	**5888.13**	**5888.66**	**0.030929**	**7.38**	**50.85**	**54.98**	**1.18**
W1	**44.0000**	**100YR**	**243.07**	**5886.67**	**5888.09**	**5888.09**	**5888.60**	**0.031211**	**7.24**	**48.50**	**53.54**	**1.18**
W1	**44.0000**	**10YR**	**223.49**	**5886.67**	**5888.03**	**5888.03**	**5888.52**	**0.031647**	**7.04**	**45.41**	**51.76**	**1.18**
W1	**44.0000**	**2YR**	**209.52**	**5886.67**	**5887.98**	**5887.98**	**5888.45**	**0.033287**	**6.97**	**42.53**	**50.04**	**1.20**
W1	**43.5000**	**500YR**	**258.22**	**5878.01**	**5880.44**	**5880.44**	**5881.19**	**0.015318**	**7.06**	**41.69**	**35.20**	**0.89**
W1	**43.5000**	**100YR**	**243.07**	**5878.01**	**5880.36**	**5880.36**	**5881.10**	**0.016004**	**7.01**	**38.82**	**33.56**	**0.91**
W1	**43.5000**	**10YR**	**223.49**	**5878.01**	**5880.24**	**5880.24**	**5880.97**	**0.017162**	**6.95**	**35.05**	**30.46**	**0.93**
W1	**43.5000**	**2YR**	**209.52**	**5878.01**	**5880.15**	**5880.15**	**5880.88**	**0.018406**	**6.93**	**32.29**	**27.52**	**0.95**

W1	43.0000	500YR	258.22	5872.88	5874.46	5874.46	5874.99	0.025872	7.66	52.27	50.23	1.12
W1	43.0000	100YR	243.07	5872.88	5874.42	5874.42	5874.93	0.025904	7.51	50.05	49.58	1.11
W1	43.0000	10YR	223.49	5872.88	5874.36	5874.36	5874.85	0.025937	7.30	47.13	48.64	1.11
W1	43.0000	2YR	209.52	5872.88	5874.31	5874.31	5874.79	0.026543	7.19	44.63	47.78	1.11
W1	42.5000	500YR	258.22	5866.01	5866.90	5866.89	5867.15	0.019315	4.27	74.57	134.68	0.87
W1	42.5000	100YR	243.07	5866.01	5866.88	5866.86	5867.12	0.018860	4.17	71.89	133.97	0.85
W1	42.5000	10YR	223.49	5866.01	5866.85	5866.83	5867.08	0.019256	4.10	66.87	132.62	0.86
W1	42.5000	2YR	209.52	5866.01	5866.82	5866.81	5867.05	0.019271	4.03	63.58	131.73	0.85
W1	42.0000	500YR	258.22	5860.42	5861.33	5861.33	5861.62	0.026854	5.52	71.95	116.69	1.05
W1	42.0000	100YR	243.07	5860.42	5861.30	5861.30	5861.59	0.027596	5.47	68.43	115.79	1.05
W1	42.0000	10YR	223.49	5860.42	5861.27	5861.27	5861.54	0.027090	5.29	65.05	114.92	1.04
W1	42.0000	2YR	209.52	5860.42	5861.25	5861.25	5861.51	0.027164	5.19	62.20	114.15	1.04
W1	41.5000	500YR	258.22	5852.23	5853.29	5853.29	5853.55	0.018734	4.85	80.78	150.08	0.89
W1	41.5000	100YR	243.07	5852.23	5853.26	5853.26	5853.52	0.018640	4.76	77.27	148.77	0.88
W1	41.5000	10YR	223.49	5852.23	5853.24	5853.24	5853.48	0.017889	4.58	73.59	147.38	0.86
W1	41.5000	2YR	209.52	5852.23	5853.21	5853.21	5853.45	0.018480	4.54	69.02	144.76	0.87
W1	41.0000	500YR	306.89	5841.51	5846.31		5846.31	0.000007	0.27	2045.32	581.23	0.02
W1	41.0000	100YR	278.14	5841.51	5846.03		5846.03	0.000007	0.26	1885.85	572.96	0.02
W1	41.0000	10YR	242.34	5841.51	5842.37	5842.37	5842.53	0.029974	5.61	101.20	292.15	1.10
W1	41.0000	2YR	218.93	5841.51	5842.36	5842.36	5842.50	0.024864	5.10	100.63	291.94	1.00
W1	40.5000	500YR	306.89	5831.44	5846.31		5846.31	0.000000	0.06	8996.87	772.48	0.00
W1	40.5000	100YR	278.14	5831.44	5846.03		5846.03	0.000000	0.05	8783.38	772.48	0.00
W1	40.5000	10YR	242.34	5831.44	5832.42	5832.42	5832.58	0.016857	4.42	110.43	296.60	0.83
W1	40.5000	2YR	218.93	5831.44	5832.37	5832.37	5832.55	0.018469	4.47	97.58	287.02	0.86
W1	40.0000	500YR	490.29	5820.01	5846.31		5846.31	0.000000	0.06	14293.99	680.37	0.00
W1	40.0000	100YR	414.42	5820.01	5846.03		5846.03	0.000000	0.05	14105.96	680.37	0.00
W1	40.0000	10YR	322.31	5820.01	5830.78		5830.78	0.000001	0.15	4132.49	632.69	0.01
W1	40.0000	2YR	259.19	5820.01	5821.61	5821.61	5822.24	0.020241	6.44	42.28	36.30	0.97
W1	39.5000	500YR	247.21	5814.02	5846.31		5846.31	0.000000	0.02	21506.05	816.93	0.00
W1	39.5000	100YR	244.72	5814.02	5846.03		5846.03	0.000000	0.02	21280.27	816.93	0.00
W1	39.5000	10YR	241.82	5814.02	5830.78		5830.78	0.000000	0.05	9284.57	762.47	0.00
W1	39.5000	2YR	224.31	5814.02	5821.65		5821.65	0.000002	0.20	2444.74	685.38	0.01
W1	39.0000	500YR	247.21	5808.01	5846.31		5846.31	0.000000	0.01	36643.75	1264.92	0.00
W1	39.0000	100YR	244.72	5808.01	5846.03		5846.03	0.000000	0.01	36294.17	1264.92	0.00
W1	39.0000	10YR	241.82	5808.01	5830.78		5830.78	0.000000	0.03	17918.69	1154.10	0.00
W1	39.0000	2YR	224.31	5808.01	5821.65		5821.65	0.000000	0.06	7596.21	1066.46	0.00
NW5	59.5000	500YR	8888.50	5818.15	5846.31		5846.32	0.000010	1.07	15363.68	738.75	0.04
NW5	59.5000	100YR	7266.20	5818.15	5846.04		5846.04	0.000007	0.88	15159.13	736.24	0.03
NW5	59.5000	10YR	5273.30	5818.15	5830.82		5830.84	0.000127	2.27	4817.61	634.10	0.11
NW5	59.5000	2YR	3047.10	5818.15	5822.94		5823.11	0.004100	6.74	971.81	361.97	0.54
NW5	59.0000	500YR	8888.50	5818.01	5846.31		5846.32	0.000006	0.86	17007.96	784.53	0.03
NW5	59.0000	100YR	7266.20	5818.01	5846.04		5846.04	0.000004	0.71	16791.07	782.38	0.02
NW5	59.0000	10YR	5273.30	5818.01	5830.80		5830.82	0.000068	1.67	5586.32	696.17	0.08
NW5	59.0000	2YR	3047.10	5818.01	5822.03		5822.27	0.002758	4.91	968.11	375.17	0.43
NW5	58.5000	500YR	8888.50	5816.01	5846.31		5846.32	0.000003	0.67	22564.86	957.91	0.02
NW5	58.5000	100YR	7266.20	5816.01	5846.04		5846.04	0.000002	0.55	22300.05	954.99	0.02
NW5	58.5000	10YR	5273.30	5816.01	5830.79		5830.80	0.000025	1.11	8571.09	855.60	0.05
NW5	58.5000	2YR	3047.10	5816.01	5821.82		5821.89	0.000655	3.05	1832.66	541.26	0.22
NW5	58.0000	500YR	8888.50	5814.01	5846.31		5846.31	0.000003	0.63	25437.68	1091.75	0.02
NW5	58.0000	100YR	7266.20	5814.01	5846.04		5846.04	0.000002	0.52	25135.49	1087.02	0.02
NW5	58.0000	10YR	5273.30	5814.01	5830.79		5830.80	0.000018	1.01	9963.53	921.01	0.04
NW5	58.0000	2YR	3047.10	5814.01	5821.74		5821.77	0.000251	2.27	2607.43	581.20	0.15
NW5	57.5000	500YR	8933.30	5812.01	5846.31		5846.31	0.000003	0.65	24719.64	1121.26	0.02
NW5	57.5000	100YR	7302.00	5812.01	5846.03		5846.04	0.000002	0.54	24410.42	1116.56	0.02
NW5	57.5000	10YR	5300.20	5812.01	5830.79		5830.79	0.000017	1.05	9783.80	848.06	0.04
NW5	57.5000	2YR	3063.60	5812.01	5821.69		5821.71	0.000151	1.96	2921.00	503.63	0.11

NW5	**57.0000**	**500YR**	**8933.30**	**5812.01**	**5846.31**		**5846.31**	**0.000002**	**0.57**	**26902.52**	**1107.39**	**0.02**
NW5	**57.0000**	**100YR**	**7302.00**	**5812.01**	**5846.03**		**5846.04**	**0.000001**	**0.47**	**26597.02**	**1107.39**	**0.01**
NW5	**57.0000**	**10YR**	**5300.20**	**5812.01**	**5830.78**		**5830.79**	**0.000010**	**0.84**	**10708.58**	**794.92**	**0.03**
NW5	**57.0000**	**2YR**	**3063.60**	**5812.01**	**5821.66**		**5821.68**	**0.000066**	**1.37**	**3854.09**	**625.79**	**0.08**
NW5	**56.5000**	**500YR**	**8961.40**	**5808.01**	**5846.31**		**5846.31**	**0.000002**	**0.53**	**31365.27**	**1165.82**	**0.02**
NW5	**56.5000**	**100YR**	**7324.60**	**5808.01**	**5846.03**		**5846.04**	**0.000001**	**0.44**	**31043.65**	**1165.82**	**0.01**
NW5	**56.5000**	**10YR**	**5317.70**	**5808.01**	**5830.78**		**5830.78**	**0.000008**	**0.82**	**13341.23**	**1113.47**	**0.03**
NW5	**56.5000**	**2YR**	**3073.40**	**5808.01**	**5821.65**		**5821.66**	**0.000047**	**1.44**	**5040.51**	**818.30**	**0.07**
NW5	**56.0000**	**500YR**	**12448.00**	**5806.02**	**5846.31**		**5846.31**	**0.000002**	**0.56**	**40474.67**	**1364.52**	**0.02**
NW5	**56.0000**	**100YR**	**10094.00**	**5806.02**	**5846.03**		**5846.03**	**0.000001**	**0.46**	**40098.23**	**1364.52**	**0.01**
NW5	**56.0000**	**10YR**	**7125.30**	**5806.02**	**5830.78**		**5830.78**	**0.000006**	**0.77**	**19281.97**	**1364.52**	**0.03**
NW5	**56.0000**	**2YR**	**4087.50**	**5806.02**	**5821.64**		**5821.65**	**0.000037**	**1.38**	**7459.54**	**1178.45**	**0.06**
NS18	**20.0000**	**500YR**	**142.00**	**6274.72**	**6276.70**	**6276.70**	**6277.32**	**0.019904**	**6.46**	**24.10**	**21.63**	**0.96**
NS18	**20.0000**	**100YR**	**107.90**	**6274.72**	**6276.47**	**6276.47**	**6277.01**	**0.020782**	**5.97**	**19.37**	**19.45**	**0.96**
NS18	**20.0000**	**10YR**	**64.00**	**6274.72**	**6276.08**	**6276.08**	**6276.51**	**0.023820**	**5.29**	**12.44**	**15.61**	**0.98**
NS18	**20.0000**	**2YR**	**32.70**	**6274.72**	**6275.71**	**6275.71**	**6276.02**	**0.028258**	**4.45**	**7.36**	**12.32**	**1.00**
NS18	**19.0000**	**500YR**	**142.00**	**6261.80**	**6263.73**	**6263.73**	**6264.36**	**0.022513**	**6.35**	**22.45**	**18.70**	**1.00**
NS18	**19.0000**	**100YR**	**107.90**	**6261.80**	**6263.50**	**6263.50**	**6264.04**	**0.024049**	**5.91**	**18.26**	**17.17**	**1.01**
NS18	**19.0000**	**10YR**	**64.00**	**6261.80**	**6263.12**	**6263.12**	**6263.54**	**0.026151**	**5.24**	**12.22**	**14.73**	**1.01**
NS18	**19.0000**	**2YR**	**32.70**	**6261.80**	**6262.75**	**6262.75**	**6263.06**	**0.028876**	**4.47**	**7.32**	**12.09**	**1.01**
NS18	**18.0000**	**500YR**	**142.00**	**6245.73**	**6248.37**	**6247.81**	**6248.70**	**0.006659**	**4.67**	**32.56**	**21.19**	**0.59**
NS18	**18.0000**	**100YR**	**107.90**	**6245.73**	**6248.11**	**6247.56**	**6248.37**	**0.006315**	**4.14**	**27.25**	**19.45**	**0.56**
NS18	**18.0000**	**10YR**	**64.00**	**6245.73**	**6247.16**	**6247.16**	**6247.62**	**0.025847**	**5.43**	**11.79**	**13.23**	**1.01**
NS18	**18.0000**	**2YR**	**32.70**	**6245.73**	**6246.76**	**6246.76**	**6247.10**	**0.028268**	**4.64**	**7.05**	**10.78**	**1.01**
NS18	**17.8**		**Bridge**									
NS18	**17.75***	**500YR**	**142.00**	**6240.01**	**6242.04**	**6242.04**	**6242.69**	**0.021979**	**6.49**	**22.07**	**17.84**	**1.00**
NS18	**17.75***	**100YR**	**107.90**	**6240.01**	**6241.79**	**6241.79**	**6242.36**	**0.023771**	**6.06**	**17.82**	**16.27**	**1.01**
NS18	**17.75***	**10YR**	**64.00**	**6240.01**	**6241.41**	**6241.41**	**6241.85**	**0.025428**	**5.32**	**12.02**	**13.78**	**1.00**
NS18	**17.75***	**2YR**	**32.70**	**6240.01**	**6241.01**	**6241.01**	**6241.34**	**0.028473**	**4.58**	**7.14**	**11.21**	**1.01**
NS18	**17.5***	**500YR**	**142.00**	**6234.29**	**6236.24**	**6236.24**	**6236.88**	**0.021710**	**6.43**	**22.49**	**18.92**	**0.99**
NS18	**17.5***	**100YR**	**107.90**	**6234.29**	**6236.00**	**6236.00**	**6236.56**	**0.023494**	**6.00**	**18.08**	**17.23**	**1.01**
NS18	**17.5***	**10YR**	**64.00**	**6234.29**	**6235.63**	**6235.63**	**6236.06**	**0.025939**	**5.23**	**12.23**	**14.66**	**1.01**
NS18	**17.5***	**2YR**	**32.70**	**6234.29**	**6235.26**	**6235.26**	**6235.57**	**0.028446**	**4.48**	**7.30**	**11.86**	**1.01**
NS18	**17.25***	**500YR**	**142.00**	**6228.57**	**6230.44**	**6230.44**	**6231.06**	**0.021300**	**6.32**	**23.23**	**20.56**	**0.98**
NS18	**17.25***	**100YR**	**107.90**	**6228.57**	**6230.21**	**6230.21**	**6230.75**	**0.022910**	**5.89**	**18.63**	**18.74**	**0.99**
NS18	**17.25***	**10YR**	**64.00**	**6228.57**	**6229.86**	**6229.86**	**6230.26**	**0.025628**	**5.08**	**12.61**	**15.93**	**1.00**
NS18	**17.25***	**2YR**	**32.70**	**6228.57**	**6229.51**	**6229.51**	**6229.80**	**0.028493**	**4.36**	**7.49**	**12.73**	**1.00**
NS18	**17.0000**	**500YR**	**142.00**	**6222.85**	**6224.64**	**6224.64**	**6225.22**	**0.020907**	**6.19**	**24.38**	**23.00**	**0.97**
NS18	**17.0000**	**100YR**	**107.90**	**6222.85**	**6224.42**	**6224.42**	**6224.92**	**0.022048**	**5.74**	**19.57**	**21.01**	**0.97**
NS18	**17.0000**	**10YR**	**64.00**	**6222.85**	**6224.07**	**6224.07**	**6224.46**	**0.025501**	**5.02**	**12.87**	**17.60**	**1.00**
NS18	**17.0000**	**2YR**	**32.70**	**6222.85**	**6223.74**	**6223.74**	**6224.02**	**0.029891**	**4.27**	**7.66**	**13.98**	**1.02**
NS18	**16.0000**	**500YR**	**142.00**	**6207.42**	**6209.29**	**6209.29**	**6209.95**	**0.021137**	**6.52**	**22.10**	**18.14**	**0.99**
NS18	**16.0000**	**100YR**	**107.90**	**6207.42**	**6209.05**	**6209.05**	**6209.61**	**0.023591**	**6.04**	**17.90**	**16.64**	**1.01**
NS18	**16.0000**	**10YR**	**64.00**	**6207.42**	**6208.68**	**6208.68**	**6209.11**	**0.025686**	**5.25**	**12.18**	**14.40**	**1.01**
NS18	**16.0000**	**2YR**	**32.70**	**6207.42**	**6208.32**	**6208.32**	**6208.62**	**0.027976**	**4.41**	**7.41**	**12.18**	**1.00**
NS18	**15.0000**	**500YR**	**142.00**	**6191.66**	**6193.43**	**6193.43**	**6194.03**	**0.021895**	**6.50**	**24.60**	**22.65**	**1.01**
NS18	**15.0000**	**100YR**	**107.90**	**6191.66**	**6193.21**	**6193.21**	**6193.73**	**0.023704**	**5.99**	**19.92**	**20.46**	**1.01**
NS18	**15.0000**	**10YR**	**64.00**	**6191.66**	**6192.86**	**6192.86**	**6193.26**	**0.025078**	**5.25**	**13.28**	**17.27**	**1.00**
NS18	**15.0000**	**2YR**	**32.70**	**6191.66**	**6192.52**	**6192.52**	**6192.81**	**0.027534**	**4.44**	**7.87**	**14.12**	**1.00**
NS18	**14.0000**	**500YR**	**142.00**	**6172.79**	**6174.30**	**6174.06**	**6174.55**	**0.010009**	**4.67**	**43.40**	**47.66**	**0.69**
NS18	**14.0000**	**100YR**	**107.90**	**6172.79**	**6174.12**	**6173.90**	**6174.33**	**0.010007**	**4.26**	**35.07**	**42.83**	**0.68**
NS18	**14.0000**	**10YR**	**64.00**	**6172.79**	**6173.83**	**6173.65**	**6173.99**	**0.010016**	**3.56**	**23.63**	**36.52**	**0.65**
NS18	**14.0000**	**2YR**	**32.70**	**6172.79**	**6173.55**	**6173.41**	**6173.66**	**0.010012**	**2.82**	**14.33**	**30.80**	**0.61**
SP1	**199.0000**	**500YR**	**1394.60**	**5882.02**	**5886.76**		**5887.40**	**0.008647**	**9.52**	**281.27**	**113.02**	**0.78**

SP1	**199.0000**	**100YR**	**1058.50**	**5882.02**	**5886.21**		**5886.83**	**0.009376**	**9.10**	**221.65**	**103.46**	**0.80**
SP1	**199.0000**	**10YR**	**646.06**	**5882.02**	**5885.35**		**5885.94**	**0.010893**	**8.37**	**141.51**	**84.15**	**0.83**
SP1	**199.0000**	**2YR**	**335.63**	**5882.02**	**5884.47**	**5884.38**	**5885.00**	**0.013051**	**7.39**	**77.46**	**62.45**	**0.86**
SP1	**198.5000**	**500YR**	**1394.60**	**5880.01**	**5883.94**	**5883.94**	**5885.22**	**0.013151**	**10.05**	**189.77**	**84.14**	**0.93**
SP1	**198.5000**	**100YR**	**1058.50**	**5880.01**	**5883.47**	**5883.47**	**5884.57**	**0.013089**	**9.15**	**152.47**	**75.88**	**0.91**
SP1	**198.5000**	**10YR**	**646.06**	**5880.01**	**5882.80**	**5882.68**	**5883.59**	**0.012281**	**7.57**	**105.59**	**63.69**	**0.84**
SP1	**198.5000**	**2YR**	**335.63**	**5880.01**	**5882.13**	**5881.90**	**5882.61**	**0.010766**	**5.75**	**66.67**	**51.67**	**0.75**
SP1	**198.0000**	**500YR**	**1394.60**	**5876.72**	**5879.47**	**5879.47**	**5880.26**	**0.031044**	**12.64**	**217.62**	**131.65**	**1.36**
SP1	**198.0000**	**100YR**	**1058.50**	**5876.72**	**5879.17**	**5879.17**	**5879.86**	**0.031324**	**11.74**	**179.67**	**125.24**	**1.34**
SP1	**198.0000**	**10YR**	**646.06**	**5876.72**	**5878.71**	**5878.71**	**5879.25**	**0.031872**	**10.26**	**125.12**	**109.01**	**1.30**
SP1	**198.0000**	**2YR**	**335.63**	**5876.72**	**5878.25**	**5878.25**	**5878.65**	**0.032243**	**8.60**	**78.26**	**93.18**	**1.25**
SP1	**197.5000**	**500YR**	**1394.60**	**5874.01**	**5878.31**		**5878.64**	**0.003478**	**5.77**	**391.33**	**154.47**	**0.49**
SP1	**197.5000**	**100YR**	**1058.50**	**5874.01**	**5877.74**		**5878.04**	**0.003748**	**5.43**	**306.18**	**138.01**	**0.50**
SP1	**197.5000**	**10YR**	**646.06**	**5874.01**	**5876.49**		**5876.90**	**0.007654**	**5.91**	**157.59**	**101.39**	**0.66**
SP1	**197.5000**	**2YR**	**335.63**	**5874.01**	**5875.66**		**5876.03**	**0.010973**	**5.35**	**83.01**	**77.82**	**0.74**
SP1	**197.375***	**500YR**	**1394.60**	**5873.51**	**5878.32**	**5876.53**	**5878.54**	**0.001824**	**4.46**	**483.78**	**176.06**	**0.36**
SP1	**197.375***	**100YR**	**1058.50**	**5873.51**	**5877.74**	**5876.11**	**5877.94**	**0.001839**	**4.11**	**386.76**	**159.03**	**0.36**
SP1	**197.375***	**10YR**	**646.06**	**5873.51**	**5876.50**	**5875.48**	**5876.72**	**0.003024**	**4.15**	**212.57**	**119.79**	**0.43**
SP1	**197.375***	**2YR**	**335.63**	**5873.51**	**5875.66**	**5874.86**	**5875.82**	**0.003083**	**3.34**	**124.68**	**89.94**	**0.41**
SP1	**197.3**		**Bridge**									
SP1	**197.25***	**500YR**	**1394.60**	**5873.01**	**5875.87**	**5875.87**	**5876.89**	**0.013930**	**8.50**	**201.91**	**115.93**	**0.91**
SP1	**197.25***	**100YR**	**1058.50**	**5873.01**	**5875.45**	**5875.45**	**5876.35**	**0.015148**	**7.92**	**156.56**	**99.31**	**0.92**
SP1	**197.25***	**10YR**	**646.06**	**5873.01**	**5874.83**	**5874.83**	**5875.56**	**0.017933**	**6.96**	**101.09**	**79.28**	**0.95**
SP1	**197.25***	**2YR**	**335.63**	**5873.01**	**5874.25**	**5874.23**	**5874.75**	**0.021270**	**5.71**	**60.18**	**63.14**	**0.97**
SP1	**197.125***	**500YR**	**1394.60**	**5872.51**	**5875.19**	**5875.19**	**5876.20**	**0.015048**	**8.27**	**189.85**	**109.68**	**0.93**
SP1	**197.125***	**100YR**	**1058.50**	**5872.51**	**5874.78**	**5874.78**	**5875.68**	**0.016865**	**7.74**	**147.36**	**94.69**	**0.96**
SP1	**197.125***	**10YR**	**646.06**	**5872.51**	**5874.20**	**5874.20**	**5874.90**	**0.019965**	**6.74**	**98.04**	**76.52**	**0.98**
SP1	**197.125***	**2YR**	**335.63**	**5872.51**	**5873.68**	**5873.67**	**5874.14**	**0.022629**	**5.45**	**61.58**	**64.41**	**0.98**
SP1	**197.0000**	**500YR**	**1394.60**	**5872.01**	**5874.53**	**5874.53**	**5875.52**	**0.016341**	**8.06**	**182.46**	**107.70**	**0.95**
SP1	**197.0000**	**100YR**	**1058.50**	**5872.01**	**5874.14**	**5874.14**	**5875.01**	**0.018429**	**7.51**	**143.92**	**90.82**	**0.98**
SP1	**197.0000**	**10YR**	**646.06**	**5872.01**	**5873.60**	**5873.60**	**5874.26**	**0.021612**	**6.51**	**99.37**	**77.79**	**1.00**
SP1	**197.0000**	**2YR**	**335.63**	**5872.01**	**5873.17**	**5873.09**	**5873.55**	**0.018993**	**5.00**	**67.11**	**69.39**	**0.90**
SP1	**196.5000**	**500YR**	**1394.60**	**5868.01**	**5869.92**	**5869.92**	**5870.68**	**0.018931**	**7.12**	**207.69**	**151.16**	**0.98**
SP1	**196.5000**	**100YR**	**1058.50**	**5868.01**	**5869.65**	**5869.65**	**5870.30**	**0.020232**	**6.54**	**168.28**	**140.90**	**0.98**
SP1	**196.5000**	**10YR**	**646.06**	**5868.01**	**5869.24**	**5869.24**	**5869.74**	**0.022827**	**5.68**	**116.01**	**119.17**	**0.99**
SP1	**196.5000**	**2YR**	**335.63**	**5868.01**	**5868.83**	**5868.83**	**5869.19**	**0.026409**	**4.80**	**70.56**	**102.95**	**1.00**
SP1	**196.0000**	**500YR**	**1394.60**	**5862.01**	**5865.18**		**5865.47**	**0.008335**	**6.50**	**393.34**	**243.86**	**0.70**
SP1	**196.0000**	**100YR**	**1058.50**	**5862.01**	**5864.91**		**5865.16**	**0.008095**	**5.96**	**328.87**	**235.11**	**0.68**
SP1	**196.0000**	**10YR**	**646.06**	**5862.01**	**5864.49**		**5864.70**	**0.008339**	**5.32**	**231.66**	**222.81**	**0.67**
SP1	**196.0000**	**2YR**	**335.63**	**5862.01**	**5864.07**		**5864.26**	**0.009079**	**4.73**	**140.24**	**211.98**	**0.67**
SP1	**195.5000**	**500YR**	**1394.60**	**5859.11**	**5860.54**	**5860.54**	**5860.91**	**0.031584**	**8.26**	**332.16**	**400.03**	**1.23**
SP1	**195.5000**	**100YR**	**1058.50**	**5859.11**	**5860.41**	**5860.41**	**5860.73**	**0.030588**	**7.62**	**280.45**	**393.25**	**1.19**
SP1	**195.5000**	**10YR**	**646.06**	**5859.11**	**5860.24**	**5860.24**	**5860.47**	**0.025445**	**6.33**	**215.91**	**387.26**	**1.06**
SP1	**195.5000**	**2YR**	**335.63**	**5859.11**	**5860.07**	**5860.07**	**5860.23**	**0.019668**	**4.99**	**151.60**	**379.83**	**0.91**
SP1	**195.0000**	**500YR**	**1394.60**	**5854.01**	**5855.69**	**5855.24**	**5855.82**	**0.010011**	**3.51**	**499.32**	**454.85**	**0.51**
SP1	**195.0000**	**100YR**	**1058.50**	**5854.01**	**5855.50**	**5855.10**	**5855.61**	**0.010017**	**3.21**	**415.05**	**435.87**	**0.50**
SP1	**195.0000**	**10YR**	**646.06**	**5854.01**	**5855.22**	**5854.92**	**5855.31**	**0.009994**	**2.75**	**298.87**	**408.76**	**0.48**
SP1	**195.0000**	**2YR**	**335.63**	**5854.01**	**5854.95**	**5854.74**	**5855.01**	**0.009998**	**2.25**	**192.73**	**376.86**	**0.46**
SP2	**189.5000**	**500YR**	**174.01**	**6082.02**	**6084.60**	**6084.60**	**6085.44**	**0.019341**	**7.54**	**25.11**	**15.92**	**0.97**
SP2	**189.5000**	**100YR**	**131.46**	**6082.02**	**6084.26**	**6084.26**	**6085.00**	**0.020028**	**7.01**	**20.03**	**14.42**	**0.97**
SP2	**189.5000**	**10YR**	**77.60**	**6082.02**	**6083.73**	**6083.73**	**6084.31**	**0.022292**	**6.15**	**13.03**	**11.99**	**0.98**
SP2	**189.5000**	**2YR**	**39.34**	**6082.02**	**6083.23**	**6083.23**	**6083.65**	**0.026492**	**5.16**	**7.65**	**9.68**	**1.00**
SP2	**189.0000**	**500YR**	**174.01**	**6064.54**	**6066.96**	**6066.96**	**6067.73**	**0.022326**	**7.64**	**26.95**	**17.81**	**1.04**
SP2	**189.0000**	**100YR**	**131.46**	**6064.54**	**6066.66**	**6066.66**	**6067.33**	**0.022745**	**7.14**	**21.75**	**16.39**	**1.03**
SP2	**189.0000**	**10YR**	**77.60**	**6064.54**	**6066.19**	**6066.19**	**6066.71**	**0.023388**	**6.24**	**14.56**	**14.05**	**1.01**

SP2	189.0000	2YR	39.34	6064.54	6065.72	6065.72	6066.10	0.024676	5.24	8.62	11.43	0.99
SP2	188.5000	500YR	234.68	6041.85	6044.31	6044.31	6045.19	0.032322	9.07	33.39	21.31	1.23
SP2	188.5000	100YR	177.14	6041.85	6044.00	6044.00	6044.74	0.034018	8.16	27.08	19.42	1.23
SP2	188.5000	10YR	104.47	6041.85	6043.50	6043.50	6044.07	0.036043	7.16	18.09	16.35	1.22
SP2	188.5000	2YR	53.34	6041.85	6043.02	6043.02	6043.42	0.039264	6.06	10.90	13.48	1.21
SP2	188.0000	500YR	234.68	6021.78	6024.23	6024.23	6025.09	0.023393	8.17	34.50	22.06	1.08
SP2	188.0000	100YR	177.14	6021.78	6023.94	6023.94	6024.65	0.024127	7.44	28.23	20.35	1.07
SP2	188.0000	10YR	104.47	6021.78	6023.44	6023.44	6024.00	0.025271	6.51	18.90	17.35	1.06
SP2	188.0000	2YR	53.34	6021.78	6022.96	6022.96	6023.36	0.027770	5.55	11.21	14.15	1.05
SP2	187.5000	500YR	234.68	6010.01	6011.91	6011.91	6012.58	0.019283	6.71	37.48	29.91	0.96
SP2	187.5000	100YR	177.14	6010.01	6011.62	6011.62	6012.23	0.020832	6.29	29.51	26.48	0.98
SP2	187.5000	10YR	104.47	6010.01	6011.21	6011.21	6011.67	0.023178	5.45	19.49	22.34	0.98
SP2	187.5000	2YR	53.34	6010.01	6011.01		6011.20	0.012489	3.52	15.22	20.17	0.70
SP2	187.375*	500YR	234.68	6008.30	6011.72		6011.85	0.001563	3.07	101.64	52.69	0.31
SP2	187.375*	100YR	177.14	6008.30	6011.62		6011.70	0.001015	2.42	96.46	51.41	0.25
SP2	187.375*	10YR	104.47	6008.30	6011.39		6011.42	0.000488	1.59	84.81	48.32	0.17
SP2	187.375*	2YR	53.34	6008.30	6011.13		6011.14	0.000188	0.92	72.52	44.76	0.10
SP2	187.25*	500YR	234.68	6006.60	6011.78		6011.81	0.000235	1.63	229.65	79.11	0.13
SP2	187.25*	100YR	177.14	6006.60	6011.66		6011.68	0.000149	1.28	220.16	77.72	0.10
SP2	187.25*	10YR	104.47	6006.60	6011.41		6011.41	0.000066	0.82	200.79	74.74	0.07
SP2	187.25*	2YR	53.34	6006.60	6011.13		6011.13	0.000022	0.46	180.75	71.41	0.04
SP2	187.125*	500YR	234.68	6004.90	6011.79	6006.90	6011.80	0.000058	1.00	420.96	108.27	0.07
SP2	187.125*	100YR	177.14	6004.90	6011.67	6006.63	6011.67	0.000036	0.78	407.47	106.73	0.05
SP2	187.125*	10YR	104.47	6004.90	6011.41	6006.25	6011.41	0.000015	0.49	380.34	103.66	0.03
SP2	187.125*	2YR	53.34	6004.90	6011.13	6005.85	6011.13	0.000005	0.27	352.21	100.25	0.02
SP2	187.1		Culvert									
SP2	187.0000	500YR	234.68	6003.19	6005.06	6005.06	6005.63	0.018109	7.31	49.81	45.79	0.97
SP2	187.0000	100YR	177.14	6003.19	6004.84	6004.84	6005.33	0.018087	6.69	40.13	42.05	0.95
SP2	187.0000	10YR	104.47	6003.19	6004.45	6004.45	6004.86	0.020679	5.89	25.13	33.89	0.96
SP2	187.0000	2YR	53.34	6003.19	6004.11	6004.11	6004.41	0.021909	4.80	14.62	27.27	0.94
SP2	186.5000	500YR	234.68	5977.77	5980.23	5980.23	5981.02	0.020326	7.15	33.51	22.58	0.99
SP2	186.5000	100YR	177.14	5977.77	5979.92	5979.92	5980.61	0.021669	6.66	26.85	20.82	1.00
SP2	186.5000	10YR	104.47	5977.77	5979.45	5979.45	5979.98	0.023982	5.86	17.82	16.92	1.01
SP2	186.5000	2YR	53.34	5977.77	5978.98	5978.98	5979.37	0.026466	5.02	10.63	13.79	1.01
SP2	186.0000	500YR	234.68	5962.23	5964.53	5964.53	5965.30	0.016475	7.58	39.01	28.18	0.94
SP2	186.0000	100YR	177.14	5962.23	5964.22	5964.22	5964.90	0.017368	6.98	30.85	25.44	0.94
SP2	186.0000	10YR	104.47	5962.23	5963.76	5963.76	5964.28	0.019380	5.97	19.95	21.27	0.94
SP2	186.0000	2YR	53.34	5962.23	5963.31	5963.31	5963.69	0.023841	4.95	11.43	17.20	0.97
SP2	185.5000	500YR	245.13	5947.58	5949.63	5949.63	5950.31	0.021269	7.47	42.91	35.01	1.03
SP2	185.5000	100YR	185.05	5947.58	5949.37	5949.37	5949.96	0.022871	6.89	34.10	31.94	1.04
SP2	185.5000	10YR	109.27	5947.58	5948.97	5948.97	5949.42	0.027360	5.97	22.19	26.80	1.07
SP2	185.5000	2YR	55.98	5947.58	5948.62	5948.62	5948.93	0.029046	4.88	13.70	22.64	1.04
SP2	185.0000	500YR	245.13	5938.02	5940.05	5940.05	5940.69	0.019706	6.76	42.30	34.83	0.98
SP2	185.0000	100YR	185.05	5938.02	5939.77	5939.77	5940.35	0.021201	6.40	33.07	30.74	0.99
SP2	185.0000	10YR	109.27	5938.02	5939.38	5939.38	5939.83	0.021789	5.53	21.95	25.90	0.96
SP2	185.0000	2YR	55.98	5938.02	5938.98	5938.98	5939.31	0.024940	4.69	12.67	20.46	0.97
SP2	184.5000	500YR	245.13	5924.07	5925.73	5925.73	5926.32	0.024121	7.93	47.76	41.59	1.10
SP2	184.5000	100YR	185.05	5924.07	5925.51	5925.51	5926.02	0.024728	7.27	38.74	38.88	1.09
SP2	184.5000	10YR	109.27	5924.07	5925.16	5925.16	5925.55	0.026883	6.24	25.85	34.31	1.08
SP2	184.5000	2YR	55.98	5924.07	5924.84	5924.84	5925.11	0.028785	5.05	15.68	29.27	1.05
SP2	184.0000	500YR	245.13	5908.28	5909.92	5909.92	5910.42	0.021205	6.94	53.13	54.90	1.01
SP2	184.0000	100YR	185.05	5908.28	5909.73	5909.73	5910.16	0.021190	6.33	43.22	51.20	0.99
SP2	184.0000	10YR	109.27	5908.28	5909.40	5909.40	5909.75	0.023998	5.52	27.77	42.81	1.00
SP2	184.0000	2YR	55.98	5908.28	5909.13	5909.13	5909.37	0.024896	4.45	16.76	36.04	0.96

SP2	**183.5000**	**500YR**	**245.13**	**5895.98**	**5897.75**	**5897.29**	**5897.91**	**0.010006**	**5.38**	**90.32**	**91.08**	**0.72**
SP2	**183.5000**	**100YR**	**185.05**	**5895.98**	**5897.54**	**5897.13**	**5897.68**	**0.010005**	**4.95**	**72.44**	**80.38**	**0.70**
SP2	**183.5000**	**10YR**	**109.27**	**5895.98**	**5897.18**	**5896.83**	**5897.29**	**0.010009**	**4.15**	**47.53**	**61.30**	**0.67**
SP2	**183.5000**	**2YR**	**55.98**	**5895.98**	**5896.85**	**5896.58**	**5896.93**	**0.010004**	**3.33**	**29.06**	**49.58**	**0.64**
MAIN	**39.5000**	**500YR**	**9993.10**	**5806.01**	**5846.31**		**5846.31**	**0.000002**	**0.63**	**29426.68**	**1050.27**	**0.02**
MAIN	**39.5000**	**100YR**	**8446.80**	**5806.01**	**5846.03**		**5846.03**	**0.000002**	**0.54**	**29136.93**	**1050.27**	**0.01**
MAIN	**39.5000**	**10YR**	**5796.90**	**5806.01**	**5830.78**		**5830.78**	**0.000007**	**0.85**	**13768.16**	**956.22**	**0.03**
MAIN	**39.5000**	**2YR**	**3793.30**	**5806.01**	**5821.63**		**5821.65**	**0.000043**	**1.49**	**5589.78**	**787.55**	**0.07**
MAIN	**39.375***	**500YR**	**9993.10**	**5806.01**	**5846.31**		**5846.31**	**0.000003**	**0.70**	**26859.65**	**997.26**	**0.02**
MAIN	**39.375***	**100YR**	**8446.80**	**5806.01**	**5846.03**		**5846.03**	**0.000002**	**0.60**	**26584.52**	**997.26**	**0.02**
MAIN	**39.375***	**10YR**	**5796.90**	**5806.01**	**5830.78**		**5830.78**	**0.000010**	**1.00**	**12069.47**	**894.42**	**0.04**
MAIN	**39.375***	**2YR**	**3793.30**	**5806.01**	**5821.62**		**5821.64**	**0.000075**	**1.97**	**4449.66**	**708.34**	**0.09**
MAIN	**39.25***	**500YR**	**9993.10**	**5806.01**	**5846.31**	**5817.59**	**5846.31**	**0.000003**	**0.79**	**24505.46**	**944.24**	**0.02**
MAIN	**39.25***	**100YR**	**8446.80**	**5806.01**	**5846.03**	**5816.78**	**5846.03**	**0.000002**	**0.67**	**24244.96**	**944.24**	**0.02**
MAIN	**39.25***	**10YR**	**5796.90**	**5806.01**	**5830.77**	**5815.68**	**5830.78**	**0.000014**	**1.17**	**10618.01**	**831.31**	**0.04**
MAIN	**39.25***	**2YR**	**3793.30**	**5806.01**	**5821.60**	**5812.80**	**5821.64**	**0.000116**	**2.46**	**3634.18**	**615.96**	**0.11**
MAIN	**39.2**		**Bridge**									
MAIN	**39.125***	**500YR**	**9993.10**	**5806.01**	**5846.31**		**5846.31**	**0.000004**	**0.88**	**22364.64**	**891.23**	**0.02**
MAIN	**39.125***	**100YR**	**8446.80**	**5806.01**	**5846.03**		**5846.03**	**0.000003**	**0.75**	**22119.20**	**891.23**	**0.02**
MAIN	**39.125***	**10YR**	**5796.90**	**5806.01**	**5830.77**		**5830.78**	**0.000019**	**1.35**	**9421.58**	**766.42**	**0.05**
MAIN	**39.125***	**2YR**	**3793.30**	**5806.01**	**5821.57**		**5821.63**	**0.000178**	**3.05**	**3029.72**	**557.95**	**0.14**
MAIN	**39.0000**	**500YR**	**9993.10**	**5806.01**	**5846.31**	**5819.48**	**5846.31**	**0.000005**	**0.97**	**20437.43**	**838.21**	**0.03**
MAIN	**39.0000**	**100YR**	**8446.80**	**5806.01**	**5846.03**	**5819.02**	**5846.03**	**0.000004**	**0.83**	**20206.59**	**838.21**	**0.02**
MAIN	**39.0000**	**10YR**	**5796.90**	**5806.01**	**5830.77**	**5817.52**	**5830.78**	**0.000024**	**1.53**	**8479.53**	**703.99**	**0.05**
MAIN	**39.0000**	**2YR**	**3793.30**	**5806.01**	**5821.52**	**5814.08**	**5821.62**	**0.000278**	**3.79**	**2533.48**	**513.14**	**0.17**
MAIN	**38.75**		**Culvert**									
MAIN	**38.5000**	**500YR**	**9993.10**	**5804.96**	**5845.00**		**5845.00**	**0.000004**	**0.79**	**24810.17**	**1037.83**	**0.02**
MAIN	**38.5000**	**100YR**	**8446.80**	**5804.96**	**5845.00**		**5845.00**	**0.000003**	**0.67**	**24810.68**	**1037.83**	**0.02**
MAIN	**38.5000**	**10YR**	**5796.90**	**5804.96**	**5813.30**		**5814.40**	**0.007011**	**11.27**	**953.74**	**280.56**	**0.75**
MAIN	**38.5000**	**2YR**	**3793.30**	**5804.96**	**5812.26**	**5812.10**	**5813.28**	**0.007111**	**10.21**	**674.90**	**258.71**	**0.73**
MAIN	**38.0000**	**500YR**	**9993.10**	**5804.24**	**5845.00**	**5812.51**	**5845.00**	**0.000001**	**0.48**	**37466.09**	**1315.04**	**0.01**
MAIN	**38.0000**	**100YR**	**8446.80**	**5804.24**	**5845.00**	**5811.94**	**5845.00**	**0.000001**	**0.40**	**37466.09**	**1315.04**	**0.01**
MAIN	**38.0000**	**10YR**	**5796.90**	**5804.24**	**5813.83**	**5811.22**	**5813.98**	**0.001001**	**4.84**	**2581.37**	**728.65**	**0.29**
MAIN	**38.0000**	**2YR**	**3793.30**	**5804.24**	**5812.73**	**5810.40**	**5812.88**	**0.001002**	**4.42**	**1829.99**	**645.22**	**0.29**

F. Project HEC-1 and HEC-RAS files Disk

G. Oversized Exhibits

APPENDIX D2

Stormwater Management and Water Quality Plan

STORMWATER MANAGEMENT
&
WATER QUALITY PLAN

Northstar Community Services District
Multi-Purpose Trail

MARTIS VALLEY, PLACER COUNTY, CALIFORNIA

Prepared for:

Northstar Community Services District
908 Northstar Drive
Northstar, CA 96161
Mike Staudenmayer
(530) 562-0747

Prepared by:

Walter Auerbach, P.E.
AUERBACH ENGINEERING CORPORATION
3092 NORTH LAKE BLVD.
TAHOE CITY, CA 96145
530-581-1116

March, 2012

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GOAL

Auerbach Engineering Corporation (AEC) has prepared this Stormwater Management and Water Quality Plan (SMWQP) for the Martis Valley Regional Trail for the purpose of demonstrating methods and means for protection of the existing water ways within and downstream of the proposed project area. This plan outlines construction details which will ensure that stormwater runoff quantity and water quality will not result in significant impacts to the existing environment including the waterways; soils; soils hydrology; vegetation; wildlife and human health and recreation. An additional goal of this Plan is to assist the requirements of the Environmental Impact Report (EIR) by revealing possible environmental impacts due to the project in regards to water quality, and identify available mitigation methods needed to ensure that those impacts are less than significant.

METHODS

The stormwater management practices utilized within this Plan are based primarily on the requirements set forth within the Placer County Stormwater Management Manual (PCSWMM). Best Management Practices (BMPs) utilized for the project correspond to the California Stormwater Quality Association (CASQA) Stormwater Best Management Practice Handbooks and the 'Erosion and Sediment Control for Developing Areas of the Sierra Foothills and Mountains' prepared by the High Sierra Resource Conversation and Development Council, 1991. Preference will be given to stormwater management systems, structures and BMPs that correspond to Low Impact Development (LID) techniques and practices as explained within the 'Low Impact Development Manual for Southern California' as recommended by CASQA.

DESIGN CRITERIA, RESOURCES AND REFERENCES

Pre-project and preliminary post-project hydrology has been modeled by Civil Engineering Solutions, Inc. (Martis Valley Trail Project Hydrology Study; March, 2012). Holdrege & Kull has studied the soil types and corresponding infiltration capacities within the project area and has developed project specific trail sections that will mitigate stormwater run-off (Preliminary Soil Evaluation and Storm Water BMP Design Report, NCSD Multi-Purpose Trail; January, 2012). These reports contain the majority of the design variables required for designing the stormwater management system. Additional design variables and constraints are found within the PCSWMM.

The PCSWMM requires that "all new development shall be planned and designed so that no damages occur to structures or improvements during the 100-year event and no inundation of private property occurs during the 10-year event". Also "The 10-year event is the minimum design storm for new developments in all drainages and all dedicated drainage facilities will be sized for this event. The development plan will also identify the effects of the 100-year event and provisions will be made in the plan to prevent loss of life and damages to property during a 100-year event". The PCSWMM allows the use for both storage and infiltration of run-off as methods for stormwater management. Both methods will be used for this project.

Civil Solution's Hydrology Study indicates that the project, as a whole, will increase the flow of the existing waterways by a maximum of approximately 1.9% during a 10-yr event and 0.9% during the 100-yr event. See Table I.II.C.15: Estimated Post-Project Peak Flow Rates – Warm Event – Peak of All Alternatives. Note that the Civil Solutions study does not incorporate the positive effect of stormwater BMP's on the project hydrology, and while these flow increases are likely insignificant by themselves, they can be reduced through implementation of additional measures as discussed below. It is the intent of this project to minimize environmental impacts to the most practical extent available.

STORMWATER MANAGEMENT

Trail

The proposed trail is a linear project, and as such it is not practical or feasible to design a centralized stormwater management system for the entire project. The best management practice for the majority of the project is to maximize on-site infiltration and perpetuate existing sheet flow conditions. This will be done by utilizing up slope swales that collect sheet flow and allow infiltration for low flow (2 and 10-yr storm) events and route stormwater runoff to under-trail drains that disperse runoff as sheet flow on the downslope side of the trail. Figure 1, Typical Trail Section, and Figure 1A, Cross Drain, detail these functions. Runoff from larger storm events will utilize the under-trail drains as well as cross the trail similar to existing sheet flow conditions.

The proposed trail system bisects several environments – such as meadows, riparian areas, upland grasses, and steep forested areas - each with their own characteristics and specific design constraints. It is the intent of the design of the trail system to not impede the natural hydrology of these differing environments.

Figure 2, Wet Meadow Section, is a possible solution provided by Holdrege & Kull which will allow existing sheet flow conditions encountered during smaller (2-yr and 10-yr) rain events to proceed unabated through the trail footprint where prolonged wet conditions occur.

Figure 3, Plumas Ivesia Section, is another trail design option provided by Holdrege & Kull for mitigating drainage within and adjacent to areas where plumas ivesia is found. Plumas ivesia grows in a particular soil type with poor infiltration capacity. A trail section such as that shown within Figure 3, will allow up slope drainage to continue through the trail footprint.

Trail sections traversing the steeper forested areas will require design features similar to those shown on Figure 4, Infiltration Trench Section, and Figure 5, Rockery Wall Section. The purpose of these designs is to infiltrate runoff and to promoting sheet flow to the down slope areas in order to avoid channelizing surface flows.

The trail will cross over larger existing storm water drainage courses. The crossings will utilize appropriately sized culverts based on the information provided within Civil Solution's Hydrology Study.

As shown on Figure 6, 100-yr Flood, the 100-yr flood event completely inundates portions of the proposed trail system. Civil Solution's Hydrology Study shows that the trail and vertical structures (i.e. bridges and boardwalks) will not impede the flow of these larger events. Therefore, the requirements set forth within the PCSWMM regarding the 100-yr storm events are met.

Trail structures for spanning existing drainage crossings, such as boardwalks and bridges, are designed to pass the 10-yr rain event without impeding the flows. The exception is the bridge located where Frank's Fishing bridge is now located – Station 29+00 of Highway Trail Segment 3A. The 10-yr event will flow well above the proposed bridge as it occurs now with the existing bridge. As such, the bridge will be designed to withstand the impacts of inundation of the 10 and 100-yr flood events.

FIGURE 1
TYPICAL TRAIL SECTION

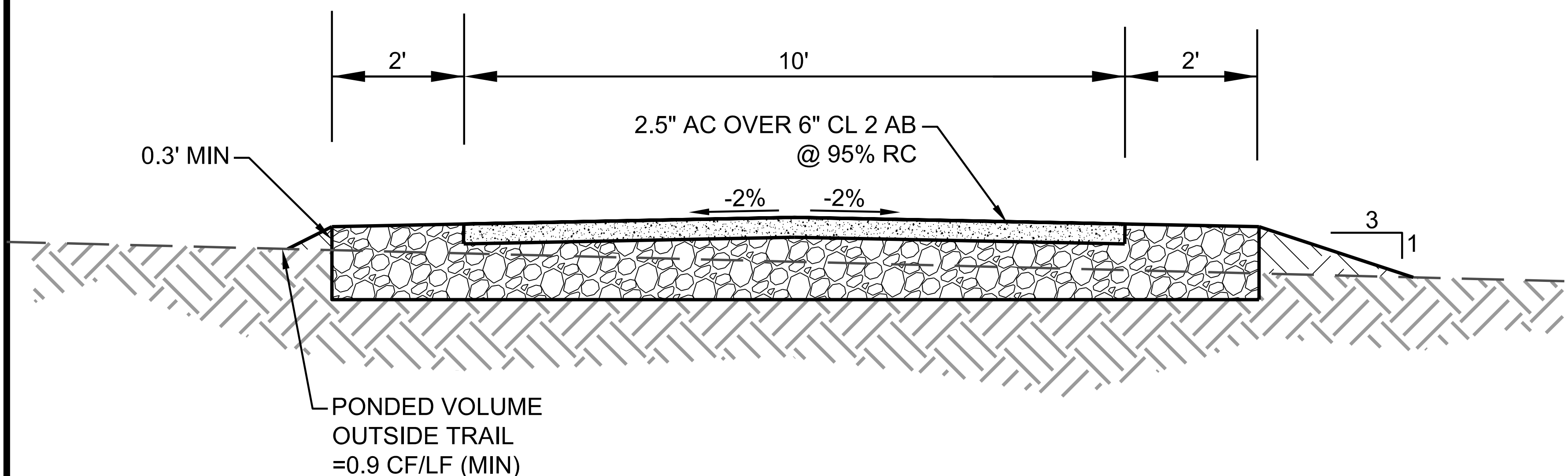

FIGURE 1
TYPICAL TRAIL SECTION
STORMWATER MANAGEMENT & WATER QUALITY PLAN
MULTI-PURPOSE TRAIL
NORTHSTAR COMMUNITY SERVICES DISTRICT
PROJECT NO.: 985.14B MARCH 2012

AUERBACH ENGINEERING CORPORATION

FIGURE 1A
DRAIN ROCK CROSS DRAIN

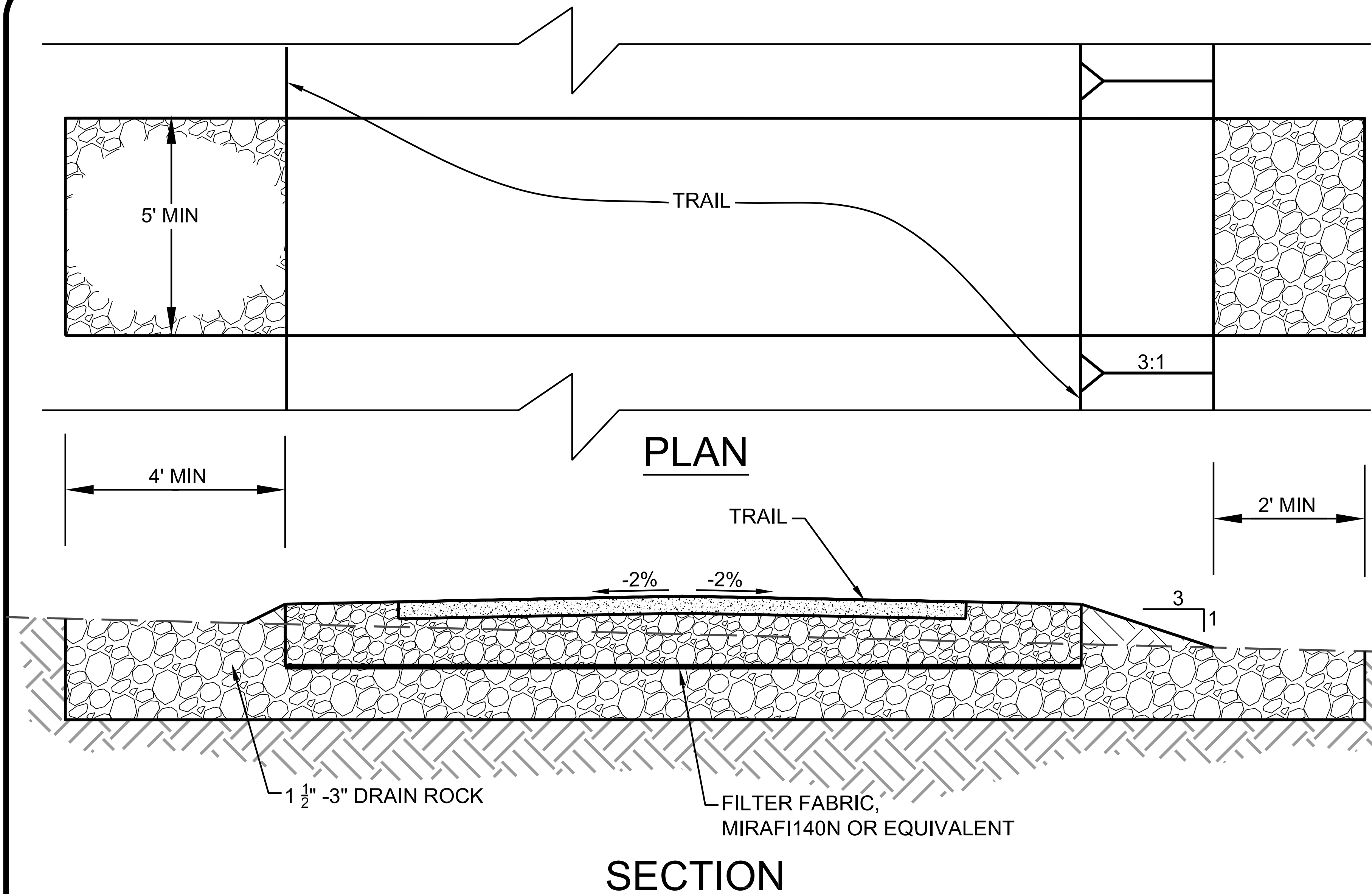

FIGURE 1A
DRAIN ROCK CROSS DRAIN DETAIL
STORMWATER MANAGEMENT & WATER QUALITY PLAN
MULTI-PURPOSE TRAIL
NORTHSTAR COMMUNITY SERVICES DISTRICT
PROJECT NO.: 985.14B MARCH 2012

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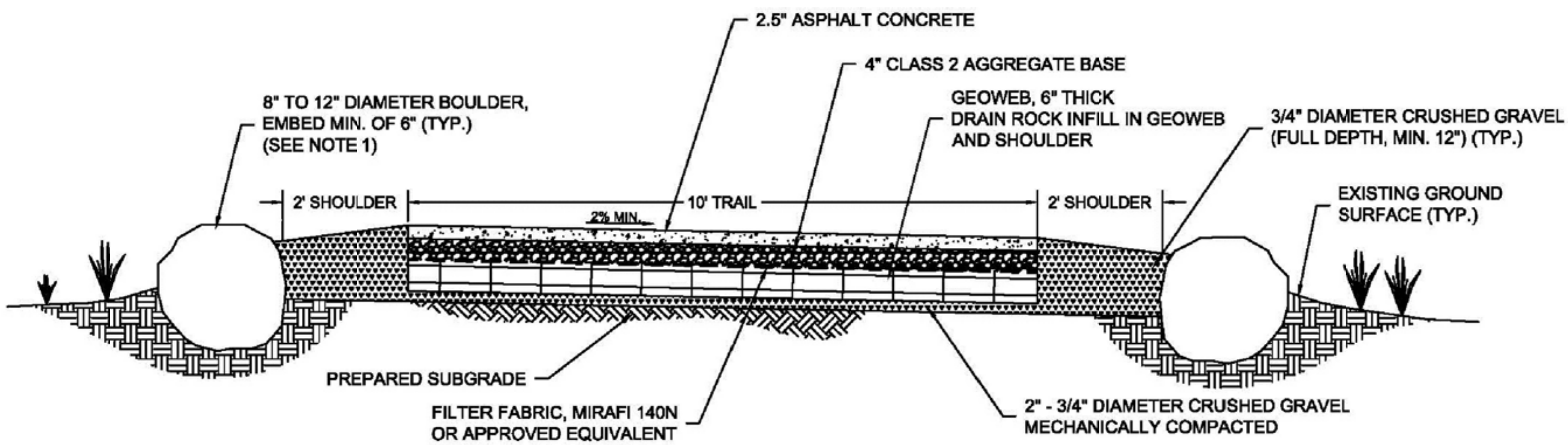
FIGURE 2
TYPICAL WET-MEADOW SECTION



NOTES:
1. PLACE BOULDERS ONLY AS CONDITIONS REQUIRE TO SUPPORT CUT AND/OR FILL MATERIAL.
2. FIGURE TAKEN FROM 'PRELIMINARY SOIL EVALUATION AND STORM WATER BMP DESIGN REPORT FOR NORTHSTAR COMMUNITY SERVICES DISTRICT MULTI-PURPOSE TRAIL' BY HOLDREGE & KULL.

FIGURE 2
WET MEADOW TRAIL SECTION
STORMWATER MANAGEMENT & WATER QUALITY PLAN
MULTI-PURPOSE TRAIL
NORTHSTAR COMMUNITY SERVICES DISTRICT
PROJECT NO.: 985.14B MARCH 2012

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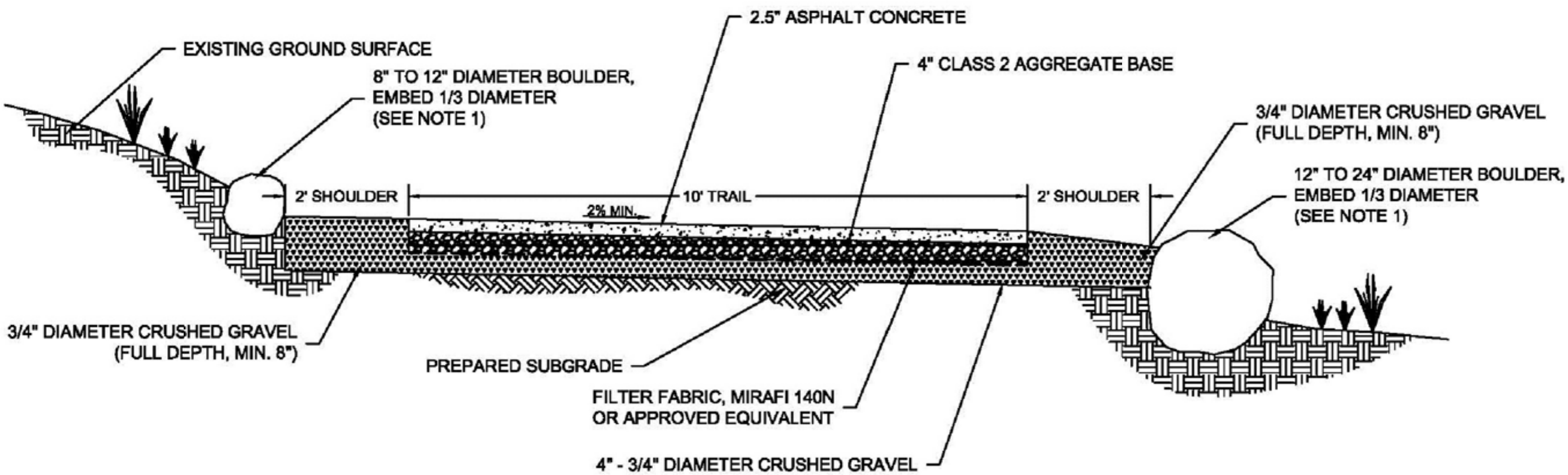
FIGURE 3
TYPICAL PLUMAS IVESIA SECTION

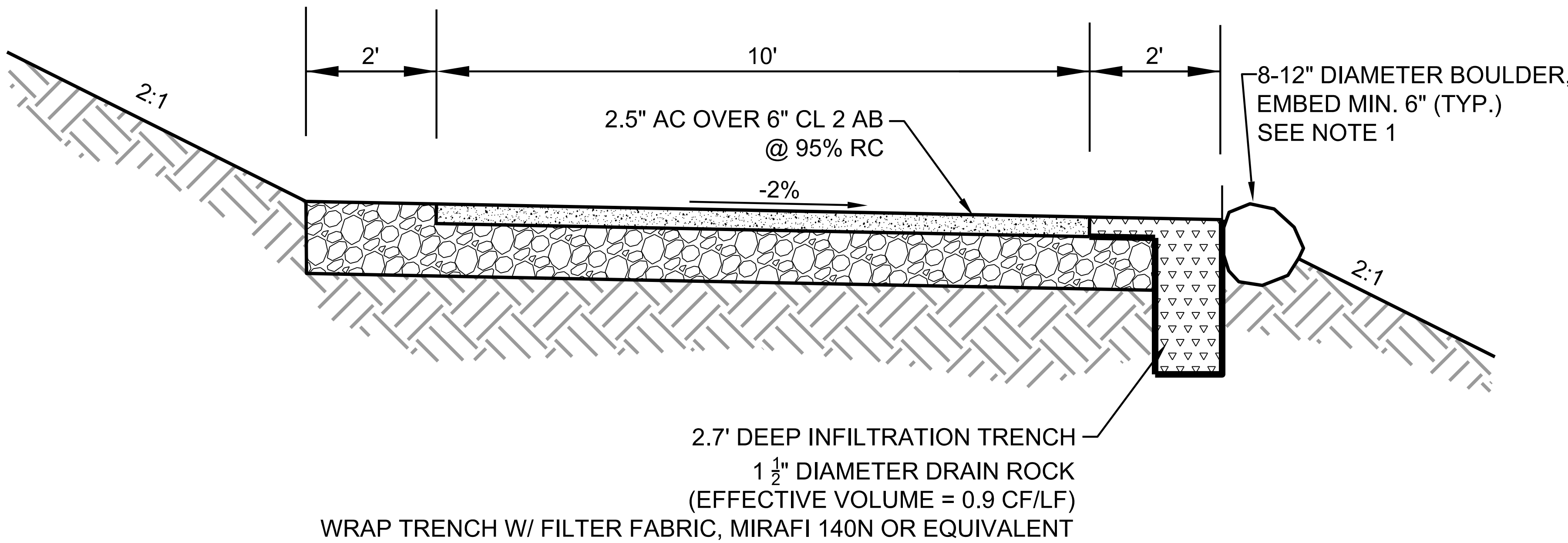


NOTES:
1. PLACE BOULDERS ONLY AS CONDITIONS REQUIRE TO SUPPORT CUT AND/OR FILL MATERIAL.
2. FIGURE TAKEN FROM 'PRELIMINARY SOIL EVALUATION AND STORM WATER BMP DESIGN REPORT FOR NORTHSTAR COMMUNITY SERVICES DISTRICT MULTI-PURPOSE TRAIL' BY HOLDREGE & KULL.

FIGURE 3
PLUMAS IVESIA TRAIL SECTION
STORMWATER MANAGEMENT & WATER QUALITY PLAN
MULTI-PURPOSE TRAIL
NORTHSTAR COMMUNITY SERVICES DISTRICT
PROJECT NO.: 985.14B MARCH 2012

AUERBACH ENGINEERING CORPORATION

FIGURE4
INFILTRATION TRENCH SECTION

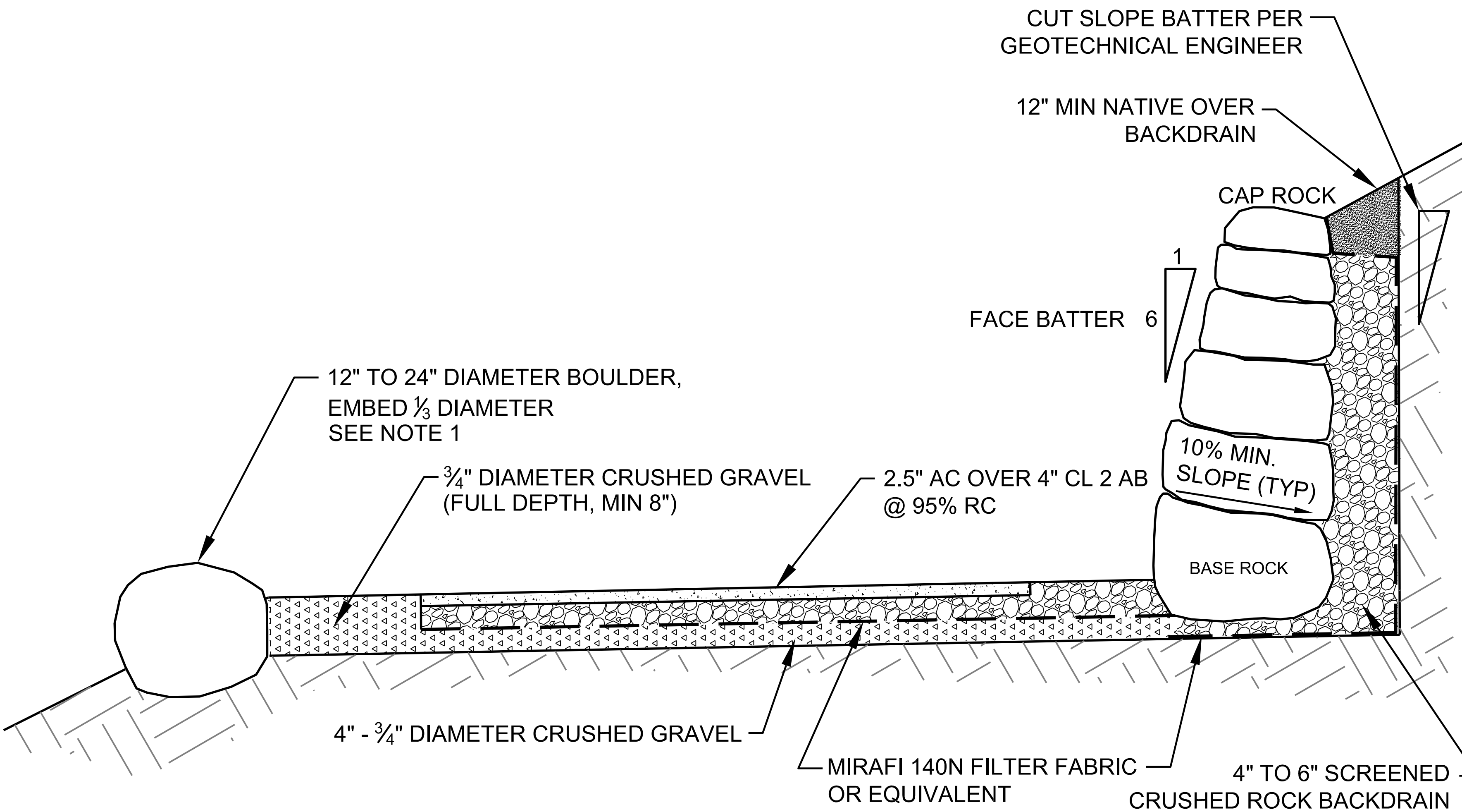


NOTES:
1. PLACE BOULDERS ONLY AS CONDITIONS REQUIRE TO SUPPORT CUT AND/OR FILL MATERIAL.

FIGURE 4
INFILTRATION TRENCH TRAIL SECTION
STORMWATER MANAGEMENT & WATER QUALITY PLAN
MULTI-PURPOSE TRAIL
NORTHSTAR COMMUNITY SERVICES DISTRICT
PROJECT NO.: 985.14B   MARCH 2012

AUERBACH ENGINEERING CORPORATION

FIGURE 5
TYPICAL ROCKERY WALL SECTION



NOTES:

1. PLACE BOULDERS ONLY AS CONDITIONS REQUIRE TO SUPPORT CUT AND/OR FILL MATERIAL.
2. INSTALL INFILTRATION TRENCH AS SHOWN ON FIGURE 4 AS RECOMMENDED BY ENGINEER

FIGURE 5
ROCKERY WALL TRAIL SECTION
STORMWATER MANAGEMENT & WATER QUALITY PLAN
MULTI-PURPOSE TRAIL
NORTHSTAR COMMUNITY SERVICES DISTRICT
PROJECT NO.: 985.14B MARCH 2012

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FIGURE 6
100-YR FLOODPLAIN

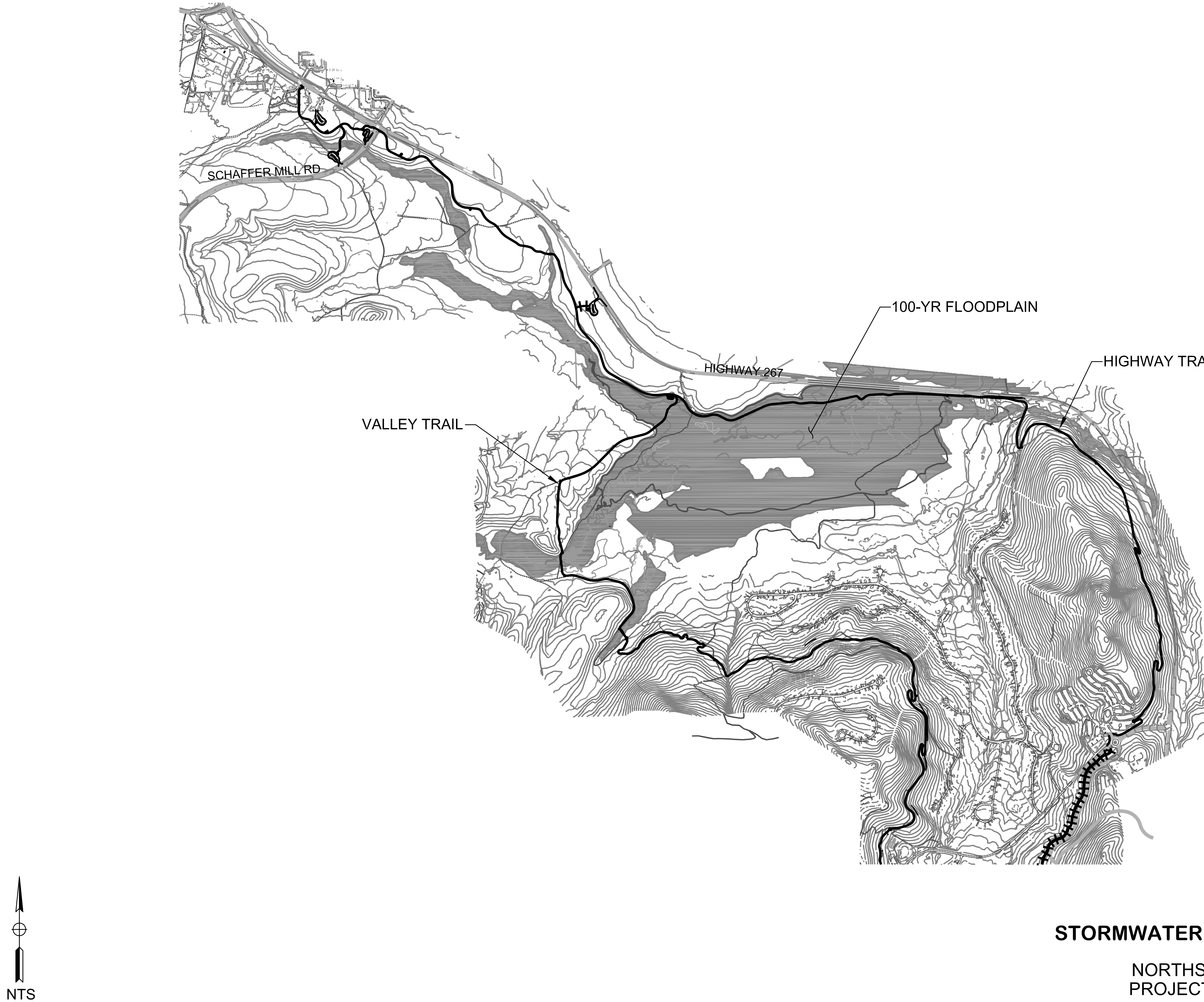

FIGURE 6
100-YR FLOODPLAIN
STORMWATER MANAGEMENT & WATER QUALITY PLAN
MULTI-PURPOSE TRAIL
NORTHSTAR COMMUNITY SERVICES DISTRICT
PROJECT NO.: 985.14B MARCH 2012

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Rest Stops, Trail Junctions, Trail Heads and Wildlife Viewing Area

The surfaces of the rest stop, trail junctions, trail heads and the Wildlife Viewing Area will be made of permeable pavers. These areas will be designed with intention of providing full infiltration of runoff from the 10-yr storm event within 12 hours. Additional soil investigations by Holdrege & Kull will be needed for each location to provide the actual available infiltration rates. If full infiltration within 12 hours is not feasible, an underdrain system will be included that will collect filtered stormwater and release the runoff downslope as sheet flow. Runoff released from these structures will be, at a maximum, 90% of pre-project runoff rates. Figure 7, Permeable Paver Section, details the materials used for the underdrain system.

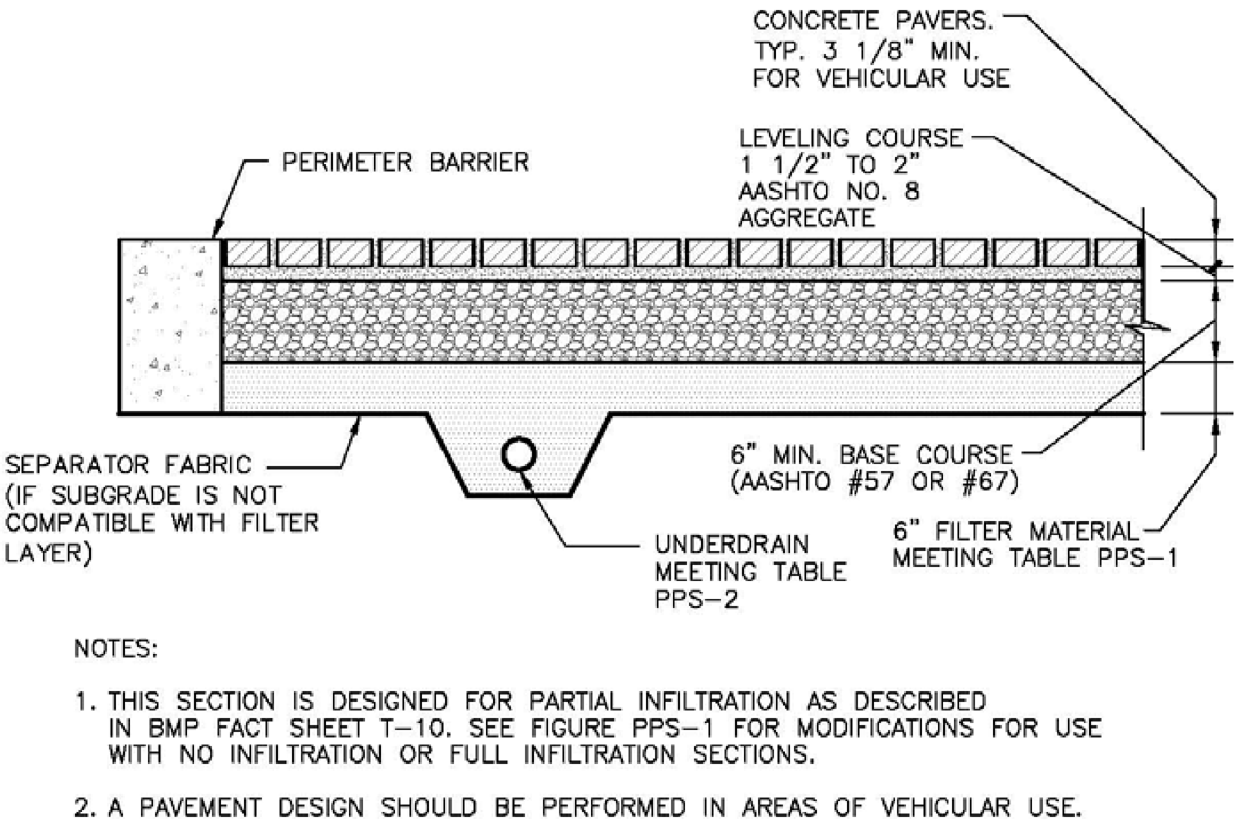

Figure 7. Permeable Paver Section. From the Urban Drainage and Flood Control District Urban Storm Drainage Criteria Manual Volume 3, BMP Fact Sheet T-10.1

Native American Interpretive Area

The surface of the Native American Interpretive Area that will receive direct rainfall will be constructed with permeable pavers as described above. Run-off from the roof will be routed to an adjacent rain garden that is sized to detain and infiltrate a 10-yr storm event. Rain gardens are highly recommended bioretention systems and LID techniques. Bioretention systems are designed to infiltrate stormwater runoff utilizing thick sections of growing media which provide stormwater runoff storage instead of open water storage which create vector-borne issues (i.e.

mosquitoes), while being aesthetically pleasing by growing native wetland vegetation. The design will incorporate an overflow system to route runoff from larger storm events as sheet flow to the downslope areas at a maximum rate of 90% of pre-project runoff rates.

Parking Area

At this time there exist four (4) potential locations for the proposed parking area. The alternative parking areas have similar layouts and will treat stormwater run-off in a similar manner with the exception of the vegetated swale location and discharge from the rain garden/detention basin, which are dependent onsite characteristics of each alternative location.

The proposed parking area will treat stormwater run-off utilizing permeable parking stalls, a vegetated swale and a rain garden/detention basin. Stormwater run-off will be routed over the permeable parking stalls to capture and treat initial run-off. Stormwater volumes exceeding the capacity of the permeable parking stalls will be routed to the vegetated swale installed either in the center of the parking area or around the downstream perimeter of the parking area. Excess stormwater not infiltrated within the vegetated swale will be routed to the rain garden/detention basin. Smaller rain events (2-yr and 10-yr) will be treated primarily by the rain garden feature allowing for infiltration. Larger events will be handled by the detention basin that is sized to release stormwater run-off at a rate of 90% of pre-project run-off rates. Release from the detention basin will be routed through an additional vegetated swale prior to entering existing water ways or will be released in a manner which reflects existing sheet flow characteristics.

WATER QUALITY

It is not anticipated that the final state of the Martis Valley Trail project will pose a threat to the water quality of the project area or downstream areas. The trail will be closed to motorized vehicles, with the exception of occasional maintenance vehicles, and as such no potential pollutant sources are foreseen to be associated with the intended uses of the trail system. However, by maintaining the existing sheet flow and infiltration characteristics of the area stormwater runoff from the trail will be naturally filtered and treated prior to introduction to the local waterways.

The parking area is a location susceptible to potential pollutants associated with vehicles. The use of permeable pavers for the parking stalls will be the initial treatment of stormwater in regard to water quality. As described above, additional runoff will be routed through the vegetated swale, rain garden/ detention basin – all of which serve to improve water quality while reducing run-off quantity; pollutants are absorbed by plants and vegetation while microbes within the root/soil matrix degrade to the pollutants. Plants and vegetation chosen for the vegetated swale, rain garden and detention basin will be a diversity of local plant types and species to ensure tolerance of pests, disease, climate and other environmental stresses. These treatment qualities will be similar at the proposed rest stops, picnic areas, trail heads, wildlife viewing area and the Native American Interpretive Area.

Erosion and sediment control during construction will be in the form of temporary BMPs such as fiber wattles, silt fences, water bars, sediment basins, mulching of disturbed soil areas, channel linings and drainage inlet protection. The project specific Stormwater Pollution Prevention Plan (SWPPP) will address design, implementation, management and monitoring of construction specific BMPs.

Permanent BMPs for erosion and sediment control will include rock slope protection (RSP), vegetated swales, rain gardens, detention basins, rock energy dissipaters, vegetation of disturbed soil areas, as well as the stormwater management methods explained in the above section. These permanent BMPs will be inherent within the design.

CONCLUSION

The Martis Valley Trail, as shown within Civil Engineering Solution, Inc's Hydrology Study, has an insignificant impact in terms of stormwater run-off with a maximum increase of 1.9% over existing flows. Utilization of infiltration trenches, vegetated swales, permeable pavers, rain gardens and the surrounding native soil and plant life will bring run-off quantities to below levels of insignificance.

Design features will be incorporated to allow existing drainage courses and overland surface flows to remain unimpeded.

Stream, creek and wetland crossings have been designed to clear the 10-yr storm event water levels. The exception to this is the location of the existing Frank's Bridge. In this instance the bridge has been designed to withstand the 10-yr and 100-yr flood events. The bridge is not anticipated to obstruct flows to a significant extent.

Increased run-off from rest areas, trail heads, trail junctions and the wildlife viewing area will be allowed to infiltrate to the underlying soil with the use of permeable pavers. The Native American Interpretive Area will also incorporate permeable pavers. Addition stormwater will be routed to a rain garden for soil infiltration. Runoff from larger storm events will routed to the surround areas as sheet flow.

The parking area will incorporate permeable parking stalls, vegetated swales and a combination rain garden/detention basin. These LID techniques will reduce stormwater run-off to 90% of existing levels and will also treat potential pollutants. This is the only area within the project anticipated to be susceptible to potential pollutants.

APPENDIX D3

Preliminary Soil Evaluation and Stormwater BMP Design Report

PRELIMINARY SOIL EVALUATION AND STORM WATER BMP DESIGN REPORT

for

Northstar Community Services District
Multi-Purpose Trail
Martis Valley
Placer County, California

Prepared for:
Auerbach Engineering Corporation
P.O. Box 5399
Tahoe City, California

Prepared by:
Holdrege & Kull
10775 Pioneer Trail Suite 213
Truckee, California 96161

Project No. 41548-01
January 30, 2012

HK HOLDREGE & KULL
CONSULTING ENGINEERS • GEOLOGISTS

Project No. 41548-01
January 30, 2012

Auerbach Engineering Corporation
P.O. Box 5399
Tahoe City, California 96145

Attention: Mr. Wally Auerbach

Reference: ***Northstar Community Services District Multi-Purpose Trail***
Martis Valley
Placer County, California

Subject: ***Preliminary Soil Evaluation and Storm Water BMP Design Report***

This report presents the results of our preliminary soil evaluation and Storm Water Best Management Practice (BMP) design for the Northstar Community Services District (NCSD) Multi-Purpose Trail Project to be constructed in Truckee, California. The project will involve construction of a paved multi use trail that will provide a regional connection between existing trails in the Town of Truckee and trails in the Lake Tahoe Basin. The purpose of our services was to evaluate surface and near-surface soil infiltration characteristics for design of low impact development (LID) BMP features for surface water and drainage and water quality protection.

The findings presented in this report are based on our surface reconnaissance, literature review, engineering analysis, and our experience with near-surface soil conditions in the project area. Our conclusions regarding soil and surface water drainage conditions for the proposed BMP features are provided in the following report.

Please contact the undersigned if you have any questions regarding our observations or the recommendations presented in this report.

Sincerely,
Holdrege & Kull

Prepared By:

REGISTERED GEOLOGIST
PAMELA J. RAYNAK
No 7180
Exp. 8-31-13
STATE OF CALIFORNIA

Pamela J. Raynak, P.G.
Project Geologist

Reviewed By:

REGISTERED PROFESSIONAL ENGINEER
JOHN K. HUDSON
No. C 050923
Exp. 9-30-13
CIVIL
STATE OF CALIFORNIA

REGISTERED GEOLOGIST
JOHN K. HUDSON
No. EG 2239
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

John K. Hudson, P.E., C.E.G.
Principal

copies: 4 to Wally Auerbach, Auerbach Engineering Corporation

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FIGURES

APPENDICES

1. INTRODUCTION

At the request of Auerbach Engineering Corporation (AEC), Holdrege & Kull (H&K) preformed a preliminary soil evaluation for the design of low impact development (LID) Storm Water Best Management Practices (BMP) to be incorporated into the proposed Northstar Community Services District (NCSD) Multi-Purpose Trail Project in Truckee, California. We performed our assessment in general accordance with our revised proposal dated July 15, 2011 for the project. A copy of the proposal is included as Appendix A of this report.

1.1 Site Description

The project area is located within Martis Valley in eastern Placer County, California. The proposed trail will start near Schaffer Mill Road at the Nevada-Placer County line and extend southeast and terminate at two possible locations near Northstar Drive, as shown on Figure 1. The trail will generally parallel Highway 267 and then trend south across Martis Valley to Northstar. Properties surrounding the project area consist of residential, undeveloped recreational areas, Highway 267, and the Northstar golf course.

Topography within the project area varies from gently sloping meadow and riparian land to moderately steep mountainous terrain. Surface water drainage is concentrated into Martis Creek and affiliated tributaries, with the exception of surface water drainage off of Highway 267, which flows adjacent to Segment 3A. The general direction of surface water flow occurs to the north-northeast. Vegetation in the project area consists of riparian bushes, grasses, upland shrubs, and conifer trees.

1.2 Purpose

The purpose of our services was to evaluate surface and near-surface soil infiltration characteristics for design of low impact development (LID) BMP features for surface water and drainage and water quality protection.

1.3 Scope of Services

To prepare this report we performed the following scope of services:

- Literature review regarding regional geology, soil, groundwater, and hydrologic characteristics in the project area.

- Surface reconnaissance along the proposed trail routes to evaluate current surface and near-surface soil conditions.
- Engineering analysis for design of LID BMP features for surface water and drainage and water quality protection.
- Preparation of this preliminary report.

1.4 Proposed Improvements

Information about the proposed project was obtained from our site visits, conversations with Wally Auerbach of AEC, preliminary trail alignment plans provided by AEC, and our previous experience in the project area. The project will involve construction of an approximately ten foot wide paved trail with two-foot wide unpaved shoulders. Pedestrian bridges, culverts, and elevated boardwalks will be needed at locations where the trail crosses existing streams, small drainages and/or wet areas. Two alternative routes are currently under consideration for the new trail. The first alternative includes Segments 1, 2A, and 2B. The second alternative includes Segments 1, 3A, and 3B, as shown on Figure 1 and described below:

- Segment 1 – The Nevada County-Placer County line to the Martis Creek Wildlife Viewing Area (approximately 1.8 miles long). This segment will contour along existing topography and other natural features and will require new trail construction where none currently exist.
- Segment 2A –Martis Creek Viewing Area and terminus of Segment 1 to the property line between Martis Creek Lake Recreation Area and Northstar Resort (approximately 1.6 miles long). This segment will following existing trails and access roads and will require a bridge crossing over Martis Creek and replacement of an existing pedestrian bridge over an affiliated tributary.
- Segment 2B – Southern terminus of Segment 2A to the bus loop at Northstar Village (approximately 1.9 miles long). This segment will require new trail construction and follow existing trails along steep terrain within open space owned by Northstar Resort. A bridge crossing will be required over a Martis Creek tributary.
- Segment 3A – The Martis Creek Viewing Area to the Northstar Resort property line (approximately 1.1 miles long). This segment will meander through Martis Valley adjacent to Highway 267 and follow an existing unimproved trail. A new pedestrian bridge will be required to span over Middle Martis Creek. The new bridge will replace an existing pedestrian bridge crossing.

- Segment 3B – Eastern terminus of Segment 3A to the existing tiered parking lot owned by Northstar Resort (approximately 1.4 miles long). This segment will traverse across steep terrain along an existing unpaved access road and will require some new trail construction.

Another trail segment, 3F, is not included in this study but may be constructed at a later date as funding becomes available.

2. METHODS OF INVESTIGATION

2.1 Literature Review

2.1.1 Site Soil

Soil information throughout the project area was researched by accessing the Natural Resources Conservation Service (NRCS) web soil survey (http://websoilsurvey.nrcs.usda.gov). Based on our review of the NRCS web site, several different soil types are mapped across the project including units from the Euer, Marts, Aquolls-Borolls, Kyburz, Trojan, Umpa, Fugawee, Tahoma, and Jorge Series. The following is a description of anticipated soil types within each of the proposed trail segments, as shown on Figure 2:

- Segment 1 – Three soil types are mapped along the proposed alignment of Segment 1, including the Euer-Martis variant, 2 to 5 percent slopes (EUB), Martis-Euer variant complex, 2 to 5 percent slopes (MEB), and the Aquolls and Borolls, 0 to 5 percent slopes (AQB). The Euer and Martis soil types consist of deep (4 to 6 feet), well-drained soils formed in glacial outwash and volcanic sources that have medium runoff and moderately slow permeability rates. The Aquolls and Borolls soil type consist of shallow to moderately deep (less than 3 feet), very poorly drained soil, subject to flooding and high water tables and has a high erosion hazard. Aquolls soil is typically formed in flood plains of streams, whereas Borolls soils contain abundant rock fragments and accumulate in valleys and drainages. Much of the Segment 1 trail is mapped as being underlain by AQB soil, a small section near the center of the trail alignment is shown as MEB soil, and a small area near the northwestern terminus of the trail is mapped as EUB soil.

- Segment 2A – Three soil types are mapped along the proposed Segment 2A alignment, including AQB, EUB, and pits and borrows (PX). The AQB soil is mapped within the low-lying portion of the trail segment and the creek crossing (northern and southern areas of the trail). The EUB soil is mapped along the terrace sections of the trail between a volcanic rock outcrop and the low-lying portions of the trail. The PX soil type is mapped within a former borrow pit area with volcanic rock exposures in the central portion of the trail and is generally devoid of soil coverage.

- Segment 2B – Six soil types are mapped along the alignment of trail Segment 2B, including variants of the Euer, Umpa, Jorge, and Fugawee Series. The first leg of the trail segment southeast of Martis Creek is mapped as the Euer-Martis variant complex, 5 to 30 percent slopes (EUE) soil type. The EUE soil type is also mapped along most of the western portions of the trail alignment above Martis Valley and a small area near the southern terminus of the trail. Umpa soil types, including Umpa stony sandy loam, 30 to 50 percent slopes (UMF) and Umpa-rock outcrop complex, 2 to 30 percent slopes (UOE) are mapped along the central portion of the trail alignment. The Umpa soil types are moderately deep (less than 4 feet), well-drained, have a medium to rapid runoff potential, and moderately rapid permeability rates. These soil types are generally formed by the weathering of andesite volcanic rock. The Jorge very stony sandy loam, 30 to 50 percent slopes (JTF) is mapped along the southern section of the trail north of Northstar Drive. JTF soil types are generally deep to very deep (7 feet), well-drained, have a low to high runoff potential, moderate permeability rates, and are formed by the weathering of basaltic volcanic rock types. The Fugawee-Tahoma complex, 2 to 30 percent slopes (FTE) soil type is mapped along the southernmost portion of the trail near the Northstar Village and is generated by the weathering of basaltic volcanic rock types. FTE soil types are moderately deep (less than 3 feet), well-drained, have slow to rapid runoff potential, and moderate to very slow permeability rates with depth.

- Segment 3A – Three soil types are mapped along the Segment 3A trail alignment, including AQB, PX, and the Inville-Riverwash-Aquolls complex, 2 to 5 percent slopes (EWB). AQB soil is mapped along the western sections of the trail alignment within low-lying areas adjacent to Highway 267. The PX soil type is mapped along the central portion of the trail adjacent to the Northstar golf course. The EWB soil type is mapped along the eastern portion of the trail adjacent to the Northstar Golf Course, is well-drained, has a moderately high to high permeability rate, and is formed by river wash deposits.

- Segment 3B – Three soil types are mapped along the alignment of the Segment 3B trail, including FUE and other Kyburz variants. The FUE soil type is mapped within the northern sections of the trail alignment adjacent to Highway 267. The Kyburz-Rock Outcrop-Trojan complex, 30 to 50 percent slopes (KRF) are mapped within the central sloping portions of the trail segment. The KRF soil unit consist of moderately to very deep (greater than 5 feet), well-drained soil with medium to high erosion hazard and moderately slow permeability rates, and are formed within colluvial deposits on hillsides. The Kyburz-Rock Outcrop-Trojan complex, 2 to 30 percent slopes (KRE) is mapped within the southern portion of the trail alignment near the ridgeline leading to the parking lot. The KRE soil unit has characteristics similar to those of KRF soil types.

2.1.2 Site Geology

We reviewed the following maps pertaining to geology within the project area:

- *Geologic Map of the Chico Quadrangle, California*, by G.J. Saucedo and D.L. Wagner, California Division of Mines and Geology, 1992 (Saucedo and Wagner 1992).

- *Geologic Map of the Lake Tahoe Basin, California and Nevada,* by George J. Saucedo, California Geological Survey, 2005 (Saucedo 2005).

The geologic maps referenced above differ in scale and detail, but generally agree that the low-lying portions of the project area are underlain by alluvial and glacial deposits and the sloping portions of the project are underlain by andesitic and basaltic volcanic rock types. The scale and detail of the Saucedo (2005) geologic map provides more detail regarding the geology of the project site; therefore, the following descriptions are based on this reference.

Several geologic units are mapped within the project area (Saucedo, 2005), including alluvium (Q), alluvial fan deposits (Qf), glacial outwash deposits (Qogo), Bald Mountain olivine latite volcanic rock (Qvbm), Prosser Creek Alluvium (Qpc), and andesitic volcanic rock and flows (Mva).

The alluvium consists of unconsolidated sand, silt and gravel and the alluvial fan deposits consist of sand, gravel, and boulders; both of these units are mapped within low-lying areas throughout the project. Glacial outwash deposits consist of silt, sand, gravel, cobbles and boulders that are generally mapped within the broad and elevated valley north of the project area. Bald Mountain olivine latite generally consists of dark gray volcanic rock that forms the sloping terrain north of Martis Creek. The Prosser Creek Alluvium consists of silt, sand, gravel, cobbles and boulders and forms the low-lying terraces in the northwest portion of the project area. The andesitic volcanic rock generally consists of a mixture of volcanic flows and volcaniclastic sediments that form the sloping terrain in the southern portions of the project area.

Most of Segment 1 is mapped as being underlain by Prosser Creek Alluvium. A small portion along the southeast portion of the trail alignment adjacent to the creek is mapped as alluvium. Alluvium, Prosser Creek Alluvium, and andesitic volcanic rock and flows are mapped along the alignment of Segment 2A. Segment 3A is mapped as being underlain by alluvium, alluvial fan, glacial outwash, and Prosser Creek Alluvium. Segments 2B and 3B are mapped as being underlain by andesitic volcanic rock and flows.

Based on the results of our surface reconnaissance, we generally concur with the geologic units mapped by Saucedo (2005), with the exception of the Prosser Creek Alluvium mapped along the western portions of Segment 1. Volcanic rock cobbles and boulders were observed on the ground surface throughout the central portion of Segment 1, which indicates that this portion of the trail alignment may be underlain by Bald Mountain volcanic rock (Qvbm) rather than Prosser Creek Alluvium (Qpc).

The referenced geologic maps show several active and potentially active faults located near the project area, including a group of unnamed faults southeast of Truckee (potentially active to active, located approximately 1.0 to 2.0 miles west of the site); the Dog Valley Fault (active, approximately 8 miles northwest); the Polaris Fault (active, approximately 2 miles northeast); the West Lake Tahoe Fault (active, approximately 14 miles south); and the North Tahoe Fault (active, approximately 9.5 miles southeast). The Genoa Fault trends in a north-south direction approximately 18 miles east of the site and is capable of very large earthquakes. Earthquakes associated with these faults may cause strong ground shaking at the project site.

Several discontinuous faults are mapped within the project area. These faults are relatively short approximately less than 100 feet to 2.5 miles long, and mapped as dashed (approximately located) or dotted (concealed). The potential hazard associated with earthquake faults involves surface rupture and strong ground motion. The unnamed discontinuous faults mapped within the immediate project area are considered inactive to potentially active and either approximately located or concealed. Segment 2A crosses a potentially active fault. All other faults crossing proposed trail alignments are considered inactive. Therefore, the potential for surface rupture crossing the trail is considered low. Earthquakes centered on regional faults in the area, such as the Genoa or West Tahoe Faults, would likely result in higher ground motion at the site than earthquakes centered on smaller faults that are mapped closer to the site.

2.1.4 Groundwater and Surface Water

The project area is located within the Martis Valley Groundwater Basin Watershed that encompasses approximately 58 square miles of land. The near-surface groundwater is a result of direct precipitation and snow melt. In addition, several springs located on the edges of Martis Valley contribute to surface water and near-surface groundwater. Seasonal saturation of near-surface soil and shallow groundwater seepage occurs in the project area during and immediately following seasonal snow melt. Low areas near creek crossings may be saturated into early- to mid-summer.

The proposed trail route will predominantly cross well-drained soil types with moderate permeability. However, soils in the low lying areas and on gentle slopes in Martis Valley have relatively low infiltration and permeability rates. Soil in these areas, particularly in areas of Aquolls and Borolls soil types, may be saturated for much of the year. Due to the already low infiltration, construction of a paved trail in these areas will not significantly increase surface runoff.

Several creeks cross the project area including Martis Creek, West Martis Creek, Middle Martis Creek and two unnamed tributaries. Martis Creek, Middle Martis Creek, and West Martis Creek are perennial streams, whereas the unnamed tributaries are ephemeral. The creeks and affiliated tributaries drain to a topographic low point near an existing concrete culvert that passes under Highway 267 near the center of Segment 3A.

2.2. Surface Reconnaissance

We performed a surface reconnaissance along Segments 1, 2A, 2B, 3A, and 3B to observe existing conditions within the project area. The following section provides descriptions of our observations along each of the proposed trail segments.

2.2.1 Segment 1

The trail will extend along the west shoulder of an existing paved roadway between Stations 0+00 and 4+00. Existing erosion control features (detention basin, rock-lined swale, and culverts) are located adjacent to the proposed trail alignment between Stations 0+00 and 2+00. Loose granular soil was observed between Stations 7+00 and 19+00, and 22+00 to 31+00. The proposed trail will travel adjacent to and cross areas containing Plumas ivesia between Stations 42+00 to 64+00 and 79+00 to 82+00; and near Station 94+00. Plumas ivesia is a small flowering perennial herb that grows in Martis Valley and is considered rare and potentially endangered. Plumas ivesia appears to be associated with near-surface saturated soil. We observed poorly drained bare soil within areas containing Plumas ivesia and along sections containing volcanic cobbles and boulders over much of Segment 1. Steep slopes containing volcanic cobbles and boulders were observed between Stations 73+00 and 81+00. The trail crosses a wide drainage at Station 14+00 and incised channels at Stations 48+00 and 58+00. The small stream channel located in the meadow area west of the trail appears to be incised or trenched into the meadow surface. The incision is possibly due to increased runoff from roads or other areas upstream or a result of upstream culverts.

2.2.2 Segment 2A

An existing 8-inch diameter culvert crosses under the existing trail at Station 107+00 and channel erosion was observed downstream from the culvert. Plumas ivesia is located near Stations 107+00 and 109+00. Volcanic rock is exposed at the ground surface between Stations 127+00 and 128+00. A former borrow pit is located west of the proposed trail in this area and drainage may have been modified in this area. Eroded soil was observed in this area leading to Martis Creek. An existing wooden plank crosses over Martis Creek between Stations 129+00 and 130+00 and channel erosion was observed near this crossing. The trail will extend along sloping terrain above and adjacent to a tributary of Martis Creek between Stations 145+00 and 151+00. An existing pedestrian bridge designated as “Jake’s Bridge” is located at Station 152+00 crossing the tributary. Surface erosion along the banks of the creek crossing were observed.

2.2.3 Segment 2B

This trail segment will follow the slope contour up moderately steep terrain through a conifer forest between Jake’s Bridge and the bus loop at Northstar Village. Erosion rills were observed on the existing slopes over much of the existing trail. An existing culvert was observed at Station 29+00 and the bank below and downslope of the trail crossing was eroded. The channel appears scoured both upstream and downstream of the culvert. Volcanic rock outcrops and boulders were observed along the ground surface within steep terrain between Stations 50+00 and 122+00. Eroded soil was observed along the cut banks where the existing trail traversed steep terrain. Wide drainage areas were observed at Stations 96+00 and 104+00 that contained minor erosion rills. An 18-inch diameter culvert crosses beneath the existing trail near Station 117+00. The trail travels adjacent to an existing detention basin between Stations 126+00 and 128+00. An 18-inch diameter culvert crosses beneath the intersection of Northstar Drive and a paved access road near Station 126+00.

2.2.4 Segment 3A

Trail Segment 3A generally parallels Highway 267 within the meadow area of Martis Valley. The proposed trail follows an existing trail and is close to the highway at the eastern end of the segment. Erosion rills and gullies were observed along the eastern portion of this trail segment adjacent to Highway 267 (Stations 49+00 to 54+00). Concentrated surface water from Highway 267 with high sediment loads runs into meadow in this area of Martis Valley and significantly impacts the vegetation and water quality. A small amount of standing water was observed in an existing drainage ditch adjacent to Highway 267 between Stations 4+00 and 14+00. A concrete culvert extends beneath Highway 267 near Station 29+00 and a detention basin is located between the trail and Highway 267 near Station 22+00. We observed a channel on the south side of the proposed trail between Stations 30+00 and 34+00 that has eroded the existing trail towards the east side of the existing pedestrian bridge. Boulder riprap has been placed in places along the roadway embankment between the trail and Highway 267 near Stations 35+00 and 37+00. An existing 24-inch diameter culvert crosses under the access road at Station 48+00 and erosion was observed from roadway runoff in this area.

2.2.5 Segment 3B

The soil type generally exposed along most of this trail consists of granular soil with scattered volcanic cobbles and boulders. Localized erosion rills were observed within the existing trail between Stations 109+00 to 131+00. The northern terminus of this trail will extend along the western shoulder of an existing access road adjacent to the Northstar golf course that may contain existing fill. Erosion rills were observed on the cut slope below Stations 64+00 to 66+00. Sheet erosion from Highway 267 was observed on the ground surface above an existing culvert at Station 56+00.

3. CONCLUSIONS AND RECOMMENDATIONS

The following conclusions and preliminary geotechnical engineering recommendations are based on our understanding of the project as currently proposed, our field observations, literature review, the engineering analysis, and our experience in the project area.

3.1 LID Management Measures for Surface and Subsurface Drainage and Water Quality Protection

Much of Martis Valley and the surface water flow have been significantly impacted by barrow pits used for Martis Dam construction and road construction. Concentrated surface water from Highway 267 with high sediment load runs into meadow areas of Martis Valley and significantly impacts the vegetation and water quality. Drainage control structures, such as culverts for the existing dirt roads, have concentrated surface water flow, often resulting in localized erosion. Given these existing drainage problems, there are many opportunities for restoration and habitat improvement in Martis Valley along the proposed trail alignment.

To help protect water quality and habitat trail design and construction should use low impact development (LID) techniques. LID is a storm water management and land development strategy applied at the parcel scale that emphasizes conservation and use of on-site features integrated with engineered and small scale hydrologic controls to more closely mimic the natural hydrologic function.

We developed four preliminary generalized cross-sections and a culvert under drain using LID design strategies for the proposed trail segments (see Figures 3, 4, and 5). The preliminary designs incorporate LID strategies to control surface and near-surface water drainage to help provide water quality protection. The generalized drawings reflect different standard designs based on surface features and soil types we observed on each of the trail segments during our assessment.

In general, we recommend a minimum pavement section of 2.5 inches of asphalt concrete (AC) on 6 inches of Class II aggregate base (AB). In areas where the pavement section is underlain by a minimum 6-inch thick layer of ¾-inch diameter crushed gravel, the AB may be reduced to 4 inches thick. A non-woven filter fabric, such as Mirafi 140N or equivalent, should be placed between the AB and crushed gravel. The upper 6 inches of native soil should be compacted to at least of 95 percent of the maximum dry density per ASTM D1557 prior to placing the crushed gravel. Aggregate base and crushed gravel should also be compacted to a minimum of 95 percent.

The standard LID design sections provide infiltration along both shoulders and under the proposed trail, as shown on Figures 3 and 4. In general, surface water along the proposed trail should not be collected and discharged at points. The trail should slope to one side or be crowned so that all runoff should be continuously infiltrated at the shoulder of the trail. Water should not be collected in ditches or curbs to be discharged at points. LID strategy mimics natural drainage as much as possible. At small drainages and swales, the trail should be constructed with blanket drains to allow near-surface groundwater to pass under the trail without concentrating the flow. Vegetation at the side of the trail should be protected to help infiltrate and filter surface water runoff. Infiltration gravel provides retention and infiltration of surface water runoff, which helps reduce runoff volume and peak flow rates, and disconnects the flow path that would otherwise concentrate drainage. The infiltration gravel or blankets were designed using a permeability rate of 0.5 inch per hour for a one inch 20 year storm event. The infiltration gravel should be a minimum of 8 inches deep and 2 feet wide, separated from the aggregate base by a non-woven filter fabric, and filled with ¾-inch diameter crushed gravel. To help maintain gravel from migrating out of the infiltration blanket, we recommend a boulder border be placed along the outboard edge of the trenches. Boulder dimensions and embedment will vary depending on terrain and area to be infiltrated, as shown on Figures 3 and 4.

To help control subsurface water flow below trail segments that cross drainage areas subject to flooding, we recommend using blanket drains comprised of ¾-inch crushed gravel wrapped in non-woven filter fabric or Geoweb textile beneath the pavement as shown on Figure 3. The Geoweb should be a minimum of 6 inches thick and filled with drain rock to allow water to flow beneath the pavement section. A 2-inch thick layer of ¾-inch diameter crushed gravel should be placed below the Geoweb textile on prepared subgrade as discussed above.

More detailed discussions of recommended trail design for each of the proposed segments are described in the following section.

3.2 Trail Segment Conclusions and Preliminary Design Recommendations

3.2.1 Segment 1

Segment 1 follows an existing road for about 400 feet and then will follow the contour at the top of a broad terrace past Schaffer Mill Road. Loose granular soil was exposed along a wide drainage located near Station 14+00. Depending on the volume of runoff, a blanket drain trail design, as shown on Figure 3; or a culvert, as shown on Figure 5, should be installed at this location. The proposed trail segment crosses incised drainage channels near Stations 48+00 and 58+00. We recommend using blanket drains around stream crossing structures in areas that cross channels along this trail segment. The incised channels may provide an opportunity for restoration and habitat improvement.

Segment 1 is underlain by poorly drained soil between Stations 31+00 to 65+00, Stations 79+00 to 82+00, and near Stations 87+00 to 95+00. Plumas ivesia is located between Stations 42+00 and 85+00 and listed as a rare and endangered plant species by the California Native Plant Society (CNPS). The Plumas ivesia habitat is vernally mesic and generally grows in volcanic-rich soils of low permeability and poor infiltration. These soils are saturated much of the time and are relatively soft when saturated. Trail construction along portions of the trail that cross areas containing Plumas ivesia should include methods to help maintain the saturated soil conditions. Deep earthwork cuts should be avoided where possible. We recommend using the generalized trail section as shown on Figure 3 for trail segments that will be located adjacent to Plumas ivesia.
Steep eroded terrain was observed between Stations 73+00 and 78+00. We recommend considering relocating the trail either upslope or downslope to avoid the steep terrain and potential increase in erosion.

3.2.2 Segment 2A

In general, soil types observed along Segment 2A vary from poorly drained soil types subject to flooding and saturation to well-drained granular soil types on steep slopes. Plumas ivesia is located between Stations 108+00 and 110+00 and an incised channel is located below an 8-inch culvert at Station 107+00. Drainage from Station 109+00 flows along the existing trail to Station 107+00. We recommend possible realignment of the trail in this area to cross the culvert and incised channel at a 90 degree angle, install a blanket drain (Figure 5), and/or install two or more 8-inch culverts to reduce concentrated water flow and prevent further channel incision.

A boardwalk and creek overlook is proposed for where the trail crosses Martis Creek between approximate Stations 129+00 and 130+00. The approaches on both sides of the creek may require a free draining trail section such as that shown on Figure 3. Blanket drains should also be considered between approximate Stations 149+00 and 151+00 where the trail approaches and is located adjacent to and upslope of a Martis Creek tributary. A second boardwalk and creek overlook is proposed for this stream crossing.

3.2.3 Segment 2B

General soil conditions observed along Segment 2B consist of granular soil types that are well-drained, but susceptible to erosion. Trail segment 2B traverses moderate to steep terrain and contains localized areas of eroded soil. Erosion rills were observed on the ground surface across portions of the existing trail and along steep cut slopes above the existing trail. Volcanic rock outcrops were observed near Station 51+00. Rock slope protection and/or revegetation should be considered along proposed cut and fill slopes that traverse moderate to steep terrain. The proposed trail makes two switchback turns at approximate Stations 70+00 and 85+00. Drainage control and discharge will be important at these turns and may require intensive revegetation and/or infiltration structures such as trenches or vegetated swales.

The proposed trail segment crosses Northstar Drive at Station 123+00 and is then adjacent to the road for a couple of hundred feet. A detention pond is located adjacent to Stations 126+00 to 128+00 near the southern terminus of Segment 2B. Surface water drainage from the proposed trail should be controlled and infiltrated away from the detention pond and the existing drainage ditch located adjacent to Northstar Drive.

3.2.4 Segment 3A

Soil conditions along Segment 3A vary from poorly drained soil lowland types that are susceptible to flooding and saturation, to moderately well-drained soil types. The proposed trail follows the slope contour north of Martis Creek. Portions of the trail from the beginning of Segment 3A to the Middle Fork of Martis Creek are exposed to surface water sheet flow over low permeability soil. Blanket drains similar to Figure 3 or culvert under drains similar to Figure 5 should be considered at approximate Stations 4+00 and 14+00. Middle Martis Creek flows through a concrete culvert that extends below Highway 267 near Station 29+00. A bridge is proposed to cross Middle Martis Creek. As previously stated, the area along proposed Segment 3A east of Middle Martis Creek is highly impacted by surface water runoff from Highway 267. Concentrated surface water from Highway 267 with high sediment loads runs into the meadow area along Segment 3A. The proposed trail may actually provide an erosion control barrier between Highway 267 and the adjacent meadow habitat. The surface water control associated with the trail segment should be designed to capture coarse sediment and infiltrate the surface runoff. The trail could help protect and separate the meadow habitat from Highway 267. Clearly, the drainage channel would have to be designed and restored for the expected stream flow.

Channel erosion was observed within the meadow adjacent to Stations 30+00 to 34+00 and 35+00 and 37+00. We recommend restoring these areas by infiltrating surface water drainage, as shown on Figure 4.

Segment 3A receives a significant amount of surface water drainage from Highway 267 and irrigation from the Northstar Golf Course, particularly between Stations 46+00 and 56+00. Erosion rills and ponded water were observed within an existing drainage ditch located adjacent to Highway 267. Where the trail will be located adjacent to Highway 267, we recommend placing rock slope protection between the trail and existing drainage ditch to help reduce erosion and channel scour, as shown on Figure 4. Due to the relatively high velocity and volume of water, the channel may be subject to moderately severe erosion. The existing drainage ditch should be sized for the estimated run-on flow volume, partly rock lined and revegetated to help slow surface water runoff and reduce erosion. A sediment trap basin that can be easily cleaned and maintained should be constructed near the highway, upstream of most of the vegetation, to help reduce the amount of sand that is carried into the meadow area and stream channel.

3.2.5 Segment 3B

The soil types observed along Segment 3B generally consist of well-drained soil that again is susceptible to erosion. Most of Segment 3B traverses moderate to steep terrain and contains localized areas of eroded soil. Erosion rills were observed on the ground surface and within existing cut slopes at localized areas along the trail segment. Rock slope protection and/or revegetation should be considered in proposed cut and fill slopes that traverse moderate to steep terrain.

A 36-inch culvert crosses below an existing unpaved access road between Stations 56+00 and 57+00 in Segment 3B. Concrete-filled bags have been used in an attempt to stabilize the channel between the top of the culvert and access road. This area has been subject to excessive erosion. The access road at this location is topographically lower than the surrounding grade and it appears that surface water from Highway 267 is flowing down the road. Drainage improvements in this area will be needed prior to trail construction along this segment.

3.3 Temporary and Permanent Best Management Practices and Erosion Control

Based on our site observations and experience in the area, site soil will be moderately to highly susceptible to erosion, particularly on steep, unprotected slopes and in areas containing poorly drained soil types. Best management practices (BMPs) should be incorporated into the design and construction of this project. A reference regarding appropriate BMPs is the “Erosion and Sediment Control Guidelines for Developing Areas of the Sierra Foothills and Mountains”, prepared by the High Sierra Resource Conversation and Development Council, 1991. The California Regional Water Quality Control Board, Lahontan Region, Best Management Practices Plan is anther source of BMPs.

Erosion and sediment control measures can be categorized as temporary or permanent. Temporary measures should be installed to provide short-term protection until the permanent measures are installed and effective. Temporary erosion control structures are designed to slow runoff velocity and intercept suspended sediment to prevent sediment discharge from the construction area while allowing runoff to continue down gradient. Typical temporary measures include properly installed silt fences, straw wattles, sediment logs, water bars, detention basins, covering of exposed soil, channel linings, and inlet protection. Following completion of construction and planting/seeding, temporary erosion control measures may be left in place, possibly for a complete growing season. Temporary erosion control measures require regular inspection and maintenance.

The selection and sizing of a sediment barrier is dependent on slope angle, slope length, and soil type. Sediment barriers should be installed down gradient and at the edges of all disturbed areas and around topsoil and spoil piles where necessary. Sediment barriers should be placed as needed on slope contours, within small drainages, and in gently sloping swales. The unprotected slope length above each barrier should not exceed 100 feet.

Berms, waterbars and ditches should be used to divert or channel storm water runoff away from sensitive, disturbed or construction areas. Waterbars are intended to slow water traveling down a disturbed slope and divert water off disturbed soil into adjacent stable often well-vegetated areas. Where possible, interceptor ditches and waterbars should take advantage of existing terrain and vegetation to divert runoff before it reaches slopes and disturbed areas. Waterbars should be constructed above and within disturbed areas. The spacing for temporary waterbars should be as needed to divert water off the disturbed areas. Waterbars should be located adjacent to non-erodible (vegetated or rocky) receiving areas. If stable receiving areas are not present, flow energy dissipaters or “J-hook” shaped silt fences should be positioned at the waterbar outlet. In highly erodible soils, waterbar ditches should be protected by temporary lining or by decreasing waterbar spacing and length of flow line slopes.

Permanent erosion and sediment control measures may include rock slope protection (RSP), rock lined ditches and inlet/outlet protection, rock energy dissipaters, infiltration/detention basins, and vegetation. All areas disturbed by construction should be revegetated, and existing vegetation should be protected and undisturbed where possible. Revegetation should consist of native brush and grass species. Slope faces should be temporarily protected against erosion resulting from direct rain impact and melting snow using the methods described above until permanent vegetation can be established. Surface water drainage should not be directed to flow over slope faces. Interceptor (brow) ditches should be considered at the tops of slopes in order to collect and divert runoff which otherwise would flow over the slope face. The intercepted water should be discharged into natural drainage courses or into other collection and disposal structures.

4. LIMITATIONS

The recommendations in this report are preliminary in nature. Actual subsurface conditions may vary from those described above. A full geotechnical investigation must be performed prior to construction. This report is only valid if Holdrege & Kull performs a subsurface exploration prior to or at the time of construction.

Our professional services were performed consistent with the generally accepted geotechnical engineering principles and practices employed in the site area at the time the report was prepared. No warranty, express or implied, is intended.

Our scope of services did not include evaluating the project site for the presence of hazardous materials or petroleum products. Although we did not observe evidence of hazardous materials or petroleum products at the time of our site visit, project personnel should take necessary precautions should hazardous materials be encountered during construction.

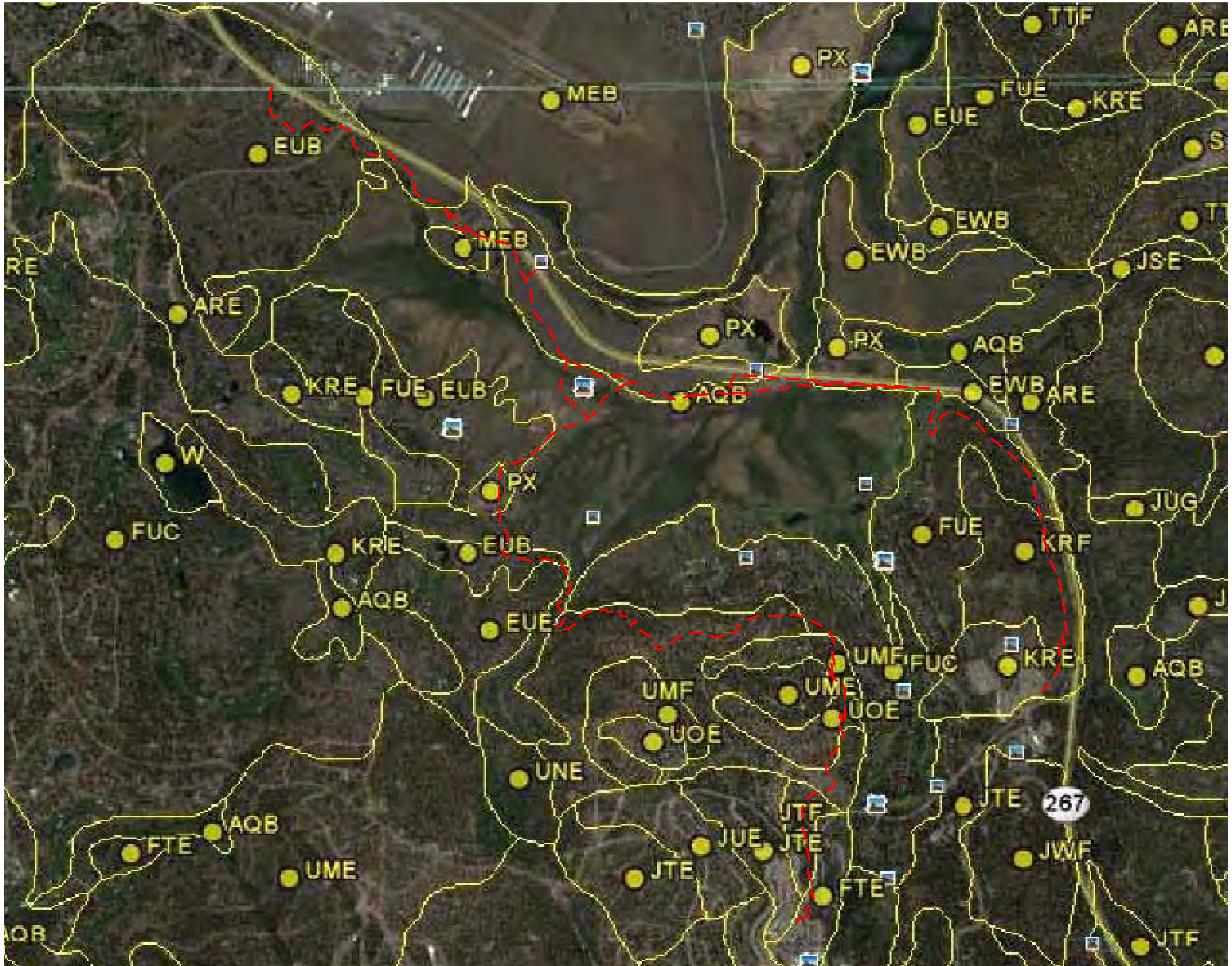
FIGURES

SOURCE: USGS MARTIS PEAK AND TRUCKEE, CA, 7.5 MINUTE TOPOGRAPHIC MAPS, 1992.

HOLDREGE & KULL
CONSULTING ENGINEERS • GEOLOGISTS
10775 PIONEER TRAIL SUITE 213
TRUCKEE, CA 96161
(530) 587–5156 FAX 587–5196

SITE VICINITY MAP
NORTHSTAR COMMUNITY SERVICES DISTRICT
MULTI–USE TRAIL PROJECT
PLACER COUNTY, CALIFORNIA

DRAWN BY: MED
CHECKED BY: JKH
PROJECT NO.: 41548–01
DATE: JANUARY 2012
FIGURE NO.: 1



1000 0 1000 2000

SCALE IN FEET

1" = 2000'

LEGEND

— — —	APPROXIMATE LOCATION OF MULTI–PURPOSE TRAIL
AQB	AQUOLLS AND BORAUS, 0–5% SLOPES
EUB	EUER–MARTIS VARIANT, 2–5% SLOPES
EUE	EUER–MARTIS VARIANT COMPLEX, 5–30% SLOPES
FTE	FUGAWEE–TAHOMA COMPLEX, 2–30% SLOPES
FUC	KYBURZ–TROJAN–SIERRAVILLE COMPLEX, 2–9% SLOPES
FUE	KYBURZ–TROJAN COMPLEX, 9–30% SLOPES
JSE	JORGE–CRYUMBREPTS, WET–TAHOMA COMPLEX, 2–30% SLOPES
JTE	JORGE–TAHOMA COMPLEX, 2–30% SLOPES
JTF	JORGE VERY STONY SANDY LOAM, 30–5–% SLOPES
JUG	JORGE–RUBBLE LAND COMPLEX, 30–75% SLOPES
JWF	JORGE–WACA–TAHOMA COMPLEX, 30–50% SLOPES
KRE	KYBURZ–ROCK OUTCROP–TROJAN COMPLEX, 2–30% SLOPES
KRF	KYBURZ–ROCK OUTCROP–TROJAN COMPLEX, 30–50% SLOPES
MEB	MARTIS–EUER VARIANT COMPLEX, 2–5% SLOPES
PX	PITS, BORROW
UME	UMPA STONY SANDY LOAM, 2–30% SLOPES
UMF	UMPA STONY SANDY LOAM, 30–50% SLOPES
UOE	UMPA–ROCK OUTCROP COMPLEX, 2–30% SLOPES

SOURCES: 2011 GOOGLE IMAGE WITH NRCS SOIL MAP (IMAGERY DATE 06/14/11) AND PROPOSED TRAIL MAP PREPARED BY AUERBACH ENGINEERING.

HK HOLDREGE & KULL

CONSULTING ENGINEERS • GEOLOGISTS

10775 PIONEER TRAIL SUITE 213
TRUCKEE, CA 96161
(530) 587–5156 FAX 587–5196

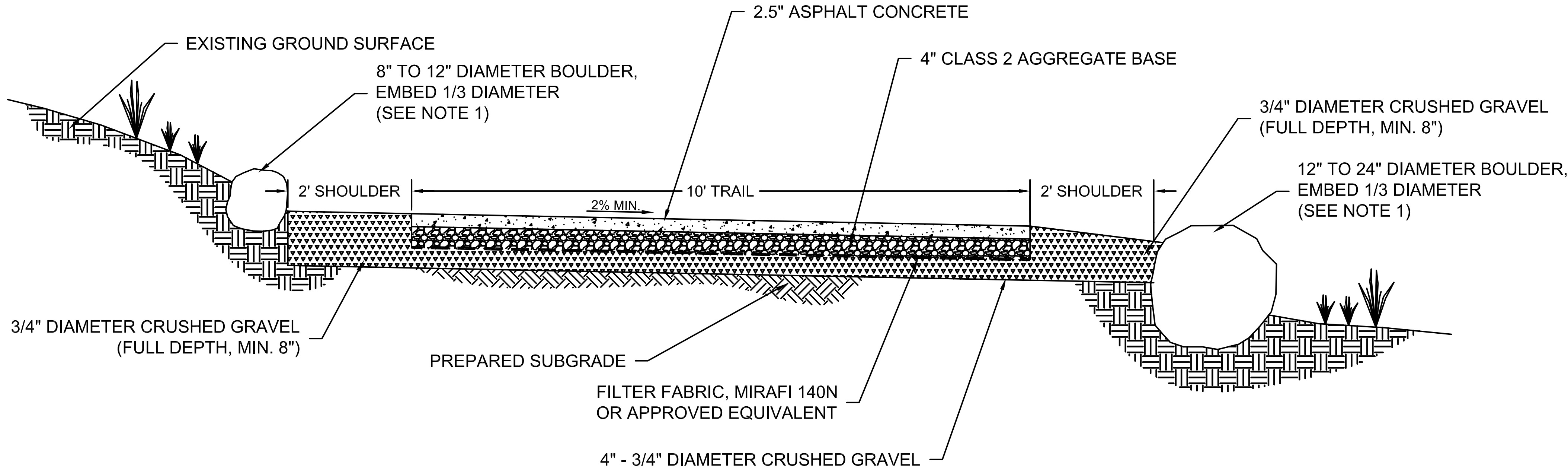
SITE SOIL MAP

NORTHSTAR COMMUNITY SERVICES DISTRICT

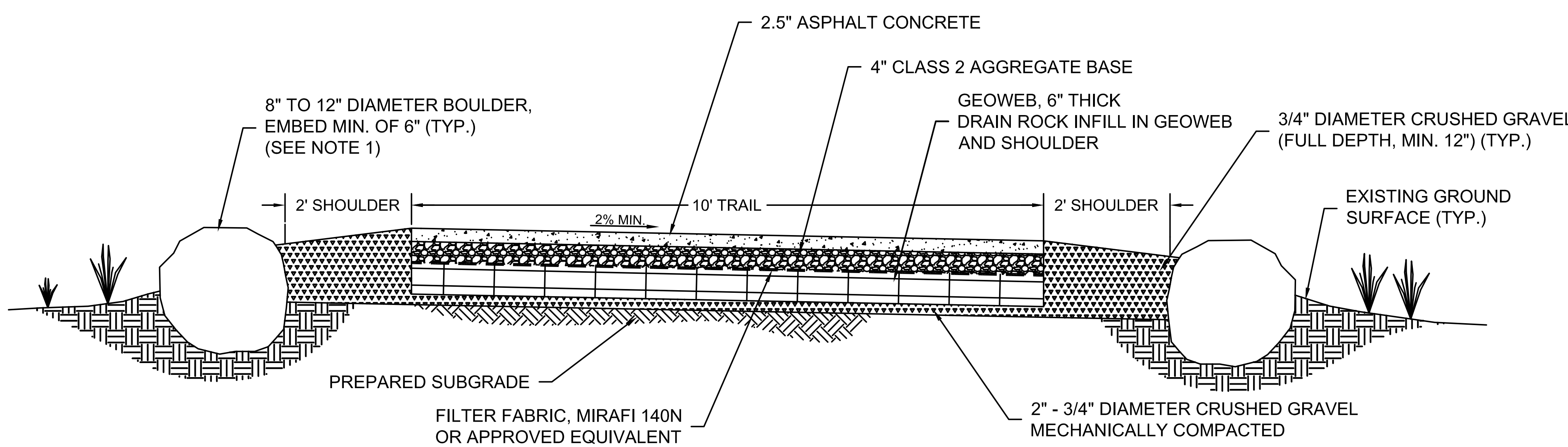
MULTI–USE TRAIL PROJECT

PLACER COUNTY, CALIFORNIA

DRAWN BY: MED	CHECKED BY: JKH
PROJECT NO.: 41548–01	
DATE: JANUARY 2012	
FIGURE NO.: 2	



A GENERALIZED SECTION AT PLUMAS IVESIA AREA
N.T.S.



B TYPICAL BLANKET DRAIN
N.T.S.

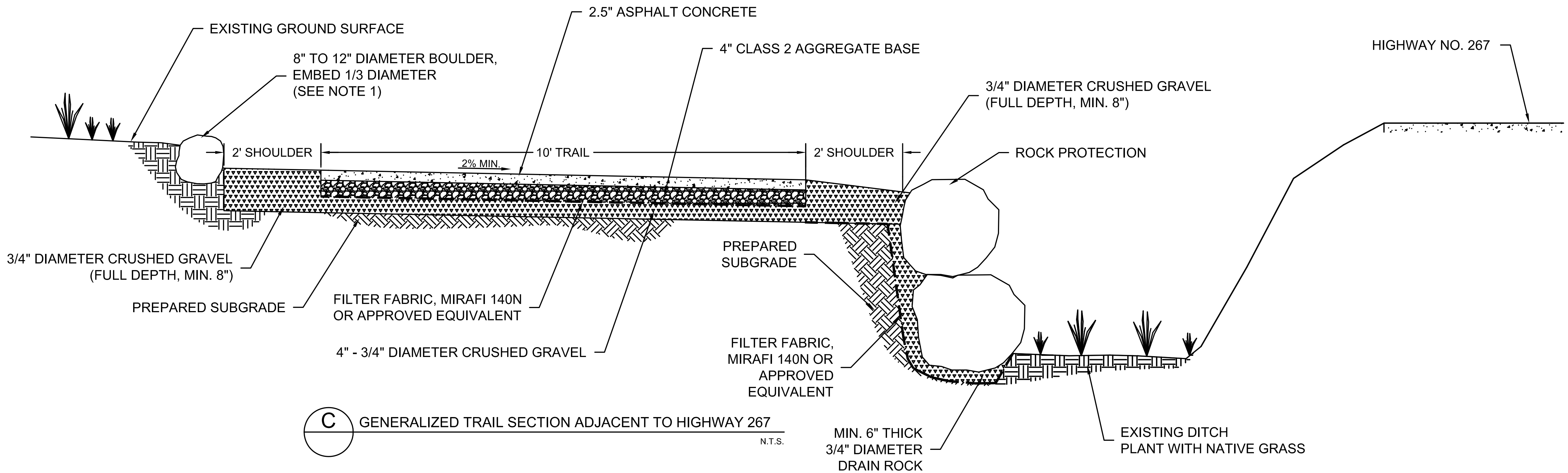
NOTES:

1. PLACE BOULDERS AS CONDITIONS REQUIRE TO MAINTAIN STABILITY OF FILL MATERIAL

HK HOLDREGE & KULL
CONSULTING ENGINEERS • GEOLOGISTS
10775 PIONEER TRAIL SUITE 213
TRUCKEE, CA 96161
(530) 587-5156 FAX 587-5196

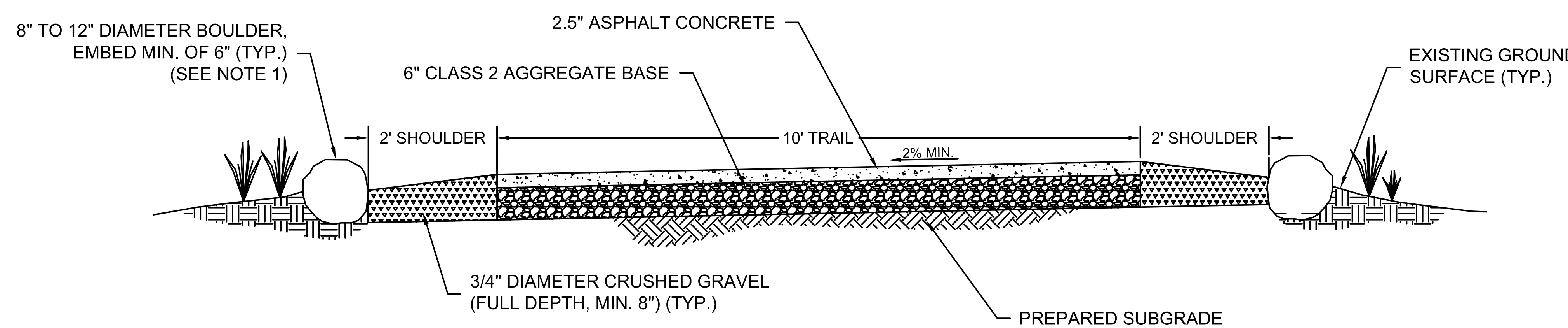
GENERALIZED TRAIL SECTIONS A & B
NORTHSTAR COMMUNITY SERVICES DISTRICT
MULTI-USE TRAIL PROJECT
PLACER COUNTY, CALIFORNIA

DRAWN BY: MED	CHECKED BY: JKH
PROJECT NO.: 41548-01	
DATE: JANUARY 2012	
FIGURE NO.: 3	



C GENERALIZED TRAIL SECTION ADJACENT TO HIGHWAY 267

N.T.S.



D GENERALIZED TRAIL SECTION ADJACENT TO RESTORATION AREAS

N.T.S.

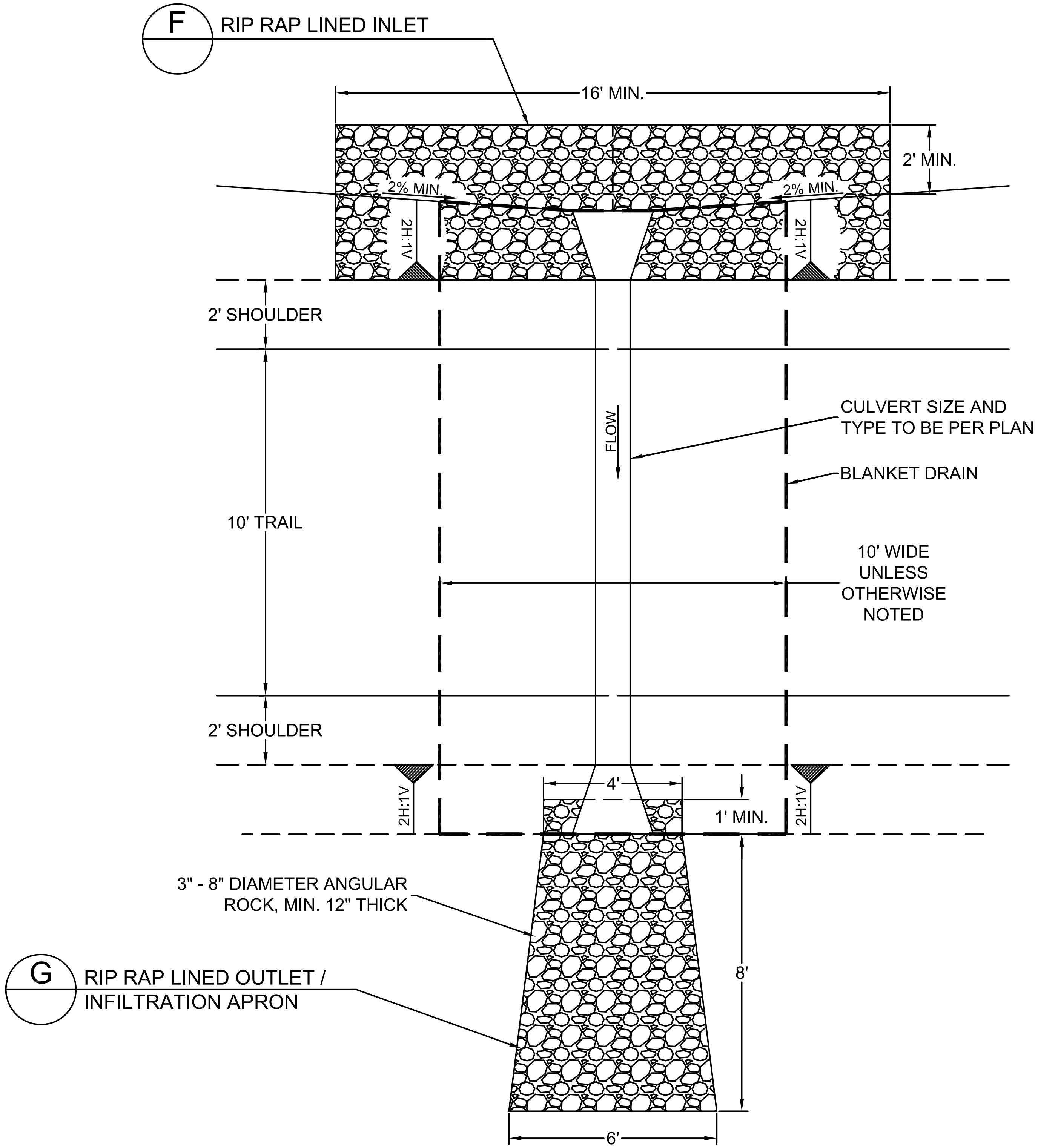
NOTES:

1. PLACE BOULDERS AS CONDITIONS REQUIRE TO MAINTAIN STABILITY OF FILL MATERIAL

HK HOLDREGE & KULL
CONSULTING ENGINEERS • GEOLOGISTS
10775 PIONEER TRAIL SUITE 213
TRUCKEE, CA 96161
(530) 587-5156 FAX 587-5196

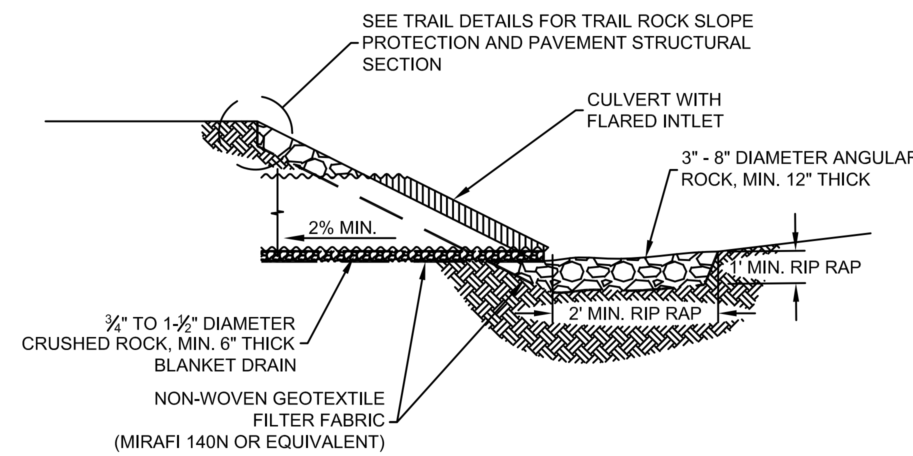
GENERALIZED TRAIL SECTIONS C & D
NORTHSTAR COMMUNITY SERVICES DISTRICT
MULTI-USE TRAIL PROJECT
PLACER COUNTY, CALIFORNIA

DRAWN BY: MED	CHECKED BY: JKH
PROJECT NO.: 41548-01	
DATE: JANUARY 2012	
FIGURE NO.: 4	



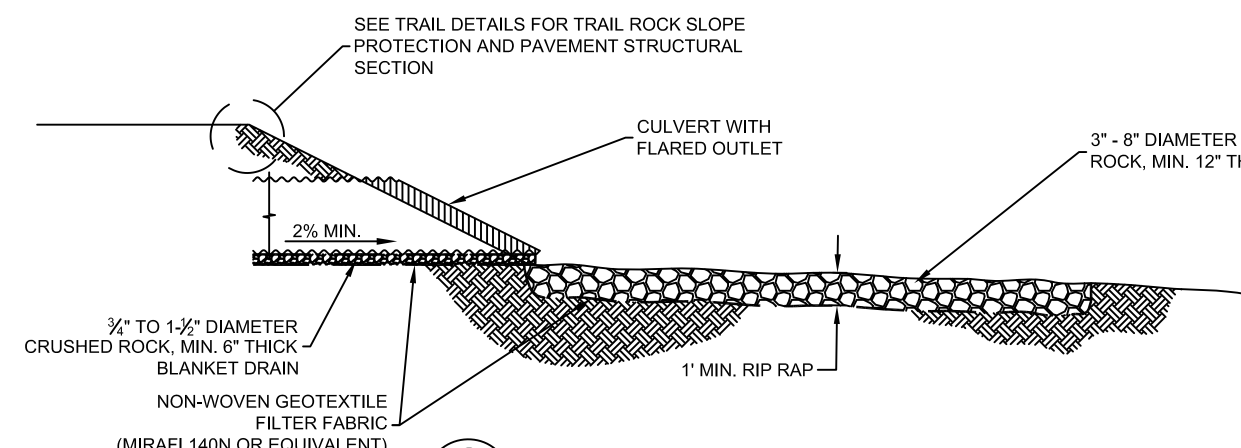
E GENERALIZED TRAIL CULVERT CROSSING

N.T.S.



F RIP RAP LINED INLET

N.T.S.



G RIP RAP LINED OUTLET / INFILTRATION APRON

N.T.S.

HK HOLDREGE & KULL
CONSULTING ENGINEERS • GEOLOGISTS
10775 PIONEER TRAIL SUITE 213
TRUCKEE, CA 96161
(530) 587-5156 FAX 587-5196

GENERALIZED TRAIL CULVERT CROSSING DETAILS
NORTHSTAR COMMUNITY SERVICES DISTRICT
MULTI-USE TRAIL PROJECT
PLACER COUNTY, CALIFORNIA

DRAWN BY: MED	CHECKED BY: JKH
PROJECT NO.: 41548-01	
DATE: JANUARY 2012	
FIGURE NO.: 5	

APPENDIX A Proposal

EXHIBIT"A"

HOLDREGE & KULL
CONSULTING ENGINEERS • GEOLOGISTS

Proposal No. PT09050
April 17, 2009 (Revised July 15, 2011)

Auerbach Engineering Corporation
P.O. Box 5399
Tahoe City, California 96145

Attention: Mr. Wally Auerbach

Reference: ***Northstar Community Services District Multi-Purpose Trail***
Martis Valley
Placer County, California

Subject: ***Proposal for Preliminary Soil Evaluation and Storm Water BMP Design Services***

This letter presents our proposal to provide preliminary soil evaluation and storm water (BMP) design services for the proposed Northstar Community Services District Multi-Purpose Trail project located in Truckee, California. Our original proposal, dated April 17, 2009 has been revised to reflect changes in our scope of services based on recent phone conversations with you.

The purpose of our services will be to evaluate surface and near-surface soil infiltration characteristics for design of low impact development (LID) BMP features for surface water drainage and water quality protection. Included in this proposal is a brief summary of our understanding of the project, the scope of services we can provide, and an estimate of our fees.

PROJECT DESCRIPTION

This proposal is based on conversations with you, our brief review of the Martis Valley Regional Trail Initial Study prepared by the Northstar Community Services District (NCSD), dated December 2010, and review of preliminary project plans prepared by Auerbach Engineering Corporation (AEC) dated May 25, 2011. The project will involve construction of paved multi use trail that will provide a regional connection between existing trails in the Town of Truckee and trails in the Lake Tahoe Basin. The trail will accommodate pedestrians, bicyclists, and other non-motorized transportation, and will be constructed to meet the standards of the Americans with Disabilities Act (ADA). We understand that the project is currently in a focused Environmental Impact Report (EIR) review process and that final design is not part of the scope of services needed at this time.

We understand that the project will involve constructing an approximately 9.5 mile long multi-use trail that will eventually extend from the Nevada/Placer County line near the southern Town of Truckee limit to a paved Forest Service road located near the top of a ridge adjacent to Sawmill Flat known locally as "Four Corners." Two possible alternative routes are currently under consideration for the new trail. Our scope of work will primarily involve Segments 1 through 3. The proposed trail will be constructed in multiple phases (Phases 1, 2A, 2B, 3, and 4) and will consist of a 10 foot wide asphalt concrete pathway with one to two foot wide unpaved shoulders. Two possible alternative routes are currently under consideration for the new trail. We understand that pedestrian bridges will be needed to cross over Martis Creek. However, geotechnical engineering recommendations for bridge foundation design are not needed at this time, but will be needed after the preferred trail route is selected.

ANTICIPATED CONDITIONS

In preparation of this proposal, we reviewed geologic maps and reports in our files regarding subsurface conditions in the project vicinity. Based on this information and our experience in the site area, we anticipate that several geologic units are likely present within both possible trail alignment areas and include alluvium, alluvial fan deposits, glacial outwash deposits, and andesite volcanic rock.

We anticipate that groundwater may be seasonally present near the ground surface at some locations and may affect the proposed project. We anticipate that the site can be accessed by foot.

SCOPE OF SERVICES

Review of Available Literature

Prior to our surface reconnaissance, we will review local and regional geologic maps and reports in our files from other nearby sites. We will review the National Resources Conservation Service (NRCS) Soil Survey.

Site Reconnaissance

We plan to complete a surface reconnaissance along the proposed trail routes to evaluate current surface and near-surface soil conditions. We anticipate that a topographic base map will be made available for our use during the surface reconnaissance.

Analysis and Preliminary Report

Based on the results of our literature review and surface reconnaissance, we will provide our preliminary design recommendations regarding the following:

- Anticipated soil and groundwater conditions along the trail alignments, with emphasis on how the conditions are expected to affect surface and near-surface water drainage;
- Preliminary surface and subsurface drainage and water quality protection recommendations;
- Discussion of temporary and permanent erosion control measures; and,
- Discussion of preliminary LID features for surface water drainage and water quality protection.

We will present our recommendations in a written letter report with figures showing generalized LID features. The information collected during our initial study can be used for site-specific design of LID features and further subsurface investigation and geotechnical engineering design for asphalt concrete pavement sections.

SCHEDULE AND FEES

At the present time, we can complete our surface reconnaissance within one to two weeks of your authorization to proceed. If weather, access, or site conditions restrict our field operations, we may need to revise our work scope and fee estimate. We anticipate submitting our preliminary letter report within two weeks after completion of our surface reconnaissance. If requested, we can provide preliminary and verbal information with respect to our anticipated conclusions and recommendations prior to completion of our final report.

We will provide the scope of work described above for a lump sum fee of . Billing will be monthly on a percent complete basis. Additional services beyond the scope of this proposal performed at the client's request will be billed on a time and materials basis using the fee schedule applicable at the time the services are provided.

CLOSING

Holdrege & Kull will perform its services in a manner consistent with the standard of care and skill ordinarily exercised by members of the profession practicing under similar conditions in the geographic vicinity and at the time the services will be performed. No warranty or guarantee, express or implied, is part of the services offered by this proposal. We understand that you will provide a contract agreement for our services described in this proposal.

We appreciate the opportunity to submit this proposal and look forward to working with you on this project. If you have any questions or need additional information, please contact the undersigned.

Sincerely,

Holdrege & Kull

P J Raynak

Pamela J. Raynak, P.G.
Project Geologist

John Hudson

John K. Hudson, P.E., C.E.G.
Principal

APPENDIX E

TRAFFIC AND TRAIL USE REPORTS

APPENDIX E1

Martis Valley Trail Use Forecasts

TRANSPORTATION CONSULTANTS, INC.

TRANSPORTATION PLANNING AND TRAFFIC ENGINEERING CONSULTANTS

2690 Lake Forest Road, Suite C
Post Office Box 5875
Tahoe City, California 96145
(530) 583-4053 FAX: (530) 583-5966
info@lsctahoe.com • www.lsctrans.com

MEMORANDUM

Date: December 14, 2011

TO: Wally Auerbach, Auerbach Engineering

FROM: Jason Briedis and Gordon Shaw, LSC

RE: Martis Valley Trail Use Forecasts

The Martis Valley Trail is proposed to run approximately 9.3 miles beginning on the west side of and adjacent to SR 267 at the Nevada/Placer county line, through the Martis Valley and Northstar areas and ending at the "Four Corners" intersection along the "Fiberboard Freeway" atop the ridge overlooking Lake Tahoe. A key issue in the evaluation of the project is the level of bicycle and pedestrian activity that would use the facility. LSC Transportation Consultants, Inc. was retained by Auerbach Engineering to prepare these use forecasts. LSC developed a specific bicycle/pedestrian usage model for the study area, using the Town of Truckee TransCAD Model and based on the methodologies used to develop the *Tahoe Region Bicycle and Pedestrian Corridor Use Model,* as described in *Tahoe Bike/Ped Model Memo* (LSC Transportation Consultants, Inc., 2009) and used in the preparation of the 2010 *Lake Tahoe Regional Bicycle and Pedestrian Plan*.

This analysis estimates the number of trail users in the following categories:

- Residents biking directly to/from the trail from home
- Visitors biking directly to/from the trail from lodging
- Residents or visitors driving to the trail to bicycle
- Residents walking directly to/from the trail from home
- Visitors walking directly to/from the trail from lodging
- Residents or visitors driving to the trail to walk.

Note that the "walk" category also includes others non-motorized persons not using a bicycle, such as in-line skaters. The analysis procedures reflect that the number of persons walking/bicycling directly to/from the trail is a function of land uses and travel patterns close to the trail corridors, while the persons driving to the trail is not.

Trail usage estimations are provided for the following three time periods: daily, peak hour, and annual. Usage estimates for the Martis Valley Trail are computed assuming a connection to the Town of Truckee Trail System at the northern terminus of the Martis Valley Trail. As indicated in the Truckee Trails and Bikeways Master Plan, the Town is actively working to provide a Class I (separated multiuse path) along the Brockway Road corridor between the north end of the Martis Valley Trail and the Regional Park, where it will tie to the Legacy Trail extending from Donner Lake to Glenshire.

Trail usage estimations are provided for the following three analysis points along the trail:

- A point immediately south of Schaffer Mill Road (Analysis Point M1)
- The point where the trail crosses the boundary between Martis Creek Lake National Recreation Area and the Northstar area (Analysis Point M2)
- A point just to the southeast of Northstar Village where the trail begins climbing toward the summit of the topographical boundary between Martis Valley and the Lake Tahoe Basin (Analysis Point M3)

The usage estimation methodologies discussed in the following sections are applied separately for each of these points along the trail. It should be noted that the sum of the trail usage estimations at all three points should not be considered an estimation of total trail usage along the entire trail. Some trail users will not be counted as using the trail at any of the analysis points (such as a trip entirely within the Northstar area) and some trail users will pass multiple analysis points and thus be counted more than once.

Maximum Feasible Demand

The estimation technique is based on a “maximum feasible demand” (the greatest number of users that would be expected if all conditions along the facility were perfect), which is then adjusted by a series of factors that reflect conditions that would tend to dissuade some of this feasible demand (such as grades). This maximum feasible demand as well as the various factors was developed based upon a detailed analysis of actual use levels on Tahoe region multipurpose trails, as well as their specific characteristics. Please refer to the methodology presented in the *Tahoe Bike/Ped Model Memo* for a detailed explanation of the derivation of the maximum feasible demand for a multi-use trail corridor.

Maximum feasible demand is estimated separately for each category of users listed above. Maximum feasible demand is also estimated separately for each analysis point. The estimation of the maximum feasible demand for trail users not driving to the trail is based on the Town of Truckee TransCAD regional travel demand model. In addition to the Town of Truckee, this model area also encompasses the Martis Valley/Northstar portion of Placer County. Estimates are provided for both existing conditions (using the 2003 Truckee TransCAD model) and future conditions (using the 2025 Truckee TransCAD model). The Martis Valley Trail model applies the data from the travel demand model to the specific areas for which the proposed multi-use trail will serve.

<u>Bicycle Demand</u>

For user trips directly from a cyclist’s home or lodging, the bicycle use model considers all trips with an origin or destination in all TAZs for which any portion is within one half mile of the trail. Table A provides a list of all TAZs considered for each analysis point. The Town of Truckee TransCAD model provides travel demand for peak hour vehicle-trips. For the purpose of this analysis, it is necessary to estimate the number of daily person-trips from the number of daily vehicle trips between TAZ pairs. It is also necessary to split the output into resident trips and visitor trips. The following steps were used to estimate daily resident and visitor person-trips from total peak hour vehicle-trips:

- Traffic trend data along SR 267 was used to estimate a ratio between peak hour and daily trips. Caltrans maintains an automatic traffic count station along SR 267 near its intersection with Soaring Way. The ratio of daily traffic to peak hour traffic on the day with 10^{th} highest peak hour in the summer was 12.5. This figure was used to estimate daily vehicle trips from the Truckee TransCAD model.

- Data from the US Census Bureau was used to estimate the percentage of households in Martis Valley that are second or vacation homes. The 2000 decennial census (still the most recent available data) indicates that 69 percent of households in Martis Valley (Block Group 5, Census Tract 220.01, Placer County, California) are "for seasonal, recreational, or occasional use." Therefore it is assumed that 31 percent of home-based vehicle-trips are resident trips and 69 percent of vehicle-trips are visitor trips.

- Average vehicle-occupancy data were used to estimate the number of person-trips from the number of vehicle trips. Data from Lake Tahoe were used, as no vehicle-occupancy data are available specific for Truckee. Resident and visitor person-trips were estimated assuming that resident vehicle-trips have an average occupancy of 1.4 persons per vehicle and that visitor vehicle-trips have an average occupancy of 2.7 persons per vehicle.

The Tahoe Area Bicycle and Pedestrian Usage model provides that 12 percent of daily resident person-trips and 11 percent of daily visitor person-trips within a bike trail corridor would potentially use the bicycle travel mode. These factors were applied to the daily resident and visitor person trips to estimate the maximum feasible bicycle demand at each of the analysis points. The existing bike-to-trail demand for all three analysis points is provided in Table B, and the future bike-to-trail demand for all three analysis points is provided in Table C.

Pedestrian Demand

The Martis Valley Trail Pedestrian Use Model considers the total resident and visitor populations in the corridor area (excluding those pedestrians driving to the facility, as discussed below). The population in each sub-corridor of the proposed Martis Valley Trail was estimated based on the number of dwelling units and lodging rooms in each TAZ through which the trail passes. The TAZs included in the estimate of the population for each sub-corridor of the Martis Valley Trail are listed in Table A. The 2000 US Census indicates that the average household size in Martis Valley is 2.63 persons. Demographic surveys from the Tahoe/Truckee area indicate that visitor accommodations (including lodging rooms and second homes/vacation rentals) in the region have an average occupancy of 2.6 persons. These factors were multiplied by the respective number of dwelling units/lodging rooms to estimate the resident and visitor populations.

The methodology for the Use Model determined that the maximum feasible daily pedestrian usage of a trail in the Tahoe/Truckee area is equivalent to 4 percent of the resident population and 3 percent of the visitor population in the corridor in which the trail is located. These factors were applied to the resident and visitor populations to estimate the maximum feasible walk-to-trail demand at each analysis point. The existing walk-to-trail demand for all three analysis points is provided in Table D, and the future walk-to-trail demand for all three analysis points is provided in Table E.

Drive-to-Trail Demand

Demand for trail users driving to the trail is estimated separately from trail users accessing the trail directly by bicycle/pedestrian modes. The estimation procedure is based on trail surveys conducted at existing Class I multiuse trails in the Lake Tahoe area, as no such trail usage data are available specific to the Truckee area. The *Tahoe Bike/Ped Model Memo* provides a complete discussion on the derivation of the drive-to-trail maximum feasible demand estimates.

Drive-to-trail usage demand for the Martis Valley Trail was estimated by comparing the drive-to-trail usage demand for similar trails in the Lake Tahoe Basin. Qualitative trail characteristics were compared as well as resident and visitor populations near to the trails. It was estimated that on a busy summer day, there would be a maximum feasible drive-to-bike demand of 250 one-way bike trips and a maximum feasible drive-to-walk demand of 80 one-way pedestrian trips. These figures reflect that the Martis Valley Trail along with the Town's Legacy Trail will be the two primary Class I paved multipurpose path recreational opportunities for the Truckee/Martis Valley area. These figures represent the total demand along the entire Martis Valley Trail for a given busy summer day. These 250 bike-trips and 80 pedestrian-trips were then distributed along the trail. As shown in Table F, this distribution was based on several factors:

- The relative resident and visitor population within a reasonable drive distance both to the north and to the south, as well as the availability of other similar recreational trails in these areas.

- The observed usage patterns at existing trails in the region. For instance, many trail users indicate a desire for a chance for refreshments or meals along their trip (which tends to increase the desirability of trips that include Northstar Village). In addition, trail users tend to favor a round trip with the "workout" at the beginning of the trip (which tends to favor a Northstar Village – Four Corners round trip that starts in Northstar Village)

- Surveys in the Tahoe Region indicate that the average one-way bicycle trip length is 2.4 miles and the average one-way pedestrian trip length is 1.5 miles. Based on this, relatively few trail users will travel the entirety of the Martis Valley Trail on any one trip.

- No parking constraints are assumed that would divert users to another trailhead.

As shown in Table F, 80 percent of drive-to-bike trips and 90 percent of drive to walk trips travel are estimated to come from the Truckee area to access the trail, while 20 percent of drive-to-bike trips and 10 percent of drive to walk trips travel from Lake Tahoe to access the trail. It is assumed that drive-to-trail users would park at the following locations:

- Proposed Trailhead and Parking at Schaffer Mill Road
- Wildlife Viewing Area along SR 267
- Northstar Village

- Four-Corners intersection along the Fiberboard Freeway

The drive-to trips were distributed to these four parking areas according to the percentages listed under the bike and walk columns in Table F. The percentage of drive-to trail users that would cross each of the three analysis points from each parking location is shown in the right-hand columns of Table F. These assumptions account for the reduction factors associated with trail grade, recreational value, etc., that are discussed in the following section. These assumptions also account for the average trip length for bicycle and pedestrian trips along a shared-use trail.

<u>Trailhead Parking Demand</u>

Trailhead parking demand is calculated for each of the four parking locations listed above. The trail usage numbers estimated in the above section are for one-way trips. Drive-to-trail users generally will generate two one-way trips to complete a round trip. Based on a survey of shared-use trail users in the Lake Tahoe area conducted by the Tahoe Coalition of Recreation Providers (TCORP) in 2007, drive-to-bike trail users have an average vehicle occupancy of 2.2 persons and drive-to-walk trail users have an average vehicle occupancy of 1.4 persons. Dividing the number of drive-to-trail round-trips by the average vehicle occupancy for bicyclists and pedestrians yields the daily parking demand at each location, as shown in Table G.

Not all of the daily drive-to-trail bicyclists and pedestrians will be using the trail at the same time. Therefore, it is necessary to estimate the percentage of trail users likely to be parked at the peak time on a typical busy day. Some trails users will utilize parking spaces early in the morning and some will utilize parking spaces later in the afternoon. The majority of drive-to-trail users will occupy a parking space for two to three hours toward the middle of the day. These trail users will overlap with morning and afternoon drive-to-trail users. It is conservatively estimated that 40 percent of the daily trailhead parking demand will be present during the peak time on a typical busy summer day. Peak parking demand for each location is shown in the right-hand column in Table G. As shown, the location with the greatest peak demand is the Northstar Village with a maximum of 12 parked cars generated by trail users.

Trail Use Reduction Factors

Once a maximum feasible usage is estimated, it is necessary to adjust the figure based on specific characteristics of the trail. Reduction factors are applied to the maximum demand estimate to adjust it for decreases in potential trail use based on trail class, grade, continuity, maintenance, recreational value, and congestion. The reduction factors for each category are estimated and applied separately for bicyclists and pedestrians and separately for each type of trail user, as listed in the first paragraph of this memo (residents, visitors, and drive-to-trail users). The *Tahoe Bike/Ped Model Memo* (LSC Transportation Consultants, Inc., 2009) provides a full discussion of the derivation of the reduction factors, while Table H provides a summary of the reduction factors applied in this analysis.

<u>Class</u>

Fewer potential bicyclists and pedestrian would use a Class II (bike lanes) or Class III (signed bike route) than for a Class I facility for any given corridor. Therefore, a reduction in trail usage is appropriate for Class II and Class III facilities. The Martis Valley trail is proposed to be constructed as a Class I facility for its entirety. Therefore, no trail usage reduction is applied for this category.

Grade

Reductions are taken based on grades and elevation changes encountered by trail users, as trails with little or no grade are observed to generate higher usage. No reduction is taken for mostly flat trails with short segments of grades of less than 4 percent. Moderate reductions (10 to 30 percent) are taken for trails with moderate grade sections (between 4 and 8 percent). Greater reductions (20 to 65 percent) are taken for trails with steep grades and large elevation changes (greater than 300 feet). The Martis Valley Trail is proposed to traverse a wide range of terrain ranging from flat sections along the valley floor to sections of steep grades with switchbacks climbing the mountains separating Martis Valley from the Lake Tahoe Basin. Reductions for the trail grades are applied separately for each analysis point:

- *Analysis Point M1: South of the intersection of SR 267 and Schaffer Mill Road:* Grades along the northern portion of the trail, from the trailhead to the "Wildlife Viewing Area," are relatively flat. The total elevation change along this approximately two-mile section of the trail is approximately 70 feet. Therefore no reduction in potential trail usage is assumed for trail grades at the M1 analysis point.

- *Analysis Point M2: Boundary between Martis Creek Lake National Recreation Area and the Northstar area:* Heading south from the "Wildlife Viewing Area," the trail is relatively flat as it follows the along side Martis Creek for less than one mile. The trail then begins to ascend toward Northstar, climbing approximately 200 vertical feet in about one half-mile. Trail grades along this section of the trail are proposed to be in the range of 4 to 6 percent with possible sections exceeding 8 percent. Grades of this description fall between the "medium" and "high" grade reduction categories. It is assumed that trail grades near the M2 analysis point will deter 25 percent of potential residents biking from home, 45 percent of visitors biking from lodging, 15 percent of residents walking from home and 33 percent of visitors walking from lodging.

- *Analysis Point M3: Southeast of Northstar Village*: Heading south from Northstar Village, the trail will gain approximately 800 feet in elevation to reach the "Four Corners" junction in just under 4 miles. Sections of this trail will be at the maximum allowable AASHTO grade for several hundred yards. Grades along this section of the trail are assumed to deter 40 percent of potential resident biking to the trail from home, 60 percent of visitors biking to the trail from lodging, 20 percent of residents walking to the trail from home and 36 percent of visitors walking to the trail from lodging.

Continuity

Reductions are taken from the initial use estimates based on continuity of the trail. No reduction is taken for trails with few driveway crossings (less than 4 per mile) or no major roadways that require crossing. The reduction increases based both on the frequency of trail crossings and the volume of traffic encountered at the crossing. The proposed Martis Valley has very few crossing locations. One such location is across Schaffer Mill Road, along the west leg of the intersection of Schaffer Mill Road with SR 267. This intersection is signalized and therefore, a protected crossing of Schaffer Mill Road is provided. The trail is also proposed to cross

Northstar Drive, just north of its intersection with Big Spring Drive. Given the relatively modest traffic levels at this location, this crossing would not result in a reduction in potential trail usage. As such, no reduction in trail usage is assumed for any of the analysis points along the Martis Valley Trail fir the Continuity category.

<u>Maintenance</u>

Reductions are taken for the maintenance issues that may occur on the trail such as presence of sand, pavement condition, and debris that regularly occur on the trail. As the Martis Valley Trail will be constructed from scratch, it is assumed that the pavement will be in excellent condition and that the trail will be properly maintained. Therefore, no reduction in trail usage for maintenance issues is applied for the Martis Valley Trail.

<u>Recreational Value</u>

A reduction factor is applied to the trail usage estimates based on the recreational and scenic value of the trail. Trails located along an especially scenic corridor such as lakefront, river front, or dense woods are considered to have the highest recreational value and no reduction factor is applied for these trails. Trail through urbanized areas are considered to have a low recreational value and are subject to a 15 to 75 percent reduction in usage estimates varying by user type, with users driving to the trail subject to the greatest reduction.

- *Analysis Point M1: South of the intersection of SR 267 and Schaffer Mill Road:* The northern section of the Martis Valley Trail is proposed to be aligned in close proximity and loosely parallel to SR 267. This section of Martis Valley is open and flat; there are no natural barriers to shield trail users from the noise and view of the traffic on SR 267. In other respects, the open space of the valley provides views of the mountains and the trail is aligned nearby to Martis Creek. It is assumed that these trail characteristics will place this section of the Martis Valley Trail in the "medium" recreational value category, characterized by "scenery mixed with urban uses." Potential trail uses would be reduced by 9 percent for residents biking to the trail from home, 18 percent for visitors biking to the trail from lodging, 9 percent for resident walking to the trail from home and 24 percent for visitors walking to the trail from lodging.

- *Analysis Point M2: Boundary between Martis Creek Lake National Recreation Area and the Northstar area:* This section of the Martis Valley Trail veers away from SR 267. There are creek crossings and the trail enters into attractive forested areas. Views of Martis Valley are become available as trail users ascend toward Northstar. This section of the trail is assumed to have a high recreational value and therefore, no reduction in potential trail usage is assumed under this category.

- *Analysis Point M3: Southeast of Northstar Village*: This section of the proposed Martis Valley trail continues to climb up into the mountains to the south of Martis Valley. The area through which the trail passes is forested and expansive views of Martis Valley are available through the trees. This section of the trail is assumed to have a high recreational value and therefore, no reduction in potential trail usage is assumed under this category.

Congestion

A final reduction factor is applied to the trail usage estimates based on the level of congestion faced by trail users, reflecting that a crowded trail can dissuade potential users. Trail congestion is estimated based on the "Shared Off-street Path" level of service methodology in the *Highway Capacity Manual* (Transportation Research Board, 2000). Level of Service (LOS) is based on the number of passing events that occur during the peak hour of trail use. A passing event is defined as either passing a bicycle/pedestrian traveling in the opposite direction or overtaking another bicycle/pedestrian traveling in the same direction. The greatest reduction factors for this category are applied to residents walking/biking to the trail. Lower reduction factors are applied to visitors, who are assumed to use the trail regardless of congestion levels.

- *Analysis Point M1: South of the intersection of SR 267 and Schaffer Mill Road --* Under 2003 land uses and traffic volumes, initial trail usage estimates place the northern section of the trail in the "low" trail congestion category, characterized by shared-use trail LOS B or C. The number of potential trail uses would be reduced by 13 percent for residents biking to the trail from home, 6 percent for visitors biking to the trail from lodging, 10 percent for residents walking to the trail from home and 5 percent for visitors walking to the trail from lodging. The number of potential trail users is projected to increase greatly in the future. Assuming buildout of the land uses in the 2025 Town of Truckee TransCAD model, the number of potential trail users accessing the trail from home or lodging, both bicyclists and pedestrians, would increase by approximately six-fold. This would increase congestion along the trail corridor to the "moderate" category, characterized by shared-use trail LOS D or E. The number of potential trail uses would be reduced by 26 percent for residents biking to the trail from home, 10 percent for visitors biking to the trail from lodging, 23 percent for residents walking to the trail from home and 8 percent for visitors walking to the trail from lodging.

- *Analysis Point M2: Boundary between Martis Creek Lake National Recreation Area and the Northstar area* -- Potential trail usage along this middle section of the proposed Martis Valley Trail is roughly the same as potential trail usage to the north. Therefore, the same reduction factors for the congestion category are applied for analysis point M2 as were applied for analysis point M1: the "low" congestion category is assumed for existing conditions (2003 land uses in the Town of Truckee TransCAD model) and the "moderate" congestion category is assumed for future conditions.

- *Analysis Point M3: Southeast of Northstar Village* -- The southern portion of the proposed Martis Valley Trail is estimated to have fewer trail users than portion of the trail to the north. This is due to both that this portion of the trail does not provide a connection between residential and commercial areas and the steep grades proposed for this portion of the trail. Trail use is estimated to be low enough to place analysis point M3 in the "none" category for trail congestion, or shared-use trail LOS A, for existing conditions. No reduction in trail usage is assumed for the congestion category.

Under future land uses, trail usage near analysis point M3 will increase slightly and some trail congestion would be expected. For future conditions, a reduction in trail usage for the congestion is applies between the "none" and "low" categories. The number of potential trail uses would be reduced by 6 percent for residents biking to the trail from home, 3 percent for visitors biking to the trail from lodging, 5 percent for residents walking to the trail from home and 3 percent for visitors walking to the trail from lodging.

Final Trail Usage Estimation

The final estimation for trail usage at each of the analysis points is equal to the maximum feasible demand multiplied by the multiplicative total of the reduction factors as discussed above. The trail usage calculations and reductions factors are provided for each analysis point for both existing and future conditions. Tables I, J, and K provide trail usage for existing conditions for analysis points M1, M2, and M3, respectively. Tables L, M, and N provide trail usage for future conditions for analysis points M1, M2, and M3, respectively. As shown, trail usage estimations are provided for daily, peak hourly, and annual trail usage at each analysis point for each scenario. The factors used to estimate peak hourly usage are based upon observed hourly and daily counts for similar Tahoe Region trails.

The factor used for annual usage assumes that trails are not cleared of snow in the winter. This factor is calculated as a weighted average of factors for residents versus visitors. For residents, a factor of 159 was applied, as discussed in the *Tahoe Region Bicycle/Pedestrian Use Model* memo. For visitors, a factor of 80 was applied, based upon visitor facility occupancy patterns in the Martis Valley/Northstar area. An overall factor of 102 was then calculated.

Table O presents a summary of the overall estimates. A review of Tables I through O indicates the following:

- The busiest of the analysis locations is location M2, which is on the north side of the Northstar area and on the southern boundary of the Martis Creek Lake National Recreation Area. If built today, approximately 428 person-trips would pass this point over a busy summer day, and approximately 43,000 over an entire year.

- The preponderance of trail use (at least at the analysis locations) would consist of bicyclists. Of total users, 91 percent are forecast to be cyclists at the northern (M1) location, and 79 percent at the other locations.

- Over all locations, approximately two-thirds of trail users are expected to consist of persons that walk or bicycle to the trail, and one-third will drive to/from the trail.

- Trail use will grow substantially in the future, reflecting development along the trail corridor. In particular, use of the northernmost portion of the trail will grow, associated with development along Shaffer Mill Road as well as in the portions of Truckee just to the north. 2025 use levels at the northernmost analysis point will be roughly 4 times current estimates, making this the busiest section of the trail.

An estimate of the *total* actual person-trips using the trail is difficult, given the many access locations and the potential to make very short trips. The annual use estimates at the analysis points were adjusted for “double counting” of longer trips at more than one location based upon observed typical trip length. In addition, trips that do not pass one of the three analysis points were factored into the total based on an evaluation of trip origin/destination patterns. Overall, it is estimated that approximately 66,000 person-trips per year would use the trail under existing conditions, increasing to 168,000 by 2025.

TABLE A: Corridor -- Traffic Analysis Zone Correspondence Table

Mode / Analysis Point		Traffic Analysis Zones in Corridor for Analysis Point																						
Bicycle																								
Entire Corridor		138	100	101	102	136	111	112	113	114	115	116	117	118	119	120	121	122	135	123	124	103	107	108
Near Shaffer Mill Rd	M1	55	56	57	58	59	60	61	62	63	64	65	66	90	100	101	102	103	107	108	136	137	138	205
Below Northstar	M2	108	110	111	112	113	114	115	116	117	118	119	120	121	122	123	124	136						
Above Northstar	M3	112	113	114	115	116	117	118	119	120	121	122	135											
Pedestrian																								
Entire Corridor		138	100	101	102	136	111	112	113	114	115	116	117	118	119	120	121	122	135					
Near Shaffer Mill Rd	M1	60	61	62	63	64	65	66	100	101	102	108	136	137	138									
Below Northstar	M2	111	112	117	118	119	120	121	122	136														
Above Northstar	M3	115	116	117	118	119	120	121	122	135														

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TABLE B: Existing Bike-To-Trail Demand Calculations

Analysis Point		Peak Hour Vehicle-Trips in Corridor	Daily Vehicle-Trips in Corridor	Person Trips in Corridor	Maximum Feasible Bike-To-Trail Demand
M1		78	970		
	Residents		301	421	51
	Visitors		669	1,806	199
M2		133	1,660		
	Residents		515	721	87
	Visitors		1,145	3,092	340
M3		66	820		
	Residents		254	356	43
	Visitors		566	1,528	168

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TABLE D: Existing Walk-To-Trail Demand Calculations

Analysis Point		Martis Valley Dwelling Units	Lodging Rooms	Population	Maximum Feasible Walk-To-Trail Demand
M1		69	100		
	Residents [1]	26		68	3
	Visitors [1]	49		387	12
M2		1,070	0		
	Residents	332		873	35
	Visitors	738		1,919	58
M3		444	0		
	Residents	138		363	15
	Visitors	306		796	24

NOTE 1: Town of Truckee TransCAD model separate Martis Valley dwelling units. 'M1' users come from areas outside of Martis Valley as well. Therefore resident and visitor dwelling units will not sum to Martis Valley dwelling units.

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TABLE C: Future Bike-To-Trail Demand Calculations

Analysis Point		Peak Hour Vehicle-Trips in Corridor	Daily Vehicle-Trips in Corridor	Person Trips in Corridor	Maximum Feasible Bike-To-Trail Demand
M1		442	5,510		
	Residents		1,708	2,391	287
	Visitors		3,802	10,265	1,129
M2		482	6,010		
	Residents		1,863	2,608	313
	Visitors		4,147	11,197	1,232
M3		157	1,960		
	Residents		608	851	102
	Visitors		1,352	3,650	402

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TABLE E: Future Walk-To-Trail Demand Calculations

Analysis Point		Martis Valley Dwelling Units	Lodging Rooms	Population	Maximum Feasible Walk-To-Trail Demand
M1		375	220		
	Residents [1]	659		1,733	69
	Visitors [1]	350		1,482	44
M2		1,475	0		
	Residents	457		1,202	48
	Visitors	1,018		2,647	79
M3		1,148	0		
	Residents	356		936	37
	Visitors	792		2,059	62

NOTE 1: Town of Truckee TransCAD model separate Martis Valley dwelling units. 'M1' users come from areas outside of Martis Valley as well. Therefore resident and visitor dwelling units will not sum to Martis Valley dwelling units.

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TABLE F: Drive-to-Trail Users Assumptions

				Percent of Trail Users Present at Analysis Points [1]					
				Bicyclists			Pedestrians		
Drive From	Park At	Bike	Walk	M1	M2	M3	M1	M2	M3
North (Truckee)	Schaffer Mill Road	35%	25%	100%	25%	5%	100%	10%	0%
80%, Bike	Wildlife Viewing Area	20%	35%	15%	60%	10%	0%	50%	0%
90%, Walk	Northstar Village	25%	30%	5%	35%	50%	0%	20%	50%
South (Lake Tahoe)	Four Corners	5%	3%	5%	20%	90%	0%	0%	2%
20%, Bike	Northstar Village	10%	5%	5%	35%	50%	0%	20%	50%
10%, Walk	Wildlife Viewing Area	5%	2%	15%	60%	10%	0%	50%	10%
	Schaffer Mill Road	0%	0%	0%	0%	0%	0%	0%	0%
	Total	100%	100%	--	--	--	--	--	--
Estimated Number of One-Way Drive-To Trail Trips		**250**	**80**	**102**	**93**	**66**	**20**	**22**	**14**

NOTE 1: Percentages of trail users present at analysis points are applied separately for each parking area as shown. Trail users from each parking area may pass multiple or zero analysis points. Therefore, rows may not sum to 100 percent.

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Martis Valley Trail Use.xls

TABLE G: Martis Valley Trail Drive-to-Trail Users Parking Demand

	Drive-to-Bike			Drive-to-Walk				
Park At	One-Way Trips [1]	Round-Trips	Vehicle-Trips	One-Way Trips [1]	Round-Trips	Vehicle-Trips	Total Daily Parking Demand	**Peak Parking Demand**
Four Corners	13	6	3	2	1	1	4	**2**
Northstar Village	88	44	20	28	14	10	30	**12**
Wildlife Viewing Area	63	32	15	30	15	11	26	**10**
Schaffer Mill Road Trailhead	88	44	20	20	10	7	27	**11**
Average Vehicle Occupancy [2]							Peak Parking Demand Factor	
Drive-to-Bike	2.2							
Drive-to-Walk	1.4							**0.4**

NOTE 1: From Table F.
NOTE 2: From TCORP 2007 surveys of users of Tahoe recreational trails.
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TABLE H: Bicycle/Pedestrian Facility Use Factors

		Bicyclists			Pedestrians		
		Residents Biking from Home	Visitors Biking from Lodging	Bicyclists Driving to Facility	Residents Walking from Home	Visitors Walking from Lodging	Walkers Driving to Facility
Facility Class	Class 1, attaining AASHTO standards	0%	0%	0%	0%	0%	0%
	Class 2, attaining standards for lane width	35%	55%	85%	Note 1	Note 1	Note 1
	Class 3, on street with acceptable width and traffic volumes	Note 2	Note 2	Note 2	Note 1	Note 1	Note 1
Grade	Flat or only short sections of gentle grade <4%	0%	0%	0%	0%	0%	0%
	Grades of 4%-8%, extending for no more than a few hundred yards	10%	30%	30%	10%	30%	30%
	Long sections of sustained maximum AASHTO grade, with total elevation change exceeding 300 feet	40%	60%	65%	20%	36%	37%
Facility Continuity	No breaks in trail or cross streets	0%	0%	0%	0%	0%	0%
	Infrequent crossings of low volume residential streets and driveways (<4 per mile)	0%	0%	0%	0%	0%	0%
	Frequent crossing of low volume residential streets and driveways (>4 per mile)	10%	15%	15%	4%	7%	16%
	Unprotected crossing of busy (ADT > 10,000) street (including crossings with striped crosswalk only)	22%	29%	40%	17%	35%	35%
	Protected crossing of busy (ADT >10,000) street (signal or roundabout)	14%	16%	18%	5%	10%	10%
	Breaks in facility continuity requiring travel along state highway or other busy street.	35%	44%	49%	36%	48%	54%
Maintenance	High -- No sand on trail or pavement deformities	0%	0%	0%	0%	0%	0%
	Medium -- Condition is an inconvenience, but not a safety hazard	11%	10%	10%	5%	5%	5%
	Poor -- Trail condition reduces safe travel speed	43%	41%	52%	8%	7%	7%
Recreational Value	High -- Shoreline, river corridor, dense woods	0%	0%	0%	0%	0%	0%
	Medium -- Scenery mixed with urban uses	9%	18%	30%	9%	24%	28%
	Low -- Urban corridor	21%	33%	75%	15%	36%	51%
Trail Congestion (Note 2)	None -- LOS A (< 40 passing events per hour)	0%	0%	0%	0%	0%	0%
	Low -- LOS B or C (40 to 100 passing events per hour)	13%	6%	4%	10%	5%	5%
	Moderate -- LOS D or E (100 to 195 passing events per hour)	26%	10%	8%	23%	8%	13%
	High -- LOS F (>195 passing events per hour)	40%	19%	15%	30%	8%	8%

Note 1: Pedestrian demand only evaluated for Class I facilities.
Note 2: Bicyclist demand only evaluated for Class I and II facilities.

Note 3: See Highway Capacity Manual 2000 Chapter 19: Bicycle Methodology. For example, 40 passenger events per hour reflects that an individual user would overtake, be overtaken, or be passed in the opposing direction by 40 other individuals over the cou

TABLE I: Martis Valley Trail Bicycle and Pedestrian Use Model - Existing Conditions - South of Schaffer Mill Road (M1)

Location	South of Schaffer Mill Road
Scenario	2003 Land uses
Analyst	JHB

Corridor	Maximum Feasible Demand		Use Factor -- Reduction from Maximum (5): Class	Grade	Continuity	Maint-enance	Recre-ational Value	Conges-tion	Multi-plicative Total	Daily Use Estimate	Peak Hour Factor (6)	Peak Hour Use Estimate	Annual / Daily Factor (7)	Annual Use Estimate
BICYCLISTS														
Resident Bike to Facility	51	Note 1	0.00	0.00	0.00	0.00	0.09	0.13	0.21	40				
Visitor Bike to Facility	199	Note 1	0.00	0.00	0.00	0.00	0.18	0.06	0.24	152				
Bicyclists Drive to Facility	70	Note 2	Methodology considers reduction categories. (8)						0.00	70				
Total -- Best Estimate										262	0.153	40	102.0	27,000
High End of Estimate Range										*328*		*50*		*33,750*
Low End of Estimate Range										*197*		*30*		*20,250*
PEDESTRIANS														
Resident Walk to Facility	3	Note 3	--	0.00	0.00	0.00	0.09	0.10	0.18	2				
Visitor Walk to Facility	12	Note 3	--	0.00	0.00	0.00	0.24	0.05	0.28	9				
Pedestrians Drive to Facility	12	Note 4	--	Methodology considers reduction categories. (8)					0.00	12				
Total -- Best Estimate										23	0.153	4	102.0	2,000
High End of Estimate Range										*35*		*5*		*3,000*
Low End of Estimate Range										*12*		*2*		*1,000*
TOTAL -- Best Estimate										285		44		29,000
High End of Estimate Range										*362*		*55*		*36,750*
Low End of Estimate Range										*208*		*32*		*21,250*

Notes

1. From Table B
2. From Table F
3. From Table D
4. From Table F
5. From Table H
6. 0.153 for Class I facility, 0.096 for Class II facility
7. 172.8 for facilities maintained year-round, 146.5 for facilities without snow removal.
8. Maximum Feasible Drive-to-trail demand from Table F considers reductions for grade, continuity, recreational value, etc.

TABLE J: Martis Valley Trail Bicycle and Pedestrian Use Model - Existing Conditions - North of Northstar Village (M2)

Location	North of Northstar Village
Scenario	2003 Land uses
Analyst	JHB

Corridor	Maximum Feasible Demand		Use Factor -- Reduction from Maximum (5): Class	Grade	Continuity	Maint-enance	Recre-ational Value	Conges-tion	Multi-plicative Total	Daily Use Estimate	Peak Hour Factor (6)	Peak Hour Use Estimate	Annual / Daily Factor (7)	Annual Use Estimate
BICYCLISTS														
Resident Bike to Facility	87	Note 1	0.00	0.25	0.00	0.00	0.00	0.13	0.35	57				
Visitor Bike to Facility	340	Note 1	0.00	0.45	0.00	0.00	0.00	0.06	0.49	175				
Bicyclists Drive to Facility	106	Note 2	Methodology considers reduction categories. (8)						0.00	106				
Total -- Best Estimate										338	0.153	52	102.0	34,000
High End of Estimate Range										*423*		*65*		*42,500*
Low End of Estimate Range										*254*		*39*		*25,500*
PEDESTRIANS														
Resident Walk to Facility	35	Note 3	--	0.15	0.00	0.00	0.00	0.10	0.24	27				
Visitor Walk to Facility	58	Note 3	--	0.33	0.00	0.00	0.00	0.05	0.37	37				
Pedestrians Drive to Facility	26	Note 4	--	Methodology considers reduction categories. (8)					0.00	26				
Total -- Best Estimate										90	0.153	14	102.0	9,000
High End of Estimate Range										*135*		*21*		*13,500*
Low End of Estimate Range										*45*		*7*		*4,500*
TOTAL -- Best Estimate										428		65		43,000
High End of Estimate Range										*558*		*85*		*56,000*
Low End of Estimate Range										*299*		*46*		*30,000*

Notes

1. From Table B
2. From Table F
3. From Table D
4. From Table F
5. From Table H
6. 0.153 for Class I facility, 0.096 for Class II facility
7. 172.8 for facilities maintained year-round, 146.5 for facilities without snow removal.
8. Maximum Feasible Drive-to-trail demand from Table F considers reductions for grade, continuity, recreational value, etc.

TABLE K: Martis Valley Trail Bicycle and Pedestrian Use Model - Existing Conditions - South of Northstar Village (M3)

Location	South of Northstar Village
Scenario	2003 Land uses
Analyst	JHB

Corridor	Maximum Feasible Demand		Use Factor -- Reduction from Maximum (5): Class	Grade	Continuity	Maint-enance	Recre-ational Value	Conges-tion	Multi-plicative Total	Daily Use Estimate	Peak Hour Factor (6)	Peak Hour Use Estimate	Annual / Daily Factor (7)	Annual Use Estimate
BICYCLISTS														
Resident Bike to Facility	43	Note 1	0.00	0.40	0.00	0.00	0.00	0.00	0.40	26				
Visitor Bike to Facility	168	Note 1	0.00	0.60	0.00	0.00	0.00	0.00	0.60	67				
Bicyclists Drive to Facility	68	Note 2	Methodology considers reduction categories. (8)						0.00	68				
Total -- Best Estimate										161	0.153	25	102.0	16,000
High End of Estimate Range										*201*		*31*		*20,000*
Low End of Estimate Range										*121*		*18*		*12,000*
PEDESTRIANS														
Resident Walk to Facility	15	Note 3	--	0.20	0.00	0.00	0.00	0.00	0.20	12				
Visitor Walk to Facility	24	Note 3	--	0.36	0.00	0.00	0.00	0.00	0.36	15				
Pedestrians Drive to Facility	14	Note 4	--	Methodology considers reduction categories. (8)					0.00	14				
Total -- Best Estimate										41	0.153	6	102.0	4,000
High End of Estimate Range										*62*		*9*		*6,000*
Low End of Estimate Range										*21*		*3*		*2,000*
TOTAL -- Best Estimate										202		31		20,000
High End of Estimate Range										*263*		*40*		*26,000*
Low End of Estimate Range										*141*		*22*		*14,000*

Notes

1. From Table B
2. From Table F
3. From Table D
4. From Table F
5. From Table H
6. 0.153 for Class I facility, 0.096 for Class II facility
7. 172.8 for facilities maintained year-round, 146.5 for facilities without snow removal.
8. Maximum Feasible Drive-to-trail demand from Table F considers reductions for grade, continuity, recreational value, etc.

TABLE L: Martis Valley Trail Bicycle and Pedestrian Use Model - Future Conditions - South of Schaffer Mill Road (M1)

Location	South of Schaffer Mill Road
Scenario	2025 Railyard Land uses
Analyst	JHB

Corridor	Maximum Feasible Demand		Use Factor -- Reduction from Maximum (5): Class	Grade	Continuity	Maint-enance	Recre-ational Value	Conges-tion	Multi-plicative Total	Daily Use Estimate	Peak Hour Factor (6)	Peak Hour Use Estimate	Annual / Daily Factor (7)	Annual Use Estimate
BICYCLISTS														
Resident Bike to Facility	287	Note 1	0.00	0.00	0.00	0.00	0.09	0.26	0.33	192				
Visitor Bike to Facility	1,129	Note 1	0.00	0.00	0.00	0.00	0.18	0.10	0.26	832				
Bicyclists Drive to Facility	70	Note 2	Methodology considers reduction categories. (8)						0.00	70				
Total -- Best Estimate										1,094	0.153	167	102.0	112,000
High End of Estimate Range										*1,368*		*209*		*140,000*
Low End of Estimate Range										*821*		*126*		*84,000*
PEDESTRIANS														
Resident Walk to Facility	69	Note 3	--	0.00	0.00	0.00	0.09	0.23	0.30	48				
Visitor Walk to Facility	44	Note 3	--	0.00	0.00	0.00	0.24	0.08	0.30	31				
Pedestrians Drive to Facility	12	Note 4	--	Methodology considers reduction categories. (8)					0.00	12				
Total -- Best Estimate										91	0.153	14	102.0	9,000
High End of Estimate Range										*137*		*21*		*13,500*
Low End of Estimate Range										*46*		*7*		*4,500*
TOTAL -- Best Estimate										1,185		181		121,000
High End of Estimate Range										*1,504*		*230*		*153,500*
Low End of Estimate Range										*866*		*132*		*88,500*

Notes
1. From Table C
2. From Table F
3. From Table E
4. From Table F
5. From Table H
6. 0.153 for Class I facility, 0.096 for Class II facility
7. 172.8 for facilities maintained year-round, 146.5 for facilities without snow removal.
8. Maximum Feasible Drive-to-trail demand from Table F considers reductions for grade, continuity, recreational value, etc.

TABLE M: Martis Valley Trail Bicycle and Pedestrian Use Model - Future Conditions - North of Northstar Village (M2)

Location	Below Northstar Village
Scenario	2025 Railyard Land uses
Analyst	JHB

Corridor	Maximum Feasible Demand		Use Factor -- Reduction from Maximum (5): Class	Grade	Continuity	Maint-enance	Recre-ational Value	Conges-tion	Multi-plicative Total	Daily Use Estimate	Peak Hour Factor (6)	Peak Hour Use Estimate	Annual / Daily Factor (7)	Annual Use Estimate
BICYCLISTS														
Resident Bike to Facility	313	Note 1	0.00	0.25	0.00	0.00	0.00	0.26	0.45	173				
Visitor Bike to Facility	1,232	Note 1	0.00	0.45	0.00	0.00	0.00	0.10	0.50	612				
Bicyclists Drive to Facility	106	Note 2	Methodology considers reduction categories. (8)						0.00	106				
Total -- Best Estimate										891	0.153	136	102.0	91,000
High End of Estimate Range										*1,114*		*170*		*113,750*
Low End of Estimate Range										*668*		*102*		*68,250*
PEDESTRIANS														
Resident Walk to Facility	48	Note 3	--	0.15	0.00	0.00	0.00	0.23	0.35	31				
Visitor Walk to Facility	79	Note 3	--	0.33	0.00	0.00	0.00		0.33	53				
Pedestrians Drive to Facility	26	Note 4	--	Methodology considers reduction categories. (8)					0.00	26				
Total -- Best Estimate										110	0.153	17	102.0	11,000
High End of Estimate Range										*165*		*25*		*16,500*
Low End of Estimate Range										*55*		*8*		*5,500*
TOTAL -- Best Estimate										1,001		153		102,000
High End of Estimate Range										*1,279*		*196*		*130,250*
Low End of Estimate Range										*723*		*111*		*73,750*

Notes

1. From Table C
2. From Table F
3. From Table **E**
4. From Table F
5. From Table H
6. 0.153 for Class I facility, 0.096 for Class II facility
7. 172.8 for facilities maintained year-round, 146.5 for facilities without snow removal.
8. Maximum Feasible Drive-to-trail demand from Table F considers reductions for grade, continuity, recreational value, etc.

TABLE N: Martis Valley Trail Bicycle and Pedestrian Use Model - Future Conditions - South of Northstar Village (M3)

Location	South of Northstar Village
Scenario	2025 Railyard Land uses
Analyst	JHB

Corridor	Maximum Feasible Demand		Use Factor -- Reduction from Maximum (5): Class	Grade	Continuity	Maint-enance	Recre-ational Value	Conges-tion	Multi-plicative Total	Daily Use Estimate	Peak Hour Factor (6)	Peak Hour Use Estimate	Annual / Daily Factor (7)	Annual Use Estimate
BICYCLISTS														
Resident Bike to Facility	102	Note 1	0.00	0.40	0.00	0.00	0.00	0.06	0.44	57				
Visitor Bike to Facility	402	Note 1	0.00	0.60	0.00	0.00	0.00	0.03	0.61	156				
Bicyclists Drive to Facility	68	Note 2	Methodology considers reduction categories. (8)						0.00	68				
Total -- Best Estimate										281	0.153	43	102.0	29,000
High End of Estimate Range										*351*		*54*		*36,250*
Low End of Estimate Range										*211*		*32*		*21,750*
PEDESTRIANS														
Resident Walk to Facility	37	Note 3	--	0.20	0.00	0.00	0.00	0.05	0.24	28				
Visitor Walk to Facility	62	Note 3	--	0.36	0.00	0.00	0.00	0.03	0.38	38				
Pedestrians Drive to Facility	14	Note 4	--	Methodology considers reduction categories. (8)					0.00	14				
Total -- Best Estimate										80	0.153	12	102.0	8,000
High End of Estimate Range										*120*		*18*		*12,000*
Low End of Estimate Range										*40*		*6*		*4,000*
TOTAL -- Best Estimate										361		55		37,000
High End of Estimate Range										*471*		*72*		*48,250*
Low End of Estimate Range										*251*		*38*		*25,750*

Notes
1. From Table C
2. From Table F
3. From Table E
4. From Table F
5. From Table H
6. 0.153 for Class I facility, 0.096 for Class II facility
7. 172.8 for facilities maintained year-round, 146.5 for facilities without snow removal.
8. Maximum Feasible Drive-to-trail demand from Table F considers reductions for grade, continuity, recreational value, etc.

TABLE O: Summary of Martis Valley Trail Use Estimates

	Analysis Location		
	M1: South of Shaffer Mill Rd	M2: North of Northstar	M3: South of Northstar
Existing			
Busy Summer Day Total Use			
Bicyclists	262	338	161
Pedestrians	23	90	62
Total	285	428	202
Total Annual Use	29,000	43,000	20,000
2025			
Busy Summer Day Total Use			
Bicyclists	1,094	891	281
Pedestrians	62	110	80
Total	1,185	1,001	361
Total Annual Use	121,000	102,000	37,000

APPENDIX E2

Martis Valley Trail Access Intersection Analysis

TRANSPORTATION CONSULTANTS, INC.

TRANSPORTATION PLANNING AND TRAFFIC ENGINEERING CONSULTANTS

2690 Lake Forest Road, Suite C
Post Office Box 5875
Tahoe City, California 96145
(530) 583-4053   FAX: (530) 583-5966
info@lsctahoe.com • www.lsctrans.com

MEMORANDUM

Date: December 20, 2011

TO: Wally Auerbach, PE, Auerbach Engineering

FROM: Gordon Shaw, PE, AICP and Jason Briedis, EIT, LSC

RE: Martis Valley Trail Access Intersection Analysis

The Martis Valley Trail is proposed to run approximately 9.3 miles from the west side of State Route (SR) 267 at the Nevada/Placer County line on the north to the “Four Corners” intersection along the “Fiberboard Freeway” on the south. The project will include a new trailhead with parking proposed to be located in the western quadrant of the SR 267/Truckee Tahoe Airport Road/Schaffer Mill Road intersection. A single access point to the parking area is proposed along Schaffer Mill Road approximately 300 feet southwest of its intersection with SR 267. The trail will also be accessible from the existing Wildlife Viewing Area (WVA) and parking lot, located to the south along SR 267 and within the Martis Creek Lake National Recreation Area. The Martis Valley Trail project does not propose any improvements to the existing WVA parking area.

Key issues in the evaluation of the project are the traffic conditions at the intersection formed by the driveway of the proposed trailhead location along Schaffer Mill Road and traffic conditions at the WVA. This memo discusses the traffic impacts pertaining to the proposed trailhead access intersection on Schaffer Mill Road and the existing intersection of the WVA access intersection on SR 267, including safety, driver sight distance, traffic volumes, level of service, and the potential need for turn lanes on SR 267.

PROPOSED TRAILHEAD PARKING AREA EVALUATION

The Martis Valley Trail trailhead parking has been proposed to be located in the western quadrant of the SR 267/Schaffer Mill Road/Truckee Tahoe Airport Road intersection. The parking area is proposed to have one access onto Schaffer Mill Road, located approximately 300 feet southwest of its intersection with SR 267. This section provides an evaluation of the traffic issues involving the intersection formed by the parking access driveway with Schaffer Mill Road, including intersection sight distance and intersection LOS.

Existing Conditions

Schaffer Mill Road is a two-lane roadway with bike lanes in the shoulders and a posted speed limit of 45 mph. At its intersection with SR 267, Schaffer Mill Road has an additional lane added to provide a right-turn lane, a shared thru-left-turn lane, and one departure lane. The proposed intersection with the parking access driveway would be located near the beginning of transition of this right turn lane.

Traffic Volumes

Traffic volumes on Schaffer Mill Road are based on intersection turning movements counts conducted at the SR 267/Schaffer Mill Road/Truckee Tahoe Airport Road intersection in August of 2009. The counts have been adjusted for the design day (10^{th} highest peak hour) and traffic growth. Based on these counts, the summer peak hour traffic volumes along Schaffer Mill Road at the proposed access point are 227 northeastbound and 69 southwestbound.

Proposed Conditions

Traffic volumes at the proposed Martis Valley Trailhead access are estimated based on the Martis Valley Trail Use Forecast Memo (LSC Transportation Consultants, 2010). Based on the trail usage forecasts, up to 11 vehicles would be parked at the proposed trailhead location. It is conservatively assumed that all 11 vehicles will generate both one inbound and one out bound trip during the peak hour. This estimate is considered to be conservative as most trail users parking at the trailhead will remain parked for longer than one hour. It is assumed that 10 inbound and 10 outbound trips will travel through the SR 267/Schaffer Mill Road/Truckee Tahoe Airport Road intersection and 1 inbound and 1 outbound trip will have an origin/destination to the west along Schaffer Mill Road.

Level of Service (LOS Analysis)

The Level Of Service (LOS) at the proposed driveway intersection with Schaffer Mill Road was analyzed using the *Highway Capacity Software* (HCS) (McTrans, 2003), which applies the methodologies specified in the Highway Capacity Manual 2000 (HCM 2000) (Transportation Research Board, 2000). The results of the analysis indicate that an adequate LOS B would be provided for vehicles exiting the driveway onto Schaffer Mill Road. Due to the minimal amount of traffic generated by the parking area in any one hour, it is concluded that LOS at the SR 267/Schaffer Mill Road/Truckee Tahoe Airport Road intersection would not be affected.

Turn Lane Warrant Evaluation

Due to the low volume of through traffic on Schaffer Mill Road and the low volume of traffic generated by the proposed trailhead parking access, left- and right-turn lanes would not be warranted along Schaffer Mill Road at the proposed Martis Valley trailhead access location. A detailed discussion of turn lane warrants is included in a later section of this memorandum.

Intersection Sight Distance

Sight distance is an important design criterion when designing and evaluating a driveway location. Drivers preparing to enter a roadway from a driveway or intersection must be able to see and react to oncoming traffic in both directions in a safe manner. There are two types of sight distance criteria to consider at new driveway locations: stopping sight distance and corner sight distance. Stopping sight distance is the minimum distance required by the driver of a vehicle to bring his vehicle to a stop after an object on the road becomes visible. This is the minimum distance needed for a driver approaching the driveway intersection on the main roadway to see an object in their travel path (such as a vehicle exiting the project site) and safely come to a stop. Corner sight distance is the minimum distance that a driver waiting at a cross street (such as the site driveway) should be able to see in either direction along the main roadway in order to accurately identify an acceptable gap in through traffic. A clear line of sight should be maintained between the driver pulling out of the minor street and any approaching vehicle on the major street. The *Caltrans Highway Design Manual* specifies minimum stopping and corner sight distance requirements as a function of roadway design speed.

Corner sight distance should be provided for vehicles exiting the driveway onto Schaffer Mill Road. The Caltrans Design Manual specifies that the minimum corner sight distance for a roadway with a design speed of 45 mph is 495 feet. Adequate corner sight distance is provided for drivers looking to the south. However sight distance to the northeast would be restricted by the existing topography and horizontal curvature of Schaffer Mill Road. It is reasonable to assume a slower design speed for southwestbound traffic on Schaffer Mill Road due to the intersection of SR 267. Using a design speed of 35 mph, 385 feet of corner sight distance should be provided. According to the Caltrans design manual, minimum corner sight distance for a private roadway should be the stopping sight distance. Stopping sight distance for 35 mph is 250 feet.

It is recommended that with construction of proposed parking area, that the hillside be modified so that a minimum of 385 feet of corner sight distance is provided looking to the northeast for a driver turning out of the proposed driveway. This distance is measured from the eye location of the driver waiting to make this left-turn movement from the driveway onto Schaffer Mill Road, which is assumed to be 3.5 feet above the pavement and 15 feet off of the existing fog line to an object 4.25 feet above the roadway surface in the center of the travel lane. Depending on final design, this probably will require removal of some of the existing low hill along the northwest side of Schaffer Mill Road between the driveway location and SR 267.

EXISTING WILDLIFE VIEWING AREA INTERSECTION AND PARKING AREA EVALUATION

This section provides a review of traffic conditions at the existing intersection of SR 267 and the Wildlife Viewing Area in Martis Valley. Although the plans for the Martis Valley Trail do not include improvements to this intersection, it should be noted that potential trail users will make use of this facility to access the Martis Valley Trail due to its convenient location along the trail.

Existing Conditions

SR 267 is the primary highway connecting the Town of Truckee with Kings Beach and the North Shore of Lake Tahoe. Through Martis Valley, SR 267 has a two-lane cross section with one travel lane for each direction of travel. The posted speed limit is 55 mph

Traffic Volumes

The summer (July and August) Average Daily Traffic volume on SR 267 is 14,400. This figure is based on the Caltrans Traffic Census Station located on SR 267, immediately north of the intersection of Brockway Road/Soaring Way – this is the closest such count station to Martis Valley. Existing peak-hour traffic volumes on SR 267 for the level of service and turn lane warrant analyses are based on 2009 summer intersection turning movement counts conducted at the intersection of SR 267 / Northstar Drive and SR 267 / Airport Road / Schaffer Mill Road. Adjusted to represent peak summer conditions, the counts indicate that there are 686 northbound and 740 southbound vehicles on SR 267 in the PM peak hour through Martis Valley.

Site Driveway

Traffic volumes at the existing Wildlife View Area driveway are based on usage numbers provided by the US Army Corps of Engineers for the fiscal year 2010. The traffic volumes maintained by the Corps of Engineers are provided as the monthly aggregate total of two-way traffic entering and exiting the driveway. The peak month, which occurred in June, had a total two-way traffic volume of 3,417. Dividing this figure by 30 results in the average daily two-way traffic volume of 114. In order to provide a conservative analysis, it is necessary to consider a busy day. In order to estimate a busy day, the average daily traffic volume was increased by 50 percent to 171 two-way vehicles. Based on trail surveys conducted along the Truckee River Trail between Tahoe City and Squaw Valley, the peak hour of trail usage accounts for approximately 15 percent of the total daily trail usage. This results in a peak hour volume of 26 vehicles (13 entering and 13 exiting). Based on the distribution of population in the vicinity, it is estimated that 75 percent of these trips will have an origin/destination to the north and that 25 percent will have an origin/destination to the south.

Safety and Sight Distance Evaluation

Speed Survey

A speed survey was conducted on SR 267 at the existing access point for the Wildlife Viewing area. The speed survey was conducted during the afternoon of Wednesday, June 15, 2011. The weather on this day was sunny and warm with dry road conditions. In compliance with the procedure outlined in the Caltrans Traffic Manual, 100 speed observations were collected for each direction of travel. Averaged over both directions of travel, the median observed speed was 56 mph and the 85^{th}-percentile or critical speed was 60 mph.

Driver Sight Distance

The design speed along SR 267 is 60 mph (posted speed limit of 55 mph), which requires 580 feet of stopping sight distance and 660 feet of corner sight distance. The existing wildlife viewing area has corner sight distance up to 850 feet to the north and up to 900 feet to the south. Therefore, adequate stopping and corner sight distances are provided up to a design speed of 65 mph (660 feet and 715 feet, respectively). The area is located in a flat valley with no visual obstructions due to buildings, signs, or topography. The horizontal curve located along the proposed trailhead location does not restrict sight distance, as there are no visual obstructions located within the curve. A summary of the sight distance evaluation is provided in Table A.

Accident Data Analysis

Accident data were obtained and reviewed from the Statewide Integrated Traffic Records System (SWITRS), which is maintained by the California Highway Patrol (CHP). Data were obtained for the segment of SR 267 from 0.5 miles north of the intersection of Martis Dam Road through 0.5 miles south of the intersection with the Wildlife Viewing Area. Records were reviewed for the ten-year period beginning March 1, 2000 through February 28, 2010. A summary of the accident data analysis is provided in Table B.

Average accident rates for the roadway segment were calculated per Million Vehicle-Miles (MVM) traveled over the roadway segment. Based on Caltrans traffic volume data on SR 267 south of the intersection of Truckee Airport Road, approximately 52.13 MVM were traveled over the ten-year period from 2000 through 2009. As shown in Table B, a total of 29 collisions occurred over the analysis period resulting in an accident rate of 0.56 accidents per MVM. Compared to the statewide averages provided by Caltrans as shown in Table B, this segment of SR 267 has an accident rate that is 42 percent lower than the statewide average for similar roadways. Also as shown in Table B, the injury accident rate is also lower than that the statewide average for similar roadway types. No fatalities occurred on this portion of SR 267 over the analysis period.

Projected Traffic Volumes

Projected traffic volumes at the proposed trailhead location are estimated based on the *Martis Valley Trail Use Forecast Memo* (LSC Transportation Consultants, Inc., 2010). The memo states that during the peak hour of trail usage, 10 vehicles will be parked at the Wildlife Viewing Area Trailhead location. For the purpose of the level of service and turn lane warrant analyses, it is conservatively assumed that all 10 of these vehicles will generate one inbound and one outbound trip during the peak hour. This scenario is considered to be conservative because the majority of drive-to-trail users will occupy a parking space for longer than one hour, and therefore they will not all generate both an inbound and an outbound vehicle-trip during the peak hour of SR 267 traffic.

Trip Distribution and Assignment

Consistent with the Martis Valley Trail Use Forecast Memo, trailhead vehicle-trips are distributed 85 percent to SR 267 to/from the north and 15 percent to SR 267 to/from the south. Appling these percentages yields 8 outbound left-turn, 2 outbound right-turns, 2 northbound left-turns from SR 267 and 8 southbound right-turns from SR 267 in the peak hour.

Intersection Level of Service Analysis

The intersection is located on a Caltrans facility within unincorporated Placer County. The Placer County portion of SR 267, outside of the Tahoe Regional Planning Agency (TRPA) area, has a LOS standard of "E".

Adding the estimated traffic volumes at the proposed driveway location to the existing through traffic volumes on SR 267 and existing turning traffic from the Wildlife Viewing area would result in a driveway LOS of "D." The intersection would therefore attain standards. The LOS calculations are provided in the appendix.

Turn Lane Warrant Analysis

The need for turn lanes at uncontrolled intersections along Caltrans state highway is governed by the *California Highway Design Manual* (6th, Edition, Caltrans, 2006-2007), which specifies that the guideline for turn lanes are found in the *Guidelines for Reconstruction of Intersections* (California Division of Transportation Operations, 1985). Left-turn lane warrants are defined by volumes thresholds of opposing traffic versus advancing traffic and based on the percentage of left-turns in the approaching traffic volume.

Left-Turn Lane Warrant Evaluation

Caltrans District 3 employs a left-turn lane warrant "point" methodology, which was evaluated as part of this analysis. This methodology indicates a total of 2.6 points, with a minimum threshold value of 20.0 needed to warrant a left turn lane. The results indicate that a left-turn lane is not warranted. The Left-Turn Channelization Guideline worksheet is included in the appendix. In addition, a review of ten years of crash data at the SR 267/WVA intersection indicates that a left turn-lane is not necessary for existing safety deficiencies at this location.

Right-Turn Lane Warrant Evaluation

The Guidelines for Reconstruction of Intersections published by Caltrans states the following with regards to right turn lanes:

> *"Numerical warrants for the inclusion of right-turn lanes are not available. Engineers generally rely on capacity analysis and accident experience when considering right-turn lanes. On reconstruction projects in rural areas, frequent high speed rear-end accidents involving the right turning vehicles may warrant the addition of a right-turn lane."*

A review of ten years of accident data at the intersection indicates no more than two accidents that may have involved right-turning vehicles. This indicates that there is not a pattern of frequent accidents. In addition, there is no level of service issue at the intersection that indicates a lack of capacity that could be addressed by provision of a right turn lane. Therefore, it is concluded that a right turn lane is not warranted.

Conclusion and Recommendations

Based upon the analysis presented above, the following conclusions and recommendations can be made:

- The proposed trailhead parking location on Schaffer Mill Road is a feasible option (with regards to traffic considerations), so long as adequate corner sight distance is provided to northeast for drivers exiting the parking lot onto Schaffer Mill Road. This would probably require some removal of the existing low hill along the northwest side of the roadway.

- The proposed trailhead parking location on Schaffer Mill Road would not degrade LOS at the SR 267/Schaffer Mill Road/Truckee Tahoe Airport Road intersection. Good LOS would be provided at the proposed driveway location on Schaffer Mill Road.

- The current wildlife viewing area generates up to 13 inbound plus 13 outbound vehicle-trips in a busy peak hour. Providing access to the Martis Valley trailhead would add an additional 10 inbound plus 10 outbound vehicle-trips per hour. With the project, therefore, the access driveway would serve up to 23 inbound plus 23 outbound vehicle-trips per hour during periods of peak trail usage.

- An LOS of “D” can be expected for drivers exiting onto SR 267 with the proposed trailhead during the peak hour. This attains applicable LOS standards.

- The 85^{th}-percentile speed on SR 267 near the existing Wildlife Viewing area is 60 mph.

- Sight distance at the existing Wildlife Viewing area meets Caltrans Design standards for a design speed of 65 mph.

- Accident rates along SR 267 in the vicinity of the proposed trailhead access point are 42 percent lower than statewide averages for roadways with similar characteristics. It can therefore be concluded that the roadway does not have an unduly high accident potential.

- The sight distance evaluation and accident history analysis indicate that left- and right-turn lanes on SR 267 would not be necessary at the WVA intersection.

Attachments: Tables A-B
Appendix

TABLE A: Martis Valley Trail Access - Sight Distance Evaluation

Location	Direction	Sight Distance (ft)	Standard [1] (ft)	Standard Attained?
WVA	To North	850	715	Yes
	To South	900	715	Yes

Note 1: At 65 mph Design Speed.

Martis Trail Intersection.xls

TABLE B: Accident Data on SR 267 in Martis Valley

		Number of Accidents (10 years) [1,2,3]				Victims		Annualized Rates		
Location	MVM	Total	PDO	Injury	Fatality	Injured	Killed	Accidents/ MVM	F+I/MVM	Fatalities/ 100MVM
SR 267, Martis Valley	52.13	29	19	10	0	12	0	0.56	0.19	0
Caltrans 2009 Collision Data on California State Highways [4]										
California Roadways										
Rural (Outside City) 2 & 3 Lane	11,509	11,133	5,966	4,895	272	7,439	304	0.97	0.45	2.64
Statewide 2 & 3 Lane	14,610	15,342	8,441	6,584	317	9,928	352	1.05	0.47	2.41
Statewide Total	176,461	142,221	93,389	47,673	1,159	69,964	1,303	0.81	0.28	0.74
Placer County Roadways										
Rural (Outside City) 2 & 3 Lane	264	217	134	81	2	124	2	0.82	0.31	0.76
Countywide Total	1,764	1,380	926	446	8	678	9	0.78	0.26	0.51

MVM = Million Vehicle-Miles for roadways and Million Vehicle-Movements for intersections.

Note 1: Accident data obtained from SWITRS.

Note 2: Accident data represents all collisions between 0.5 miles north of Martis Dam Road through 0.5 miles south of the Wildlife Viewing Area access roadway.

Note 3: Accident data represents the ten-year period beginning March 1, 2000 through February 28, 2010.

Note 4: Source of Data: "2009 Collision Data on California State Highways (road miles, travel, collisions, collision rates)", Caltrans, 2011.

Canyon Springs 2011.xls

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	JHB	Intersection	
Agency/Co.	LSC	Jurisdiction	Placer County
Date Performed	12/9/2011	Analysis Year	
Analysis Time Period			
Project Description			
East/West Street: Schaffer Mill Road		North/South Street: Martis Valley Trail Access	
Intersection Orientation: East-West		Study Period (hrs): 0.25	

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	1	227	0	0	69	10
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate (veh/h)	1	252	0	0	76	11
Proportion of heavy vehicles, P_{HV}	0	--	--	0	--	--
Median type	Undivided					
RT Channelized?			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	0	0	0	10	0	1
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate (veh/h)	0	0	0	11	0	1
Proportion of heavy vehicles, P_{HV}	0	0	0	0	0	0
Percent grade (%)		0			0	
Flared approach		N			N	
Storage		0			0	
RT Channelized?			0			0
Lanes	0	0	0	0	0	0
Configuration					LR	

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
Volume, v (vph)	1						12	
Capacity, c_m (vph)	1522						681	
v/c ratio	0.00						0.02	
Queue length (95%)	0.00						0.05	
Control Delay (s/veh)	7.4						10.4	
LOS	A						B	
Approach delay (s/veh)	--	--				10.4		
Approach LOS	--	--				B		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*JHB*	Intersection	
Agency/Co.	*LSC*	Jurisdiction	*Placer County*
Date Performed	*12/9/2011*	Analysis Year	
Analysis Time Period			
Project Description			
East/West Street:	*Martis Valley Trail Access*	North/South Street:	*SR 267*
Intersection Orientation:	*North-South*	Study Period (hrs):	*0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	*5*	*686*	*0*	*0*	*740*	*18*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR	*5*	*745*	*0*	*0*	*804*	*19*
Percent Heavy Vehicles	*0*	--	--	*0*	--	--
Median Type	*Undivided*					
RT Channelized			*0*			*0*
Lanes	*1*	*1*	*0*	*0*	*1*	*1*
Configuration	*L*	*T*			*T*	*R*
Upstream Signal		*0*			*0*	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	*0*	*0*	*0*	*18*	*0*	*5*
Peak-Hour Factor, PHF	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*	*0.92*
Hourly Flow Rate, HFR	*0*	*0*	*0*	*19*	*0*	*5*
Percent Heavy Vehicles	*0*	*0*	*0*	*0*	*0*	*0*
Percent Grade (%)	*0*			*0*		
Flared Approach		*N*			*N*	
Storage		*0*			*0*	
RT Channelized			*0*			*0*
Lanes	*0*	*0*	*0*	*0*	*0*	*0*
Configuration					*LR*	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	*L*						*LR*	
v (vph)	*5*						*24*	
C (m) (vph)	*816*						*144*	
v/c	*0.01*						*0.17*	
95% queue length	*0.02*						*0.58*	
Control Delay	*9.4*						*34.9*	
LOS	*A*						*D*	
Approach Delay	--	--				*34.9*		
Approach LOS	--	--				*D*		

Calculated by DHB / LSC Date 12/16/2011 Co.-Rte.-P.M. ______

Applicant ______ Permit No. ______

LEFT TURN CHANNELIZATION ~~WARRANTS~~ GUIDELINE
(TWO-LANE ROADS ONLY)

WARRANTS: POINTS

(A) MAINLINE ADT 14400 x 0.001 Existing Plus Project = 14.40

(B) ANTICIPATED DAILY LEFT TURNS

Type Land Use	Type Devel.	Trips Gen. (IN)		% Left Turns		Left Turns		
REC	REC	47	x	20%	=	10	x 0.01 =	0.10

(C) PREVAILING SPEED FACTOR 1.49 + GRADE CORRECTION 0 = 1.49

SPEED FACTORS		CORRECTION FOR GRADE					
		UPGRADE			DOWNGRADE		
<30 MPH*	1.00	3-4%	5-6%	7-8%	3-4%	5-6%	7-8%
30	1.18	-	-.01	-.02	+.01	+.02	+.03
35 40	1.23 1.26	-.01	-.02	-.03	+.01	+.03	+.05
45 50	1.30 1.34	-.02	-.03	-.05	+.02	+.05	+.08
55 60	1.38 1.49	-.03	-.05	-.08	+.03	+.08	+.11

*No corr. factor for <30 MPH

NOTE: If sight distance or width is the major factor, consider cost to improve sight distance or width in lieu of channelization.

(D) SIGHT DISTANCE - VERTICAL OR HORIZONTAL

DISTANCE	D FACTORS	DISTANCE	D FACTORS
500'	1.00	300' - 400'	1.20
400' - 500'	1.05	200' - 300'	1.40

= 1.00

(E) WIDTH - Paved or unpaved - Available traversable (one way)

WIDTH	E FACTORS	WIDTH	E FACTORS
12'	1.35	20'	1.00
14'	1.20	22'	0.95
16'	1.10	24'	0.85
18'	1.05	26' or more	0.70

= 1.10

(F) TRAFFIC BRANCH JUDGEMENT FACTOR ITEMS TO BE CONSIDERED
Total to range between 0.75 - 1.25

- ☐ Accidents
- ☐ % large vehicles
- ☐ Adverse climate (snow-ice-fog)
- ☒ % unfamiliar with road — 1.1
- ☐ Pedestrian traffic
- ☐ Conflicts
- ☐ Lighting
- ☐ Future development
- ☐ Other ______

= 1.10

(A) 14.40 x (B) 0.10 x (C) 1.49 x (D) 1.00 x (E) 1.10 x (F) 1.10 = $\boxed{2.60}$

WARRANTS:
- ☐ Use 15 points for Low Cost (Paint only)
- ☒ Use 20 points for Medium Cost (Flat terrain - Minor grade - base - pave)
- ☐ Use 25 points for High Cost (Steep terrain - Major grade - base - pave)

CHANNELIZATION IS ☐ IS NOT ☒ REQUIRED.

APPENDIX E3

Martis Valley Trail Parking Alternative Access Intersections Analysis

TRANSPORTATION CONSULTANTS, INC.

TRANSPORTATION PLANNING AND TRAFFIC ENGINEERING CONSULTANTS

2690 Lake Forest Road, Suite C
Post Office Box 5875
Tahoe City, California 96145
(530) 583-4053 FAX: (530) 583-5966
info@lsctahoe.com • www.lsctrans.com

MEMORANDUM

Date: March 13, 2012

TO: Wally Auerbach, PE, Auerbach Engineering

FROM: Gordon Shaw, PE, AICP and Jason Briedis, EIT, LSC

RE: Martis Valley Trail Parking Alternative Access Intersections Analysis

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The Martis Valley Trail is proposed to run approximately 9.3 miles from the west side of State Route (SR) 267 at the Nevada/Placer County line on the north to the "Four Corners" intersection along the "Fiberboard Freeway" on the south. The project will include a new trailhead with interpretive information and trail user parking. There are four locations proposed for the location of the trailhead, all located near to the northern terminus of the trail. The proposed trailhead locations are:

1. Southwest of the Truckee Donner Veterinary Hospital, accessed through the veterinary hospital parking directly from SR 267 (Parking Alternative Number 1)

2. North side of Schaffer Mill Road, approximately 860 feet southwest of SR 267 (Parking Alternative Number 2)

3. The western quadrant of the SR 267/Schaffer Mill Road/Truckee-Tahoe Airport Road intersection, accessed from Schaffer Mill Road approximately 275 feet southwest of the intersection (Parking Alternative Number 3)

4. Along the west side of SR 267, 400 feet south of Martis Creek Road (Parking Alternative Number 4)

Key issues in the evaluation of the project are the traffic conditions at the intersection created by the driveway of the selected proposed trailhead location with its corresponding roadway. This memo discusses the traffic impacts pertaining to each of the proposed trailhead access intersection locations including safety, driver sight distance, traffic volumes, level of service, and the potential need for turn lanes.

PARKING ALTERNATIVE NUMBER 1 – SOUTHWEST OF THE TRUCKEE DONNER VETERINARY HOSPITAL, ACCESSED THROUGH THE VETERINARY HOSPITAL PARKING DIRECTLY FROM SR 267

Parking Alternative Number 1 is proposed to be located behind the Donner Truckee Veterinary Hospital, which is located along SR 267 south of the Town of Truckee limits and between the two respective traffic signals at Schaffer Mill Road and Brockway Road. This parking location would be accessed from SR 267 through the veterinary hospital parking lot.

Existing Conditions

Through the study area, SR 267 is a two-lane highway with a posted speed limit of 55 mph. The site access driveway for the veterinary hospital is located directly across from the access roadway for the Airport Storage facility. These two accesses form a 4-way intersection with SR 267. There are no turn lanes present along SR 267 at this intersection and there no restrictions on turning movements. Traffic conditions including Level Of Service (LOS) and intersection sight distance at this intersection were evaluated in the *Donner Truckee Veterinary Hospital Redevelopment Traffic Impact Study* (LSC Transportation Consultants, 2007) (DTVH TIS). Portions of this analysis reference that study.

<u>Traffic Volumes</u>

Traffic volumes on SR 267 are based on intersection turning movement counts conducted at the SR 267/Schaffer Mill Road/Truckee Tahoe Airport Road intersection in August of 2009. The counts have been adjusted for the design day (10th highest peak hour) and traffic growth. Based on these counts, the summer peak hour traffic volumes along SR 267 at the access point intersection are 750 northbound and 685 southbound. As there are no access points on SR 267 between the intersection and the driveway location, traffic volumes at the location of the proposed access location are equal to traffic volumes at the intersection.

Average daily traffic (ADT) count data are provided by Caltrans for state highways. SR 267 at the Nevada/Placer county line has a peak month ADT of 16,200 and an annualized average daily traffic count (AADT) of 12,500. These data represent 2010 counts, which are most recent data available at the time of this report. Traffic volumes at the proposed access intersection are based on traffic counts for the DTVH TIS.

Projected Traffic Volumes

Projected traffic volumes at the proposed trailhead location are estimated based on the *Martis Valley Trail Use Forecast Memo* (LSC Transportation Consultants, Inc., December 2011). The memo states that during the peak hour of trail usage, 11 vehicles will be parked at the proposed trailhead alternative location near Schaffer Mill Road. For the purpose of the level of service and turn lane warrant analyses, it is conservatively assumed that all 11 of these vehicles will generate one inbound and one outbound trip during the peak hour. This scenario is considered to be conservative because the majority of drive-to-trail users will occupy a parking space for longer than one hour and therefore they will not all generate both an inbound and an outbound vehicle-trip during the peak hour of SR 267 traffic.

Trip Distribution and Assignment

Consistent with the *Martis Valley Trail Use Forecast Memo*, trailhead vehicle-trips are distributed 85 percent to SR 267 to/from the north and 15 percent to SR 267 to/from the south. Appling these percentages yields 9 outbound left-turn onto SR 267, 2 outbound right-turns onto SR 267, 2 northbound left-turns from SR 267 and 9 southbound right-turns from SR 267 in the peak hour.

Proposed Development of DTVH Site

The DTVH site has an approved development project that would add retail and office floor space to the site. A full discussion of the trip generation and trip distribution for the proposed project is available in the DTVH TIS. The additional traffic volumes generated by the buildout of the approved project were included in this analysis.

Intersection Level of Service Analysis

The intersection is located on a Caltrans facility within unincorporated Placer County. The Placer County portion of SR 267, outside of the Tahoe Regional Planning Agency (TRPA) area, has a LOS standard of "E".

The driveway intersection is shown to currently operate at LOS E with existing land uses. Adding the estimated traffic volumes at the proposed driveway location to the existing through traffic volumes on SR 267 and existing turning traffic from the DTVH and Airport Storage Facility would result in a driveway LOS of "F" for outbound left-turns from the DTVH access. The intersection would therefore fail to attain standards. The LOS calculations are provided in the appendix.

Turn Lane Warrant Analysis

The need for turn lanes at uncontrolled intersections along Caltrans state highway is governed by the *California Highway Design Manual* (6th, Edition, Caltrans, 2006-2007), which specifies that the guideline for turn lanes are found in the *Guidelines for Reconstruction of Intersections* (California Division of Transportation Operations, 1985). Left-turn lane warrants are defined by volumes thresholds of opposing traffic versus advancing traffic and based on the percentage of left-turns in the approaching traffic volume.

Left-Turn Lane Warrant Evaluation

Caltrans District 3 employs a left-turn lane warrant "point" methodology, which was evaluated as part of this analysis. This methodology indicates a total of 19.8 points, with a minimum threshold value of 20.0 needed to warrant a left turn lane. The results indicate that a left-turn lane is not warranted. The Left-Turn Channelization Guideline worksheet is included in the appendix.

Right-Turn Lane Warrant Evaluation

The Guidelines for Reconstruction of Intersections published by Caltrans states the following with regards to right turn lanes:

> *"Numerical warrants for the inclusion of right-turn lanes are not available. Engineers generally rely on capacity analysis and accident experience when considering right-turn lanes. On reconstruction projects in rural areas, frequent high speed rear-end accidents involving the right turning vehicles may warrant the addition of a right-turn lane."*

A review of ten years of accident data indicates no pattern of frequent accidents associated with southbound right-turning vehicles. In addition, there is no level of service issue at the intersection that indicates a lack of capacity that could be addressed by provision of a right turn lane. Therefore, it is concluded that a right turn lane is not warranted.

Intersection Sight Distance

Driver sight distance is an important design criterion when designing and evaluating a driveway location. Drivers preparing to enter a roadway from a driveway or intersection must be able to see and react to oncoming traffic in both directions in a safe manner. There are two types of sight distance criteria to consider at new driveway locations: stopping sight distance and corner sight distance. Stopping sight distance is the minimum distance required by the driver of a vehicle to bring his vehicle to a stop after an object on the road becomes visible. This is the minimum distance needed for a driver approaching the driveway intersection on the main roadway to see an object in their travel path (such as a vehicle exiting the project site) and safely come to a stop. Corner sight distance is the minimum distance that a driver waiting at a cross street (such as the site driveway) should be able to see in either direction along the main roadway in order to accurately identify an acceptable gap in through traffic. A clear line of sight should be maintained between the driver pulling out of the minor street and any approaching vehicle on the major street. This distance is measured from the eye location of the driver waiting to make a turn maneuver from a side street or driveway location, which is assumed to be 3.5 feet above the pavement and 15 feet off of the existing fog line to an object 4.25 feet above the roadway surface in the center of the travel lane. The *Caltrans Highway Design Manual* specifies minimum stopping and corner sight distance requirements as a function of roadway design speed. The DTVH TIS states that: "Adequate driver sight distance is provided at the proposed driveway location. Therefore, no sight distance mitigation measures are necessary."

PARKING ALTERNATIVE NUMBER 2 – NORTH SIDE OF SCHAFFER MILL ROAD, 860 FEET WEST-SOUTHWEST OF SR 267/SCHAFFER MILL ROAD/TRUCKEE TAHOE AIRPORT ROAD INTERSECTION

Parking Alternative Number 2 for the Martis Valley Trail trailhead parking is located along the northwest side of Schaffer Mill Road. The parking area is proposed to have one access onto Schaffer Mill Road, located approximately 860 feet west-southwest of the Schaffer Mill Road/Truckee Tahoe Airport Road intersection.

Existing Conditions

Schaffer Mill Road is a two-lane roadway with bike lanes in the shoulders and a posted speed limit of 45 mph. At its intersection with SR 267, Schaffer Mill Road has an additional lane added to provide a right-turn lane, a shared thru-left-turn lane, and one departure lane.

Traffic Volumes

Traffic volumes on Schaffer Mill Road are based on intersection turning movements counts conducted at the SR 267/Schaffer Mill Road/Truckee Tahoe Airport Road intersection in August of 2009. The counts have been adjusted for the design day (10^{th} highest peak hour) and traffic growth. Based on these counts, the summer peak hour traffic volumes along Schaffer Mill Road at the proposed access point are 227 northeastbound and 69 southwestbound. As there are no access points on Schaffer Mill Road between the intersection and the proposed driveway location, traffic volumes at the location of the proposed access location are equal to traffic volumes at the intersection.

Projected Traffic Volumes

Traffic volumes at the proposed Martis Valley Trailhead access are estimated based on the *Martis Valley Trail Use Forecast Memo*. Based on the trail usage forecasts, up to 11 vehicles would be parked at the proposed trailhead location. It is conservatively assumed that all 11 vehicles will generate both one inbound and one out bound trip during the peak hour. This estimate is considered to be conservative as most trail users parking at the trailhead will remain parked for longer than one hour. It is assumed that 10 inbound and 10 outbound trips will travel through the SR 267/Schaffer Mill Road/Truckee Tahoe Airport Road intersection and 1 inbound and 1 outbound trip will have an origin/destination to the west along Schaffer Mill Road.

Level of Service Analysis

The Level Of Service (LOS) at the Parking Alternative Number 2 driveway intersection with Schaffer Mill Road was analyzed using Highway Capacity Software. The results of the analysis indicate that an adequate LOS B would be provided for vehicles exiting the driveway onto Schaffer Mill Road. Due to the adequate existing LOS and the minimal amount of traffic generated by the parking area in any one hour, it is concluded that LOS at the SR 267/Schaffer Mill Road/Truckee Tahoe Airport Road intersection would not be affected.

Turn Lane Warrant Evaluation

Considering the low volume of through traffic on Schaffer Mill Road and the low volume of traffic generated by the proposed trailhead parking access left- and right-turn lanes would not be warranted along Schaffer Mill Road at this proposed Martis Valley trailhead access location.

Intersection Sight Distance

Corner sight distance should be provided for vehicles exiting the driveway onto Schaffer Mill Road. The Caltrans *Highway Design Manual* identifies different standards for sight distance based on the classification of the intersecting roadways. Schaffer Mill Road is a private roadway. The Caltrans *Highway Design Manual* specifies that the minimum corner sight distance for a roadway with a design speed of 45 mph is 495 feet; however according to Section 405.1(2)(c) of the Caltrans *Highway Design Manual* for “Private Road Intersections and Rural Driveways…. The minimum corner sight distance shall be equal to the stopping sight distance as given in Table 201.1, measured as previously described." Stopping sight distance for 45 mph is 360 feet.

This proposed access intersection would be located within a horizontal curve on Schaffer Mill Road. There are no topographical constraints to sight distance at this location. So long as vegetation does not grow to impede corner sight distance, adequate driver sight distance would be provided.

PARKING ALTERNATIVE NUMBER 3 – WESTERN QUADRANT OF SR 267/SCHAFFER MILL ROAD/TRUCKEE TAHOE AIRPORT ROAD INTERSECTION

Parking Alternative Number 3 for the Martis Valley Trail trailhead parking would be located in the western quadrant of the SR 267/Schaffer Mill Road/Truckee Tahoe Airport Road intersection. The parking area is proposed to have one access onto Schaffer Mill Road, located approximately 275 feet southwest of its intersection with SR 267.

Existing Conditions

The physical description of Schaffer Mill Road is consistent with the evaluation for Parking Alternative Number 2, which is located along Schaffer Mill Road further to the west. Schaffer Mill Road is a two-lane roadway with bike lanes in the shoulders and a posted speed limit of 45 mph. At its intersection with SR 267, Schaffer Mill Road has an additional lane on the southwest leg to provide a right-turn lane, a shared thru-left-turn lane, and one departure lane. This proposed intersection with the parking access driveway would be located near the beginning of the transition of this right turn lane.

Traffic Volumes

Traffic volumes on Schaffer Mill Road are based on intersection turning movements counts conducted at the SR 267/Schaffer Mill Road/Truckee Tahoe Airport Road intersection in August of 2009. The counts have been adjusted for the design day (10^{th} highest peak hour) and traffic growth. Based on these counts, the summer peak hour traffic volumes along Schaffer Mill Road at the proposed access point are 227 northeastbound and 69 southwestbound.

Projected Traffic Conditions

Traffic volumes at the proposed Martis Valley Trailhead access are estimated based on the *Martis Valley Trail Use Forecast Memo*. Based on the trail usage forecasts, up to 11 vehicles would be parked at the proposed trailhead location. It is conservatively assumed that all 11 vehicles will generate both one inbound and one out bound trip during the peak hour. This estimate is considered to be conservative as most trail users parking at the trailhead will remain parked for longer than one hour. It is assumed that 10 inbound and 10 outbound trips will travel through the SR 267/Schaffer Mill Road/Truckee Tahoe Airport Road intersection and 1 inbound and 1 outbound trip will have an origin/destination to the west along Schaffer Mill Road.

Level of Service Analysis

The Level Of Service (LOS) at the proposed driveway intersection with Schaffer Mill Road for Parking Alternative Number 3 is identical to the LOS analysis for Parking Alternative Number 2, as both Alternatives would create a similar intersection with Schaffer Mill Road with identical traffic volumes. The results of the analysis indicate that an adequate LOS B would be provided for vehicles exiting the driveway onto Schaffer Mill Road. Due to the minimal amount of traffic generated by the parking area in any one hour, it is concluded that LOS at the SR 267/Schaffer Mill Road/Truckee Tahoe Airport Road intersection would not be affected.

Turn Lane Warrant Evaluation

The turn lane warrant evaluation for Parking Alternative Number 3 is identical to that for Parking Alternative Number 2: left- and right-turn lanes would not be warranted along Schaffer Mill Road at the proposed Martis Valley trailhead access location.

Intersection Sight Distance

Corner sight distance should be provided for vehicles exiting the driveway onto Schaffer Mill Road. The Caltrans *Highway Design Manual* identifies different standards for sight distance based on the classification of the intersecting roadways. Schaffer Mill Road is a private roadway. The Caltrans *Highway Design Manual* specifies that the minimum corner sight distance for a roadway with a design speed of 45 mph is 495 feet. Adequate corner sight distance is provided for drivers looking to the southwest. However sight distance to the northeast would be restricted by the existing topography and horizontal curvature of Schaffer Mill Road. It is reasonable to assume a slower design speed for southwestbound traffic on Schaffer Mill Road due to the traffic signal at the intersection of SR 267. Using a design speed of 35 mph, 385 feet of corner sight distance would be provided under ideal conditions. However, due to topographical design constraints, less than ideal corner sight distance is proposed to be provided. According to Section 405.1(2)(c) of the Caltrans *Highway Design Manual* for “Private Road Intersections and Rural Driveways…. The minimum corner sight distance shall be equal to the stopping sight distance as given in Table 201.1, measured as previously described.” Stopping sight distance for 35 mph is 250 feet.

It is recommended that with construction of this parking area the hillside be modified so that a minimum of 250 feet of corner sight distance is provided looking to the northeast for a driver turning out of the proposed driveway. Depending on final design, this probably will require removal of some of the existing low hill along the northwest side of Schaffer Mill Road between the driveway location and SR 267.

PARKING ALTERNATIVE NUMBER 4 – ALONG THE WEST SIDE OF SR 267, 400 FEET SOUTH MARTIS CREEK ROAD

Parking Alternative Number 4 for the Martis Valley Trail trailhead parking has been proposed to be located along the west side of SR 267 approximately 400 feet south of the intersection with Martis Creek Road.

Existing Conditions

SR 267 is the primary highway connecting the Town of Truckee with Kings Beach and the North Shore of Lake Tahoe. Through Martis Valley, SR 267 has a two-lane cross section with one travel lane for each direction of travel. The posted speed limit is 55 mph

Traffic Volumes

The summer (July and August) Average Daily Traffic volume on SR 267 is 14,400. This figure is based on the Caltrans Traffic Census Station located on SR 267, immediately north of the intersection of Brockway Road/Soaring Way – this is the closest such count station to Martis Valley. Existing peak-hour traffic volumes on SR 267 for the level of service and turn lane warrant analyses are based on 2009 summer intersection turning movement counts conducted at the intersection of SR 267 / Northstar Drive and SR 267 / Airport Road / Schaffer Mill Road. Adjusted to represent peak summer conditions, the counts indicate that there are 686 northbound and 740 southbound vehicles on SR 267 in the PM peak hour through Martis Valley.

Projected Traffic Volumes

Projected traffic volumes at this proposed trailhead location are estimated based on the *Martis Valley Trail Use Forecast Memo*. The memo states that during the peak hour of trail usage, 10 vehicles would be parked near the Wildlife Viewing Area location, which would be located at this proposed Trailhead Parking Alternative location. For the purpose of the level of service and turn lane warrant analyses, it is conservatively assumed that all 10 of these vehicles will generate one inbound and one outbound trip during the peak hour. This scenario is considered to be conservative because the majority of drive-to-trail users will occupy a parking space for longer than one hour, and therefore they will not all generate both an inbound and an outbound vehicle-trip during the peak hour of SR 267 traffic.

Trip Distribution and Assignment

Consistent with the *Martis Valley Trail Use Forecast Memo*, trailhead vehicle-trips are distributed 85 percent to SR 267 to/from the north and 15 percent to SR 267 to/from the south. Appling these percentages yields 8 outbound left-turns, 2 outbound right-turns, 2 northbound left-turns from SR 267 and 8 southbound right-turns from SR 267 in the peak hour.

Intersection Level of Service Analysis

The intersection is located on a Caltrans facility within unincorporated Placer County. The Placer County portion of SR 267, outside of the Tahoe Regional Planning Agency (TRPA) area, has a LOS standard of "E". Adding the estimated traffic volumes at the proposed driveway location to the existing through traffic volumes on SR 267 would result in a driveway LOS of "D." The intersection would therefore attain standards. The LOS calculations are provided in the appendix.

Driver Sight Distance

As a basis for the sight distance analysis at this location, a speed survey was conducted on SR 267 at the existing access point for the Wildlife Viewing area. The speed survey was conducted during the afternoon of Wednesday, June 15, 2011. The weather on this day was sunny and warm with dry road conditions. In compliance with the procedure outlined in the Caltrans Traffic

Manual, 100 speed observations were collected for each direction of travel. Averaged over both directions of travel, the median observed speed was 56 mph and the 85th-percentile or critical speed was 60 mph. This indicates that an appropriate design speed for driver sight distance is 65 mph.

This proposed location of the new access point for the trailhead has greater than 1,000 feet of corner sight distance to both the north and the south. Therefore, sight distance requirements are satisfied for a design speed of 65 mph.

Turn Lane Warrant Analysis

The need for turn lanes at uncontrolled intersections along Caltrans state highway is governed by the *California Highway Design Manual* (6th, Edition, Caltrans, 2006-2007), which specifies that the guideline for turn lanes are found in the *Guidelines for Reconstruction of Intersections* (California Division of Transportation Operations, 1985). Left-turn lane warrants are defined by volumes thresholds of opposing traffic versus advancing traffic and based on the percentage of left-turns in the approaching traffic volume.

Left-Turn Lane Warrant Evaluation

Caltrans District 3 employs a left-turn lane warrant "point" methodology, which was evaluated as part of this analysis. This methodology indicates a total of 1.1 points, with a minimum threshold value of 20.0 needed to warrant a left turn lane. The results indicate that a left-turn lane is not warranted. The Left-Turn Channelization Guideline worksheet is included in the appendix. In addition, a review of ten years of crash data at the SR 267/WVA intersection indicates that a left turn-lane is not necessary for existing safety deficiencies at this location. As the WVA location is on the same side of SR 267 and very near to the proposed location for Parking Alternative Number 4, it is assumed that an access on SR 267 for Parking Alternative Number 4 would not generate a considerable safety concern.

Right-Turn Lane Warrant Evaluation

The Guidelines for Reconstruction of Intersections published by Caltrans states the following with regards to right turn lanes:

> *"Numerical warrants for the inclusion of right-turn lanes are not available. Engineers generally rely on capacity analysis and accident experience when considering right-turn lanes. On reconstruction projects in rural areas, frequent high speed rear-end accidents involving the right turning vehicles may warrant the addition of a right-turn lane."*

A review of ten years of accident data at the intersection indicates no more than two accidents that may have involved right-turning vehicles. This indicates that there is not a pattern of frequent accidents. In addition, there is no level of service issue at the intersection that indicates a lack of capacity that could be addressed by provision of a right turn lane. Therefore, it is concluded that a right turn lane is not warranted.

CONCLUSIONS AND RECOMMENDATIONS

Based upon the analysis presented above, the following conclusions and recommendations can be made:

- Parking Alternative Number 1 would cause the LOS at the existing DTVH driveway (with the buildout traffic volume of the Veterinary Hospital) to degrade to an unacceptable LOS F.
- The addition of traffic at the existing DTVH access for Parking Alternative Number 1 to the proposed full development traffic would not warrant the need for a left-turn lane on SR 267.
- Adequate driver sight distance is provided at the existing DTVH access driveway that would be used for Parking Alternative Number 1.
- The access driveway for Parking Alternative Number 2 would have LOS B and adequate corner sight distance, and would not require additional turn lanes.
- Parking Alternative Number 3 on Schaffer Mill Road is a feasible option (with regards to traffic considerations), so long as adequate corner sight distance is provided to northeast for drivers exiting the parking lot onto Schaffer Mill Road. This would probably require some removal of the existing low hill along the northwest side of the roadway.
- The two proposed trailhead parking locations on Schaffer Mill Road (Parking Alternative Numbers 2 and 3) would not degrade LOS at the SR 267/Schaffer Mill Road/Truckee Tahoe Airport Road intersection. Good LOS would be provided at the proposed driveway locations on Schaffer Mill Road.
- An LOS of “D” can be expected for drivers exiting onto SR 267 with the Parking Alternative Number 4 proposed trailhead access during the peak hour. This attains applicable LOS standards.
- Sight distance at the proposed driveway location for Parking Alternative Number 4 area meets Caltrans Design standards for a design speed of 65 mph.
- The sight distance evaluation and accident history analysis indicate that left- and right-turn lanes on SR 267 would not be necessary at the intersection created by an access point at Parking Alternative Number 4.

In summary, and considering only traffic-related factors, Parking Alternatives 2 and 4 are feasible alternatives with no improvements required beyond the access drive. Parking Alternative 3 is a feasible alternative, though it may require some removal of the existing low hill to the northwest off the access point along Schaffer Mill Road. Parking Alternative 1 is not considered to be feasible due to the poor (F) level of service that would result at the SR 267 / Veterinary Hospital access point intersection.

Attachment: Appendix

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	JHB	Intersection	
Agency/Co.	LSC	Jurisdiction	Placer County
Date Performed	3/12/2012	Analysis Year	
Analysis Time Period			
Project Description	With Martis Valley Trail Parking Alternative Number 1		
East/West Street:	DTVH Access Intersection	North/South Street:	SR 267
Intersection Orientation:	North-South	Study Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	3	750	6	6	685	13
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR	3	815	6	6	744	14
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	3	0	8	15	0	3
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR	3	0	8	16	0	3
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
v (vph)	3	6		11			19	
C (m) (vph)	862	817		196			97	
v/c	0.00	0.01		0.06			0.20	
95% queue length	0.01	0.02		0.18			0.68	
Control Delay	9.2	9.4		24.5			50.9	
LOS	A	A		C			F	
Approach Delay	--	--	24.5			50.9		
Approach LOS	--	--	C			F		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	JHB	Intersection	
Agency/Co.	LSC	Jurisdiction	Placer County
Date Performed	12/9/2011	Analysis Year	
Analysis Time Period			
Project Description	ALTERNATIVES 2 AND 3		
East/West Street:	Schaffer Mill Road	North/South Street:	Martis Valley Trail Access
Intersection Orientation:	East-West	Study Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	1	227	0	0	69	10
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate (veh/h)	1	252	0	0	76	11
Proportion of heavy vehicles, P_{HV}	0	--	--	0	--	--
Median type	Undivided					
RT Channelized?			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	0	0	0	10	0	1
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Hourly Flow Rate (veh/h)	0	0	0	11	0	1
Proportion of heavy vehicles, P_{HV}	0	0	0	0	0	0
Percent grade (%)		0			0	
Flared approach		N			N	
Storage		0			0	
RT Channelized?			0			0
Lanes	0	0	0	0	0	0
Configuration					LR	

Control Delay, Queue Length, Level of Service

Approach	EB	WB	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
Volume, v (vph)	1						12	
Capacity, c_m (vph)	1522						681	
v/c ratio	0.00						0.02	
Queue length (95%)	0.00						0.05	
Control Delay (s/veh)	7.4						10.4	
LOS	A						B	
Approach delay (s/veh)	--	--				10.4		
Approach LOS	--	--				B		

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	*JHB*	Intersection	
Agency/Co.	*LSC*	Jurisdiction	*Placer County*
Date Performed	*3/12/2012*	Analysis Year	
Analysis Time Period			
Project Description	*Parking Alternative Number 4*		
East/West Street:	*Martis Valley Trail Access*	North/South Street:	*SR 267*
Intersection Orientation:	*North-South*	Study Period (hrs):	*0.25*

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume	2	686	0	0	740	8
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR	2	745	0	0	804	8
Percent Heavy Vehicles	0	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LT					TR
Upstream Signal		0			0	

Minor Street	Westbound			Eastbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume	0	0	0	8	0	2
Peak-Hour Factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Hourly Flow Rate, HFR	0	0	0	8	0	2
Percent Heavy Vehicles	0	0	0	0	0	0
Percent Grade (%)	0			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	0	0	0	0	0
Configuration					LR	

Delay, Queue Length, and Level of Service

Approach	NB	SB	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT						LR	
v (vph)	2						10	
C (m) (vph)	823						144	
v/c	0.00						0.07	
95% queue length	0.01						0.22	
Control Delay	9.4						31.9	
LOS	A						D	
Approach Delay	--	--				31.9		
Approach LOS	--	--				D		

Calculated by JHB Date 3/12/12 Co.-Rte.-P.M. ______

Applicant ______ Permit No. ______

MARTIS VALLEY TRAIL
PARKING ALTERNATIVE #1

LEFT TURN CHANNELIZATION ~~WARRANTS~~ GUIDELINE
(TWO-LANE ROADS ONLY)

WARRANTS: POINTS

(A) MAINLINE ADT 16,200 x 0.001 (PEAK MONTH) = 16.2

(B) ANTICIPATED DAILY LEFT TURNS

Type Land Use	Type Devel.	Trips Gen. (IN)		% Left Turns		existing Left Turns				Points
			x		=	48+4+10	x 0.01	=		0.62

(C) PREVAILING SPEED FACTOR 1.49 + GRADE CORRECTION 0 = 1.49

SPEED FACTORS		CORRECTION FOR GRADE					
		UPGRADE			DOWNGRADE		
<30 MPH*	1.00	3-4%	5-6%	7-8%	3-4%	5-6%	7-8%
30	1.18	-	-.01	-.02	+.01	+.02	+.03
35 40	1.23 1.26	-.01	-.02	-.03	+.01	+.03	+.05
45 50	1.30 1.34	-.02	-.03	-.05	+.02	+.05	+.08
55 60	1.38 1.49	-.03	-.05	-.08	+.03	+.08	+.11

*No corr. factor for <30 MPH

NOTE: If sight distance or width is the major factor, consider cost to improve sight distance or width in lieu of channelization.

(D) SIGHT DISTANCE - VERTICAL OR HORIZONTAL

DISTANCE	D FACTORS	DISTANCE	D FACTORS
500'	1.00	300' - 400'	1.20
400' - 500'	1.05	200' - 300'	1.40

= 1.00

(E) WIDTH - Paved or unpaved - Available traversable (one way)

WIDTH	E FACTORS	WIDTH	E FACTORS
12'	1.35	20'	1.00
14'	1.20	22'	0.95
16'	1.10	24'	0.85
18'	1.05	26' or more	0.70

= 1.10

(F) TRAFFIC BRANCH JUDGEMENT FACTOR ITEMS TO BE CONSIDERED
Total to range between 0.75-1.25

- [ ] Accidents
- [ ] % large vehicles
- [x] Adverse climate (snow-ice-fog)
- [ ] % unfamiliar with road
- [ ] Pedestrian traffic
- [ ] Conflicts
- [ ] Lighting
- [ ] Future development
- [ ] Other ______

= 1.20

(A) 16.2 x (B) 0.62 x (C) 1.49 x (D) 1.00 x (E) 1.10 x (F) 1.20 = $\boxed{19.8}$

WARRANTS:
- [ ] Use 15 points for Low Cost (Paint only)
- [x] Use 20 points for Medium Cost (Flat terrain - Minor grade - base - pave)
- [ ] Use 25 points for High Cost (Steep terrain - Major grade - base - pave)

CHANNELIZATION IS [ ] IS NOT [x] REQUIRED.

Calculated by JHB Date 3/12/12 Co.-Rte.-P.M. ______

Applicant ______ Permit No. ______

MARTIS VALLEY TRAIL PARKING ALTERNATIVE #4

LEFT TURN CHANNELIZATION ~~WARRANTS~~ GUIDELINE
(TWO-LANE ROADS ONLY)

WARRANTS: POINTS

(A) MAINLINE ADT 14,300 x 0.001 Peak Month = 14.3

(B) ANTICIPATED DAILY LEFT TURNS

Type Land Use	Type Devel.	Trips Gen. (IN)		% Left Turns		Left Turns		
		26	x	15	=	4	x 0.01 =	0.04

(C) PREVAILING SPEED FACTOR 1.49 + GRADE CORRECTION 0 = 1.49

SPEED FACTORS		CORRECTION FOR GRADE					
		UPGRADE			DOWNGRADE		
<30 MPH*	1.00	3-4%	5-6%	7-8%	3-4%	5-6%	7-8%
30	1.18	-	-.01	-.02	+.01	+.02	+.03
35 40	1.23 1.26	-.01	-.02	-.03	+.01	+.03	+.05
45 50	1.30 1.34	-.02	-.03	-.05	+.02	+.05	+.08
55 60	1.38 1.49	-.03	-.05	-.08	+.03	+.08	+.11

*No corr. factor for <30 MPH

NOTE: If sight distance or width is the major factor, consider cost to improve sight distance or width in lieu of channelization.

(D) SIGHT DISTANCE - VERTICAL OR HORIZONTAL

DISTANCE	D FACTORS	DISTANCE	D FACTORS
500'	1.00	300' - 400'	1.20
400' - 500'	1.05	200' - 300'	1.40

= 1.00

(E) WIDTH - Paved or unpaved - Available traversable (one way)

WIDTH	E FACTORS	WIDTH	E FACTORS
12'	1.35	20'	1.00
14'	1.20	22'	0.95
16'	1.10	24'	0.85
18'	1.05	26' or more	0.70

= 1.10

(F) TRAFFIC BRANCH JUDGEMENT FACTOR ITEMS TO BE CONSIDERED
Total to range between 0.75-1.25

- ☐ Accidents
- ☐ % large vehicles
- ☒ Adverse climate (snow-ice-fog)
- ☐ % unfamiliar with road
- ☐ Pedestrian traffic
- ☐ Conflicts
- ☐ Lighting
- ☐ Future development
- ☐ Other ______

= 1.20

(A) 14.3 x (B) 0.04 x (C) 1.49 x (D) 1.00 x (E) 1.10 x (F) 1.20 = $\boxed{1.13}$

WARRANTS:
- ☐ Use 15 points for Low Cost (Paint only)
- ☐ Use 20 points for Medium Cost (Flat terrain - Minor grade - base - pave)
- ☐ Use 25 points for High Cost (Steep terrain - Major grade - base - pave)

CHANNELIZATION IS ☐ IS NOT ☒ REQUIRED.

APPENDIX F

VISUAL REPORTS

APPENDIX F1

Visual Impact Analysis for Phase I of the Martis Valley Regional Trail Project

VISUAL IMPACT ANALYSIS FOR PHASE 1
OF THE
MARTIS VALLEY REGIONAL TRAIL PROJECT

PLACER COUNTY, CALIFORNIA

Prepared for:

Northstar Community Services District
908 Northstar Drive
Northstar, CA 96161

Prepared by:

north fork associates
110 Maple Street, Auburn, California 95603
(530) 887-8500

October 14, 2009

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FIGURES

VISUAL IMPACT ANALYSIS FOR PHASE 1
OF THE
MARTIS VALLEY REGIONAL TRAIL PROJECT

INTRODUCTION

This report includes an inventory of viewer and landscape setting characteristics and a description of the aesthetic effects anticipated to result from implementation of Phase 1 of the proposed Martis Valley Regional Trail Project. This aesthetics analysis has been prepared to analyze the effects of Phase 1 (Segments 1 and 2) of the proposed trail alignment, the portion of the trail currently proposed for construction, and does not provide an analysis of Phase 2 (Segments 3C, 3D, 3E, and 4) of the proposed trail or any alternatives to the proposed alignment for Phase 1 (Segments 3A and 3B).

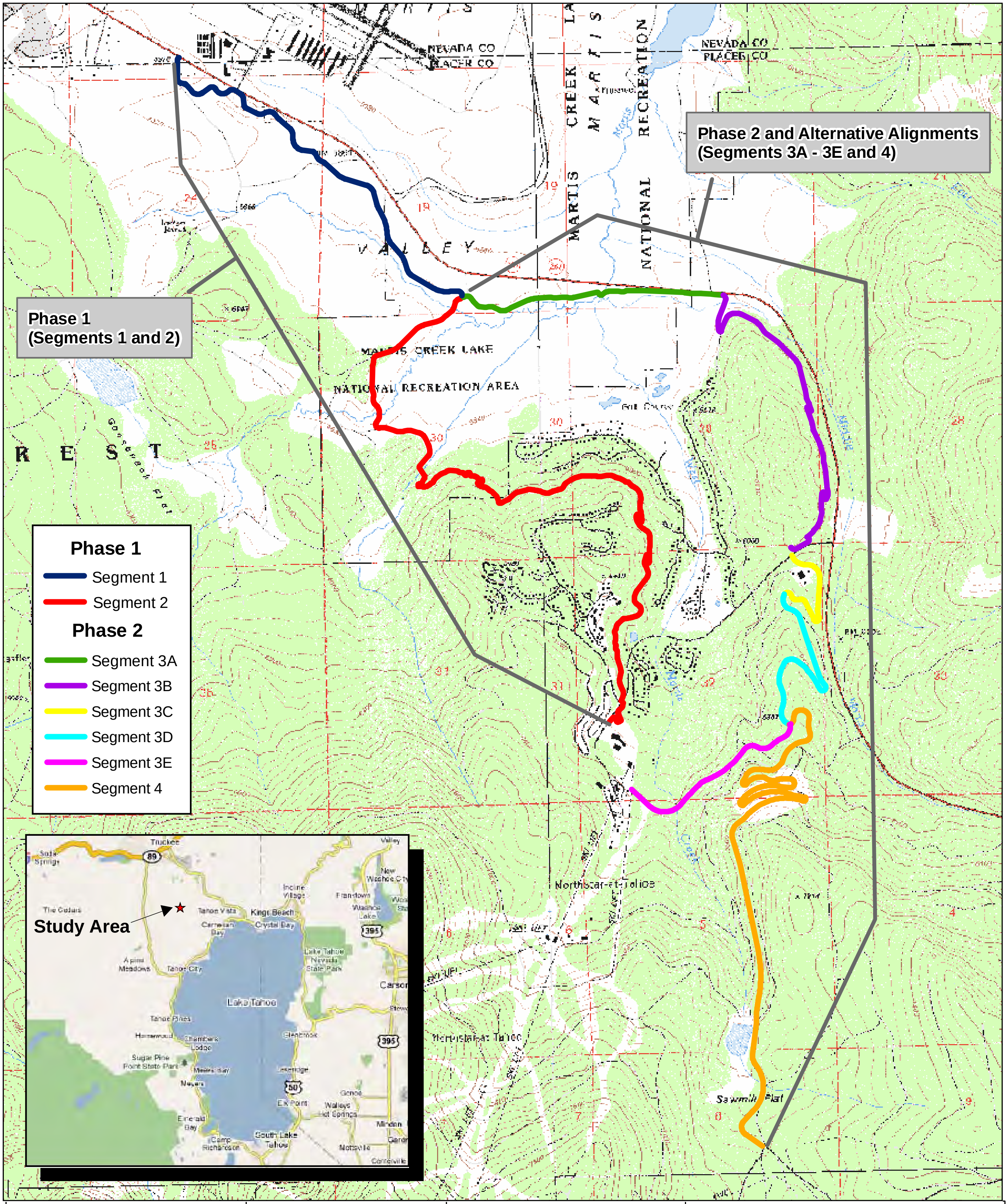
Project Location

The proposed Phase 1 Martis Valley Regional Trail alignment stretches from the eastern limits of the Town of Truckee east and south through Martis Valley to the Village at Northstar. The trail corridor is located within Townships 16N and 17N and Ranges 16E and 17E of the Truckee and Martis Peak U.S. Geological Survey 7.5 minute quadrangles. State Route (SR) 267 provides the primary vehicular access through the project area. The project area, including proposed future phases and alternative alignments, is shown on a USGS map in Figure 1. Figure 2 depicts the Phase 1 alignment, the subject of this visual impacts analysis, on an aerial photograph of the project area. Figure 2 also identifies photopoints used in this visual impacts analysis. Figures 3a – 3F are photos taken from the photopoints referenced in Figure 2. The existing Tomkins Memorial Trail (TMT) map is provided as Figure 4.

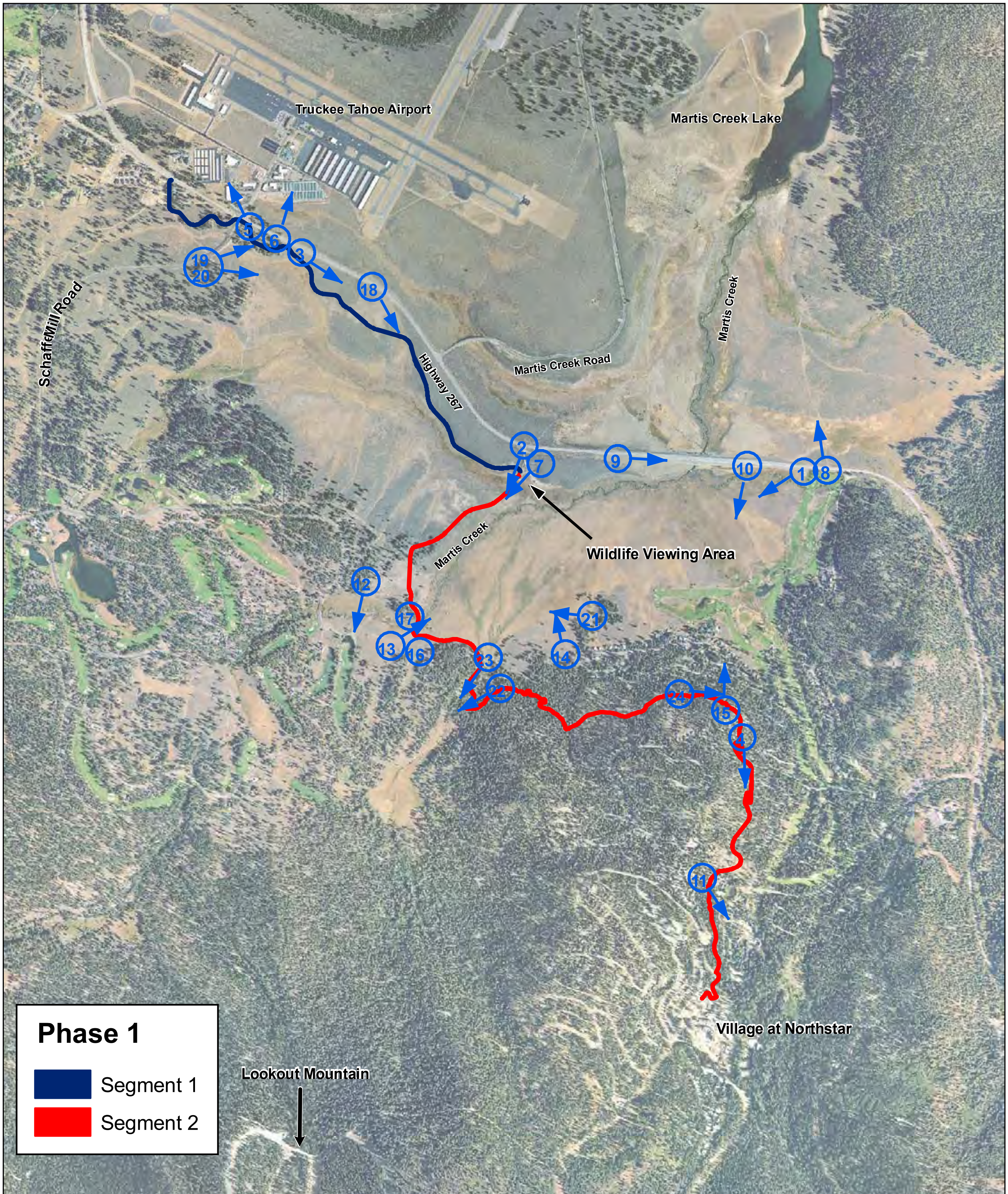
Project Description

The proposed project would construct a multiple-use paved trail from the southern limits of the Town of Truckee at the Nevada/Placer County line to the Four Corners area at Brockway Summit. The trail would provide a regional connection between existing trails in the Town of Truckee and trails in the Lake Tahoe Basin. The trail would allow for pedestrian and bicycle use, and would be constructed to meet the standards of the Americans with Disabilities Act (ADA). The maximum grade of the trail would be five percent, and the width of the trail would generally be ten feet, with two-foot unpaved shoulders on either side. Bridges would be used to span Martis Creek and one perennial tributary to Martis Creek and would be designed to be consistent in design with other wetland and stream crossing structures used on the existing TMT. The trail alignment has been located to minimize visibility and noise exposure associated with traffic traveling SR 267, by taking advantage of screening afforded by existing vegetation and topographical relief.

The Northstar CSD is proposing to construct Segments 1 and 2 of the proposed trail, Phase 1, with funding currently identified. Phase 1 would connect the Town of Truckee with the Village at Northstar and would construct a trail through Martis Valley. Segment 1 of Phase 1 travels over relatively flat terrain within Martis Valley, south of and generally parallel to SR 267. Segment 2 of Phase 1 travels south and east through Martis Valley, moving away from SR 267, and climbs into steeper terrain within the Northstar at Tahoe property. Segment 2 crosses



north fork associates	N 0 750 1,500 3,000 Scale in Feet	USGS Base Map: Truckee & Martis Peak, CA 7.5 minute topographic quadrangle Sections: 5,8,13,19,20,24,28,29,30,32,33 Township: 16N,17N Range: 16E,17E	**Figure 1** **SITE & VICINITY MAP** *Martis Valley Regional Trail* Placer County, California



north fork associates

N
0 500 1,000 2,000
Scale in Feet

Aerial Photo: Placer County, 2005

Figure 2

PHOTOPOINT MAP

Martis Valley Regional Trail

Placer County, California

Martis Creek and one perennial tributary to Martis Creek. To the extent possible, the proposed trail alignment has been designed to avoid sensitive natural resources, while following existing topographic contours to minimize grades, and discourage erosion from runoff on steep profiles. An effort was made to minimize new impacts by designing portions of the Segment 2 alignment to follow existing and well used unpaved trails in the valley.

Primary access from the north to the Phase 1 portion of the trail would be from existing trails and roadways within the Town of Truckee, while access from the south would be from existing trails and roadways in the Village at Northstar. The Phase 1 section of trail would also be accessible in the Martis Valley from the Martis Creek Wildlife Viewing Area.

Environmental Setting

Landscape Character

The proposed Phase 1 trail alignment is located on the eastern side of the Sierra Nevada Mountains, north of Lake Tahoe and southeast of the Town of Truckee. The topography is gently rolling to generally flat within Martis Valley, and steep outside of the valley toward the Northstar resort. Adjacent land uses include the Northstar Community (including Northstar at Tahoe golf course), Lahontan Golf Club, Truckee-Tahoe Airport, and Martis Creek Lake.

Natural Features: The proposed trail alignment crosses through four distinct habitat types, including coniferous forest, sagebrush scrub, wet meadow, and riparian. Riparian and wet meadow habitat types are hydrologically supported by several drainages that course through Martis Valley, including Martis Creek, which is the primary drainage in the valley. The floor of Martis Valley is characterized by wide and relatively flat meadows associated with Martis Creek and its tributaries. Riparian vegetation, primarily willows, occurs as a distinct feature along the meandering courses of Martis Creek and its tributaries and contrasts in color and relief with adjacent meadow vegetation (Photos 1 and 2). Sagebrush scrub vegetation is generally adjacent to and at a slightly higher elevation than meadow vegetation, occurring on flat to gently rolling topography in the vicinity of SR 267 (Photo 3). Dense, even-aged coniferous forest occupies higher elevations, dominating the slopes east and south of the valley and the terrain in the vicinity of the Village at Northstar (Photo 2 and 4). When under snow cover, the valley is characterized by flat expanses of snow distinctly contrasting with the darker conifer forest on the slopes east and south of the valley floor.

Constructed Features: Constructed features in the valley are associated with the Truckee-Tahoe Airport, office/commercial in the vicinity of Truckee-Tahoe Airport Road and Soaring Way, recreational and facilities development associated with Martis Creek Lake and Martis Creek Wildlife Viewing Area, Lahontan Golf Club and residential development, and the Northstar Community (including Northstar at Tahoe golf course, residential development, and public facilities).

SR 267, a heavily traveled two lane highway connecting Interstate 80 to SR 28 in the Lake Tahoe Basin, bisects the valley floor on a slightly elevated west-east alignment and represents a prominent constructed landscape feature through the valley (Photos 1, 3, and 9). SR 267 also represents the primary viewpoint from which the trail alignment and Martis Valley are viewed, as it provides a slightly elevated vantage point to many motorists crossing the valley daily. SR 267 is designated by the Placer County as a scenic route.

At the north end of the alignment in the vicinity of Schaffer Mill Road / Truckee-Tahoe Airport Road / SR 267 intersection, dominant constructed landscape features include office/commercial development on the north side of SR 267 where airplane hangars and rows of self-storage buildings are visually prominent (Photos 5 and 6). Ski runs in the Lookout Mountain portion of the Northstar ski area are visually prominent as a modified natural feature as linear swaths where trees have been removed. These linear swaths generally appear as an "N" shape when viewed from the valley or SR 267 to the north and are more distinct in winter as snow cover contrasts with dark hues of the conifer forest (Photo 2). While existing unpaved multi-use trails exist on the slopes south of Martis Valley, they are screened by dense forest and are not visible from the valley floor or SR 267. In the vicinity of the parking area for the Martis Creek Wildlife Viewing Area, portions of the unpaved multi-use TMT (TMT) are visible from SR 267, particularly the section leading southwest from the parking area through a bench of sagebrush scrub habitat (Photo 7). Portions of the existing TMT in the vicinity of the crossing of West Martis Creek and running along Middle Martis Creek are also visible from the highway. Snow cover obscures these portions of trail during much of winter and into spring.

Martis Creek Dam is a visually prominent feature of the landscape north of SR 267, appearing as a level and elevated embankment when not under snow cover (Photo 8). At its current level, Martis Creek Lake is not a prominent feature as viewed from SR 267 (Photo 8). When not under snow cover, the north end of the Northstar at Tahoe golf course is a prominent landscape feature at the east side of the valley at the base of the coniferous forest, as the bright green of the course contrasts with the color of natural vegetation in the valley (Photos 9 and 10). Homes situated on the south and east edge of the golf course are visible from the valley and SR 267, but are somewhat screened by mature conifers and are not considered a primary visual component of the landscape. Other constructed landscape features visible in the valley include power poles at the east end of the valley floor, fencing, and a sewer lift station building south of SR 267, just north of the Northstar at Tahoe golf course (Photo 10).

Within the Northstar Community, the constructed landscape is characterized by residential development visually screened by dense conifer forest. Near Big Springs Drive, the Northstar CSD office is visible south and east of the proposed trail alignment and is visually characterized by a parking lot, cleared area, and several smaller buildings (Photo 11). The existing unpaved multi-use trail within the Northstar Community is largely obscured by conifer forest and shrubby vegetation and is not a prominent landscape feature in the vicinity of the Northstar Community or as viewed from Northstar Drive. The existing unpaved multi-use trail is likely visible from several condominium units at the end of Gold Bend Road in the Northstar Community, although it is not considered a prominent landscape feature in this area as the view to the trail is nearly completely obscured by vegetation. In winter the trail surface is covered by snow and is not visible, although use for cross-country skiing or snowshoe recreation may be evident as tracks in the snow.

Regional Features: Long range views within the region include Castle Peak and the Sierra Nevada crest to the west. Martis Peak and other mountain peaks surrounding the Lake Tahoe Basin are visible generally east of the valley.

Existing Trail Facilities

The proposed trail would follow an alignment similar to the existing TMT from the Wildlife Viewing Area parking lot south into the Northstar Community to the Village at Northstar. The existing trail alignment crosses Martis Creek on an elevated pathway (Pappe's Bridge) in a location allowing views directly up the easternmost fairway of the Lahontan Golf Course (Photo 12). The views from the existing trail system in the valley are dominated by near-distant views to meadow areas associated with Martis Creek and its tributaries, broken up by linear riparian shrub vegetation following the course of the streams. The Northstar at Tahoe golf course is a prominent element along the portion of the TMT adjacent to the golf course north of Basque Drive (see Figure 4). While the raised alignment of SR 267 is visible from many portions of the existing trail system in the valley, the surface of the road is rarely visible and the road surface is not a primary visual component of the landscape as viewed from the existing trail system (Photos 13 and 14). However, cars traveling the roadway are visible and are distinct in the landscape, particularly along the portion of the existing trail that runs just south of the highway east of the Wildlife Viewing Area parking lot. As the existing trail climbs toward Northstar, views to the valley are obstructed or filtered by conifer forest. In places where views to the valley are possible, views are characterized by meadow features and Martis Creek Lake (Photo 15).

Guidance Documents

Several planning documents have been prepared to provide guidance for development and management of Martis Valley. These include Placer County documents, including the 2003 Martis Valley Community Plan and the 1994 Placer County General Plan that govern development of lands in the valley under County jurisdiction, including portions of Segment 1 of the trail alignment south of the Town of Truckee and the southern portion of Segment 2 of the trail alignment within the Northstar Community. The 1977 Martis Creek Lake Master Plan prepared by the U.S. Army Corps of Engineers governs development and use of the federally owned lands north and south of SR 267 associated with Martis Creek Lake and the Wildlife Viewing Area, through which portions of Segments 1 and 2 of the trail alignment pass. These documents were reviewed to identify policies and guidelines pertinent to the analysis of visual impacts of the proposed trail. A summary of the applicable portions of each document is provided below.

Martis Valley Community Plan

Section I.E "Major Plan Area Findings" of the Martis Valley Community Plan (MVCP) states:

> *The visual quality of the Martis Valley Community Plan area has a profound effect on the vitality of the local economy and the quality of life for residents and visitors. While virtually the entire valley could be classified as moderately to highly scenic, there remains the potential to accommodate substantial development, including recreational uses, without significant negative impacts on the visual quality of the Martis Valley.*
>
> *Any development within the open meadow and sagebrush flats of the Martis Valley visible from SR267, must be considered very carefully. This area cannot support and the Plan does not allow any new residential or commercial development (structures)... Construction of roads and trails within the*

open valley or even recreational uses could result in substantial visual impacts and such facilities, although permitted, should be carefully sited.

Section IV "Community Design" of the MVCP identifies three goals for the preservation of aesthetic values of the Martis Valley and includes 25 policies and two implementation programs to facilitate meeting these goals. Implementation programs require that proposed development projects be reviewed for consistency with Section IV of the MVCP, as well as the County's Design and Landscape Design Guidelines and also designate SR 267, Schaffer Mill Road, and Northstar Drive as scenic routes. Policies included in Section IV of the MVCP that would be applicable to visual and design aspects of the proposed project include Policies 4.A.4(c, d), 4.B.1, 4.B.2, 4.B.6(d), 4.B.7, 4.B.8, 4.C.1, and 4.C.2. These policies include provisions requiring that new development be designed to fit and blend with the natural terrain, maintain the character and visual quality of the area, minimize grading, minimize visibility of graded areas, minimize erosion from trails and paths, and use natural landforms and vegetation for screening. Policy 4.C.1 designates SR 267, Schaffer Mill Road, and Northstar Drive as scenic routes. (None of these routes are designated State scenic highways.) Policy 4.C.2 requires the County to protect and enhance scenic corridors by implementing the design review process in regulation of the design and placement of signs and use of vegetative screening. Figure 3 of Section VII of the MVCP "Recreation and Trails" identifies the Wildlife Viewing Area parking lot as a Scenic Overlook.

Section IV of the MVCP also includes Design Guidelines for specific sub-areas of the plan area. Design Guidelines for recreational uses within the Northstar at Tahoe Community call for trail construction to include "minimal grading or disturbance of the natural terrain." These Design Guidelines state that recreational development may include various improvements "compatible with the natural setting and a year-round resort community."

Placer County General Plan

The 1994 Placer County General Plan Land Use Element contains policies to ensure protection of visual and scenic resources that echo or duplicate those contained in the MVCP. Policy 1.L.7 specifically applies to scenic corridors and states that the County "shall encourage the use of bicycles as an alternative mode of travel for recreational purposes in scenic corridors."

Martis Creek Lake Master Plan

The 1977 Martis Creek Lake Master Plan was prepared by the U.S. Army Corps of Engineers to guide management and development for Corps-owned property in the Martis Valley, including Martis Creek Lake and the large meadow area south of SR 267 accessed from the Wildlife Viewing Area. The Master Plan identifies the area south of SR 267 as a wildlife management area "for the protection and improvement of wildlife habitat" and assigns it a land use category of "Operations: wildlife management." The plan contemplates a "nature interpretive" trail system within the area, stating that "intensive recreation would cause habitat loss." The plan includes resource use objectives for the plan area. The plan states that these objectives "reflect the policy of the Chief of Engineers to provide the public with safe, healthful, and varied opportunities for outdoor recreation and to protect, enhance, and manage all project resources." Resource use objectives identified include providing quality outdoor recreation opportunities for a variety of activities, establishing and maintaining a wildlife management area (within the area south of SR 267), and preserving the aesthetics of the area for the recreating public. Primary scenic qualities of the valley cited in the Master Plan include open grassy meadows along Martis Creek and its tributaries, sagebrush covered alluvial terraces, and densely forested hillsides, as well as distant views of "often snow-covered granite peaks…" (page 13). An example of efforts to maintain the scenic value of the area is evidenced in the plan's call for grass seeding in the fluctuation area of Martis Creek Lake to avoid visual impacts associated with exposed dead vegetation below the high water mark during times of low pool in the lake (page 37).

Impacts

Method of Analysis

The project area was assessed by surveying the existing and proposed trail alignments on foot and by bicycle, reviewing aerial photographs, and taking/reviewing site photographs. In addition, the applicable design guidelines and planning guidance documents were reviewed to identify any visual elements given special consideration by the community. Since the Martis Valley is recognized as a scenic resource within a scenic corridor, an effort was made to identify important visual elements of the existing environment in the valley and important characteristics of those elements to evaluate the significance of changes to those elements and characteristics thereof that would result from implementation of the proposed trail project.

Viewer Groups and Viewer Sensitivity

Key viewpoints and photo locations, shown in Figure 2, were chosen to represent the typical views that could be affected by the proposed project. Examples of those views are shown in photographs in Figures 3a – 3f.

Viewpoints looking toward the project site lie within "external viewsheds." The primary external viewsheds are from SR 267, as this viewshed is experienced by all motorists traveling SR 267; the viewshed from homes within the Northstar Community, particularly those on the north side of Basque Drive, the west side of Skidder Trail, and at the end of Gold Bend Road; and those views experienced by users of the existing TMT (see Figure 4 for locations of referenced roads). These views are generally characterized by meadow and riparian vegetation, SR 267, golf course greens and fairways, conifer forest, and adjacent residential development. When snow cover is present, meadow and riparian vegetation, and golf course features are not as visually prominent.

Viewpoints located along the project corridor looking outward are considered to be within the "internal viewshed." The view from the project alignment is characterized by office / commercial development at its western terminus; conifer forest and ski runs on slopes ascending from the valley; and meadow, riparian, and sagebrush scrub vegetation within the valley. Vehicles traveling SR 267, although moving, are also characteristic of the internal viewshed experienced from the trail alignment. Within the portion of the trail alignment in conifer forest, views are typically characterized by dense forest and understory forest shrubs, although adjacent residential development is visible in places.

Factors that influence the visual quality of the local landscape character include:

- The intact nature of the large meadow and linear riparian habitat on the valley floor;
- Intact long distance views west to the Sierra Crest and Castle Peak;
- Seasonal variety in views;
- Visual contrast and continuity associated with constructed and natural elements of the existing landscape;
- Presence of existing alterations of the natural aesthetic state by constructed features including SR 267 (and cars traveling the highway), office / commercial development, golf courses, trails, ski area development, power lines, Martis Creek Dam, and residential development;

When assessing the above factors with respect to the project vicinity, the visual quality of the area may be characterized as moderate in terms of vividness, intactness, and unity, since the site is largely characterized by mixed natural and constructed visual components. However, visual response to the area is considered to be high, as the meadow and valley floor is the primary and dominant visual component of the landscape and, although bisected by SR 267 and altered by Martis Creek Dam and other constructed features, remains largely intact and is a well used recreational area.

Changes to the visual environment and aesthetic character of the project area resulting from the proposed Class 1 trail were evaluated based on review of trail design information and standard criteria for construction of Class 1 trails. In particular, impacts have been evaluated in response to Appendix G of the CEQA Guidelines as it applies to evaluating project impacts to aesthetic values. Appendix G prompts for the evaluation of impacts to visual resources are provided below.

Would the proposed project:

a) Have a substantial adverse effect on a scenic vista?

b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

c) Substantially degrade the existing visual character or quality of the site and its surroundings?

d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

Impact Analysis

a) ***Would the project have a substantial adverse effect on a scenic vista?***

Figure 3 in Section VII "Recreation and Trails" of the MVCP identifies the Wildlife Viewing Area parking lot as a Scenic Overlook. Section I.E "Major Plan Area Findings" of the MVCP identifies the valley as moderately to highly scenic, but states that recreational and other development, if carefully sited, can be accommodated within the valley without significant negative impacts on the visual quality of the valley. Section I.E specifically states that "Any development within the open meadow and sagebrush flats of the Martis Valley visible from SR 267, must be considered very carefully... Construction of roads and trails within the open valley or even recreational uses could result in substantial visual impacts and such facilities, although permitted, should be carefully sited."

While Section I.E the MVCP indicates that additional recreational uses could be accommodated without degrading the special visual qualities of the valley, it recognizes a need for careful consideration of any development, including trails, to ensure that visual impacts are kept to a minimum.

The 1977 Martis Creek Lake Master Plan prepared by the U.S. Army Corps of Engineers identifies the area south of SR 267 as a wildlife management area and includes resource use objectives for the area. Resource use objectives include preserving the aesthetics of the area for the recreating public. Primary scenic qualities of the valley cited in the Master Plan include open grassy meadows along Martis Creek and its tributaries, sagebrush covered alluvial terraces, and densely forested hillsides, as well as distant views of "often snow-covered granite peaks…"

From the Wildlife Viewing Area scenic overlook, a wide existing trail is clearly visible leading southwest across a meadow area and continuing onto a bench of sagebrush scrub. The trail remains visible until gaining slightly in elevation on a sparsely forested knoll (Photo 7). The trail in this location appears as a small dirt and gravel road and is wide enough for motor vehicle access. The light color of the bare soil and gravel surface of the trail contrasts with the appearance of the natural meadow and sagebrush vegetation in the valley and is a visually prominent constructed feature in the landscape. Other portions of the TMT along SR 267 and Martis Creek are also visible west and south of the Wildlife Viewing Area.

The proposed trail would follow the alignment of the existing gravel track leading southwest from the Wildlife Viewing Area until the proposed alignment departs from the existing path on the forested knoll, where it descends gradually, partially along an existing gravel path, to a proposed new crossing of Martis Creek (Photos 16 and 17). The proposed new crossing of Martis Creek and the proposed new trail alignment departing from the existing trail and leading south to the crossing area is screened from view by vegetation and topography and would not be visible from the Wildlife Viewing Area.

The primary viewshed from the Wildlife Viewing Area overlook is generally to the valley southwest, south, and southeast and is characterized by views of the natural valley features of meadow, riparian, conifer, and sagebrush vegetation. From the Wildlife Viewing Area, existing constructed features at the eastern edge of the valley, including the Northstar at Tahoe golf course, homes at the valley edge, the sewer lift station, and powerpoles are in the distance and do not represent prominent landscape features. Recreational use within the valley, in the form of existing trails, is evident in the view from the Wildlife Viewing Area. The proposed trail would replace the existing gravel and soil surfaced path visible from the overlook with a slightly wider path surfaced with asphalt pavement. Installation of the wider asphalt path, and the resulting visual contrast of the asphalt pavement with vegetation in the valley, would make more vivid the constructed or artificial landscape feature represented by the trail as viewed from the Wildlife Viewing Area and would alter the scenic quality of the open sagebrush terrace and meadow area. The addition of standard asphalt paving to the portion of trail visible looking southwest from the Wildlife Viewing Area, and the resulting contrast with the natural vegetation and soil substrate, would potentially degrade the view enjoyed from the Wildlife Viewing Area scenic overlook. Long distance views west to Castle Peak and the Sierra Crest would not be affected by the proposed trail.

Recommendation

It is recommended that natural or earth tone surfacing be used for this portion of the trail, as determined appropriate to minimize contrast with the natural colors of the vegetation and soils of the valley (concrete could be mixed to match the tone of the dominant sagebrush or natural soil color along this section). Colored concrete or equivalent, mixed to a color determined to be appropriate by a landscape architect, is recommended to retain the current aesthetic values enjoyed by viewers from the Wildlife Viewing Area. The color and material proposed for surfacing the trail would be subject to review and approval by the U.S. Army Corps of Engineers, as this section of trail is on federal lands. Use of pavement colored to blend with the existing vegetation or soils that characterize the natural meadow and sagebrush visual component of the valley as viewed from the overlook would ensure that the contrast in pavement and the addition of this constructed feature would result in no substantial impact in the view of Martis Valley enjoyed from the Wildlife Viewing Area scenic overlook.

b) ***Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?***

The project would result in no impacts to any resources adjacent to or within the viewshed of a state scenic highway. None of the roadways in the vicinity of the proposed trail are designated as state scenic highways. However, Policy 4.C.1 of the MVCP designates SR 267, Schaffer Mill Road, and Northstar Drive as scenic routes.

The view of the valley by passersby on SR 267 from west to east includes development in the vicinity of the airport (Photos 5 and 6), Martis Creek Dam to the north (Photo 8), wide expanses of sagebrush and meadow areas with trails on the valley floor and ski runs on the forested slopes above the valley (Photo 2), and golf course greens and fairways and homes at the eastern edge of the valley (Photo 10). Existing portions of the TMT recreational trail system ranging from 3 to 12 feet in width are visible to motorists traveling SR 267, particularly westbound lanes, from the entrance to the Wildlife Viewing Area west to the sewer lift station building on the south side of SR 267 at the eastern edge of the valley floor. These trails generally appear as light areas of bare soil contrasting with slightly darker surrounding vegetation (Photos 2, 7, 10). The primary view along the SR 267 corridor through Martis Valley is therefore visually characterized by the prominent natural features of the meadow and sagebrush areas, as well as by development consistent with the values and passive and active recreational pursuits of a resort community.

From SR 267, the proposed trail alignment and surface of the trail would be visible in several places where it is proposed within sagebrush areas just south of the Highway along Segment 1. Presently, no trail exists within these areas (Photos 3, 9, 18). The proposed trail would also be visible as it heads southwest from the Wildlife Viewing Area along the alignment of the existing trail, as discussed in (a) above.

The view from Schaffer Mill Road in the vicinity of the proposed trail alignment is generally characterized by meadow and sagebrush areas to the east and southeast, commercial development and residential to the north and northwest, and sparse conifer forest to the northeast. The trail alignment would be visible from northbound Schaffer Mill Road in several places both west and east of the proposed trail crossing of Schaffer Mill Road at the SR 267 / Schaffer Mill / Truckee-Tahoe Airport Road intersection. The proposed trail would potentially be most visible as it travels within the stand of trees just east of the intersection and along the sagebrush scrub adjacent to SR 267 (Photos 19 and 20).

The portion of Schaffer Mill Road from which the proposed trail would be viewable is at a lower elevation than the proposed trail through conifer forest just east of the intersection and nearly even with the more distant portion of proposed trail along SR 267, and therefore views of the trail surface would be nearly entirely obscured by vegetation. In areas where the trail would be visible, it would appear as a linear feature, as it would be viewed from the side, and would not be considered a prominent visual feature of the landscape. Slightly more of the trail surface may be visible from Schaffer Mill Road on the portion of the alignment lower than the road and west of the intersection, although the view north and northwest from Schaffer Mill Road is dominated by existing commercial and residential development and is not considered a primary viewshed within the Schaffer Mill scenic corridor. The proposed trail would result in no substantial impact to scenic views from Schaffer Mill Road.

Views from Northstar Drive in the vicinity of the trail alignment are limited by topography and dense conifer forest and are generally characterized by resort and community facilities development and short to mid-range views of conifer forest. Development on Big Springs Drive and the Northstar Community Services District and Northstar Fire Station are all located near the proposed trail alignment. An existing portion of the TMT follows an alignment similar to the proposed alignment. Views from Northstar Drive to the existing trail and the proposed trail alignment are nearly entirely screened by vegetation and topography; views to the proposed trail would be similarly screened. Impacts of the proposed trail to views from Northstar Drive would not be substantial.

Construction of the proposed multi-use trail would be visually consistent with existing resort community and recreational development, including golf courses, resort signage, existing trails, and airport development along the scenic corridors of SR 267, Schaffer Mill Road, and Northstar Drive. However, as discussed in (a) above, standard asphalt paving of the trail could visually degrade the natural visual landscape component represented by the open meadow and sagebrush area on the valley floor.

Recommendation

It is recommended that colored surfacing, as described in (a) also be used for the portion of the proposed trail west of the SR 267 / Schaffer Mill / Truckee-Tahoe Airport Road intersection to its connection with Segment 2 and on to the forested knoll southwest of the Wildlife Viewing Area. The portion of Segment 1 crossing private lands west of the Martis Creek Road intersection would require a use permit from Placer County and would be subject to review and approval by the Design Review Committee to ensure trail design, surface colors, and materials used are appropriate and would be consistent with policies and guidelines contained in the MVCP and General Plan.

Use of pavement colored to blend with the existing vegetation or soils that characterize the natural sagebrush visual component of the valley as viewed from SR 267 and implementation of the Design Review process by the County for portions of the trail under County jurisdiction would ensure that the proposed paved trail does not visually degrade the view of natural areas of the valley from SR 267.

c) ***Would the project substantially degrade the existing visual character or quality of the site and its surroundings?***

The project would construct a paved trail ten feet wide with two-foot unpaved shoulders on each side through Martis Valley and to the Village at Northstar. As discussed in (a) and (b) above, the visual character of the valley includes commercial, residential, and passive and active recreational development, in addition to natural landscape features. The proposed trail would be most visually prominent in the open meadow and sagebrush areas along 267 and leading southwest away from the Wildlife Viewing Area, since SR 267 and the Wildlife Viewing Area both represent primary viewing locations. The existing visual character and quality of the natural area of the Martis Valley is also observed by occupants of homes along the golf course, golfers, skiers at Northstar, and users of the existing TMT trail system. Visual impacts to these viewer groups are discussed in this section.

Views west and northwest to the area of the proposed trail alignment are distant from areas on the east side of the valley floor, including residences, the golf course, and portions of the TMT on the east side of the valley (Photos 1, 14, 21). The primary constructed features visible from within the trail system and areas on the east side of the valley floor are the road surface leading off of SR 267 to the Wildlife Viewing Area and the raised alignment of SR 267, although the surface of SR 267 is not visible (Photos 13, 14). Existing trails within the valley are partially to fully screened by topography and vegetation from most viewing areas within and adjacent to the valley. The area of the proposed new crossing of Martis Creek along Segment 2 is obscured by topography and dense vegetation and would not be visually prominent from any substantial distance (Photos 16, 17, 21). It is noted that there is an existing use path at the proposed crossing (Photo 16). The proposed new crossing of Martis Creek will place the proposed trail in a location that will screen it from views of and from Lahontan golf course (the existing TMT trail alignment allows for views directly to and from the trail to a fairway on the golf course (Photo 12)).

The proposed new crossing of the perennial stream that is tributary to Martis Creek would also be well screened by vegetation and would not be a significant visual element except in the immediate vicinity of the crossing (Photos 22 and 23). Hillside portions of existing trails are entirely obscured by conifer forest and are not visible from the valley. While some trees will be removed and small retaining walls will be built to construct the trail, it is unlikely that trees or retaining walls will be visible from the valley floor. The proposed trail would be consistent with existing visual elements associated with recreational and resort uses in and around the valley and would result in less than significant impacts to the existing visual character or quality of the site presently experienced by viewers in and adjacent to the valley.

Views to the existing portions of the TMT within the Northstar Community are nearly entirely obscured by conifers or shrubby vegetation in most places. The proposed alignment will follow a similar alignment to the existing TMT and will travel through dense conifer forest. Similar to the existing trail, the proposed trail will be mostly obscured by understory vegetation and conifer forest (Photos 4, 24). The proposed trail would be visually consistent with other recreational and resort development within the Northstar Community. The proposed trail would result in no substantial impacts to the existing visual character or quality of the site presently experienced by viewers in and around the Northstar Community.

d) ***Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?***

No lighting is proposed as part of the trail project. The proposed trail would be constructed using non-reflective materials and finishes for the surface of the pathway and retaining wall surfaces. Any reflective striping used for pathway markings would not result in substantial glare or adversely affect day or nighttime views in the area. Signage would be designed to be consistent with existing signs used for the TMT and would be subject to the County's Design Review process and approval by the Corps of Engineers for portions of the trail on federal lands. Impacts resulting from glare or addition of lighting would not be substantial.

Photo 1 – Looking west from Highway 267 across Martis Valley.

Photo 2 – View to south across Martis Valley from the entrance to the Wildlife Viewing Area. Note ski runs on Lookout Mountain.

Photo 3 – View from Highway 267 looking east across Martis Valley.

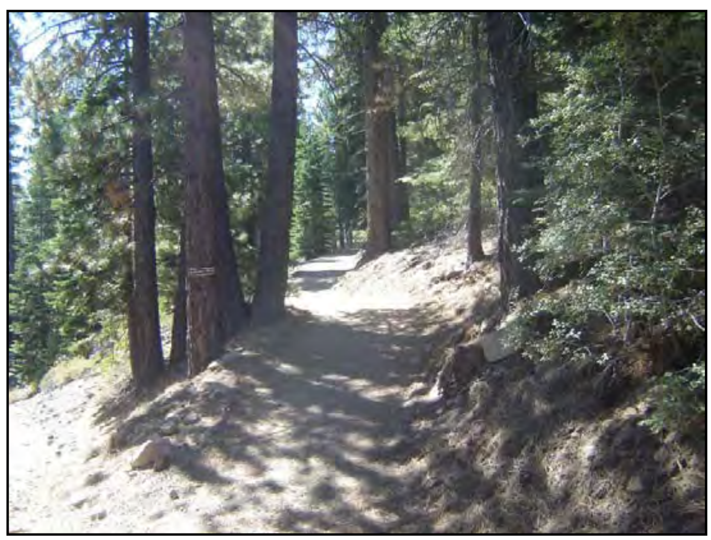


Photo 4 – Typical portion of existing trail through coniferous forest in the vicinity of the Northstar Community.

north fork associates

Photo Date: September 20, 2009

Figure 3a

Photopoints

Martis Valley Regional Trail

Placer County, California

Photo 5 – Photo looking north to commercial development at Schaffer Mill Road / SR 267 intersection.

Photo 6 – View from 267 north to self-storage facility and airport area at west side of Martis Valley.

Photo 7 – View from Highway 267 looking southwest to portion of existing Tomkins Memorial Trail through sagebrush scrub.

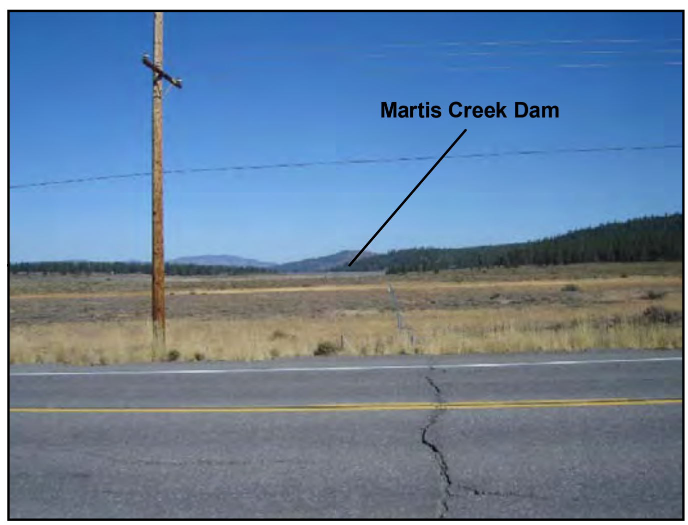


Photo 8 – Looking north from Highway 267 to Martis Creek Lake and dam.

north fork associates

Photo Date: September 20, 2009

Figure 3b

Photopoints
Martis Valley Regional Trail
Placer County, California

Photo 9 – Looking east from Highway 267 in Martis Valley near the entrance to the Wildlife Viewing Area. The Northstar at Tahoe golf course is prominent at the east side of the valley floor.

Photo 10 – View from Highway 267 southwest to Northstar at Tahoe golf course. Ski runs on Lookout Mountain, homes at the edge of the golf course, and power poles are visible. Lift station is out of picture to left. No existing trails are visible within conifer forest area.

Photo 11 – Looking southeast from existing trail to Northstar CSDand Fire Department facilities area. Trail is east and downslope from the Gold Bend Condominiums in this location.

Photo 12 – Looking south from existing Tomkins Memorial Trail to existing crossing of Martis Creek. A fairway in the Lahontan golf course is clearly visible from this location.

north fork associates

Photo Date: September 20, 2009

Figure 3c

Photopoints

Martis Valley Regional Trail

Placer County, California

Photo 13 – Looking northeast from section of existing Tomkins Memorial Trail near south of the existing crossing of Martis Creek.

Photo 14 – View looking north from the Tomkins Memorial Trail near Squeak's Bridge, west of Basque Drive. The Wildlife Viewing Area parking lot and airport development are visible.

Photo 15 – Filtered views north to Martis Valley from the existingTomkins Memorial Trail north of Martis Landing Road in the Northstar Community. Martis Lake is visible in the valley.

Photo 16 – Looking north from existing Tomkins Memorial Trail in area proposed for new crossing of Martis Creek. Forested knoll is visible at left. Meadow and riparian vegetation are visible in foreground along existing use path.

north fork associates

Photo Date: September 20, 2009

Figure 3d

Photopoints

Martis Valley Regional Trail

Placer County, California

Photo 17 – Looking northeast to area of riparian and meadow area in vicinity of proposed new crossing of Martis Creek. Existing use trail crossing is visible in this photo.

Photo 18 – View southeast from shoulder of Highway 267 toward sagebrush in area proposed for new trail.

Photo 19 – View northeast from Schaffer Mill Road to area proposed for new trail.

Photo 20 – View from Schaffer Mill Road looking east toward proposed trail alignment along Highway 267.

north fork associates

Photo Date: September 20, 2009

Figure 3e

Photopoints

Martis Valley Regional Trail

Placer County, California

Photo 21 – Looking west across the valley floor from existing Tomkins Memorial Trail approximately 500 feet north of Basque Drive. View is to forested knoll and riparian vegetation in area of proposed new crossing of Martis Creek.

Photo 22 – Looking west from existing Tomkins Memorial Trail to area proposed for new crossing of tributary to Martis Creek.

Photo 23 – Looking southeast from existing Tomkins Memorial Trail to area proposed for new crossing of tributary to Martis Creek. Area is characterized by dense riparian (willow) and forest vegetation.

Photo 24 – Example of dense conifer forest along TMT in Northstar Community.

north fork associates

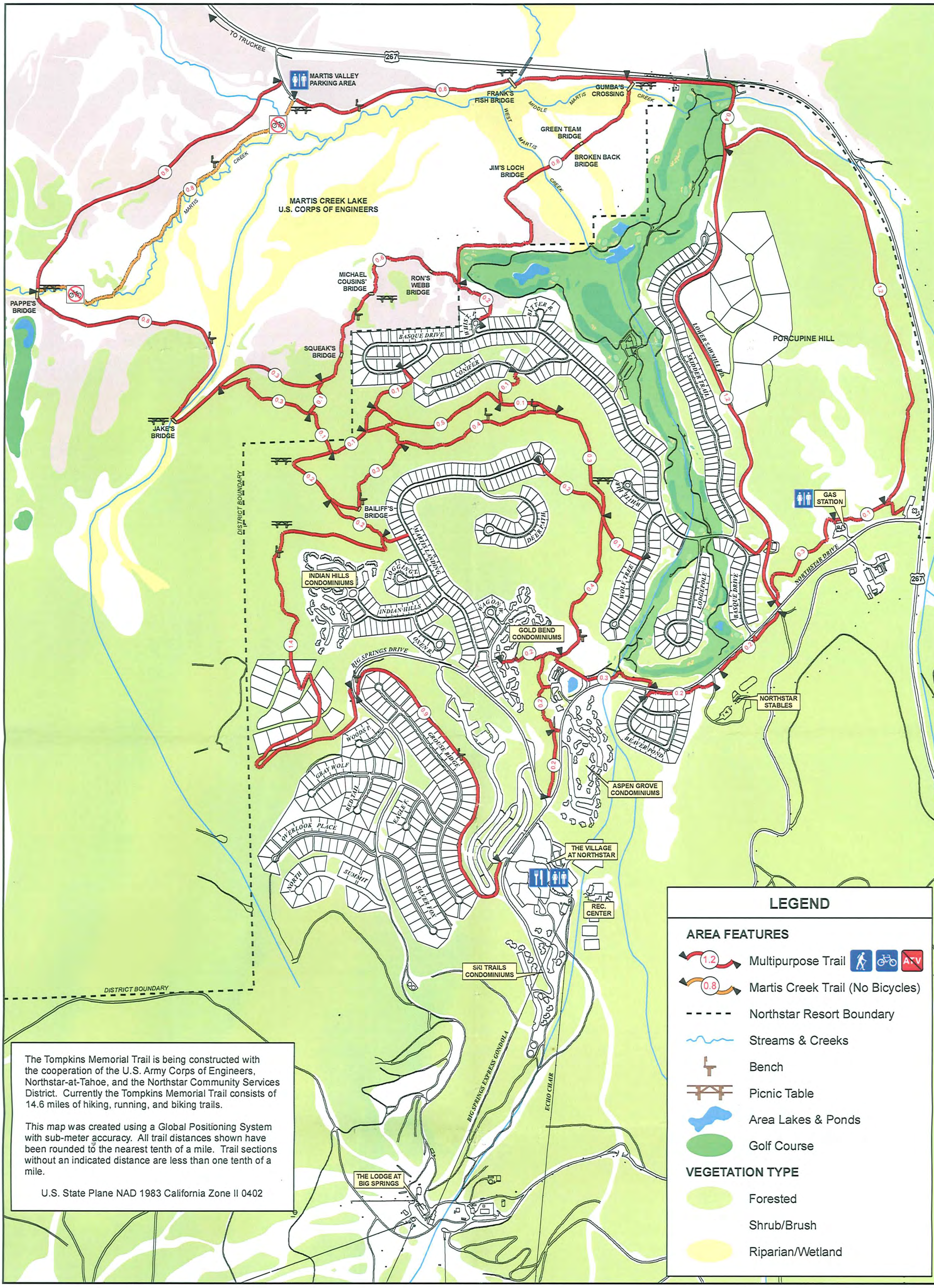
Photo Date: September 20, 2009

Figure 3f

Photopoints

Martis Valley Regional Trail

Placer County, California



The Tompkins Memorial Trail is being constructed with the cooperation of the U.S. Army Corps of Engineers, Northstar-at-Tahoe, and the Northstar Community Services District. Currently the Tompkins Memorial Trail consists of 14.6 miles of hiking, running, and biking trails.

This map was created using a Global Positioning System with sub-meter accuracy. All trail distances shown have been rounded to the nearest tenth of a mile. Trail sections without an indicated distance are less than one tenth of a mile.

U.S. State Plane NAD 1983 California Zone II 0402

TOMPKINS MEMORIAL TRAIL

N

Scale: 1:13,000

0 0.25 0.5 0.75 1 Kilometers

0 1,000 2,000 3,000 4,000 Feet

0 0.25 0.5 0.75 1 Miles

Produced by RET

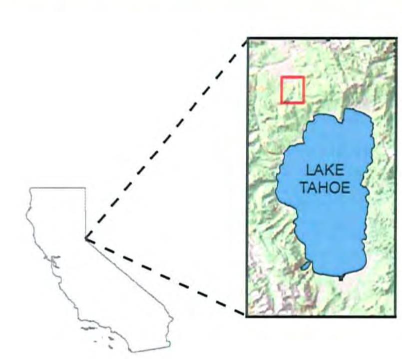


Figure 4

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Placer County. *Placer County Design Guidelines Manual.* May 21, 1996.

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APPENDIX F2

Addendum to Visual Impact Analysis for Phase I of the Martis Valley Regional Trail Project

ADDENDUM TO
VISUAL IMPACT ANALYSIS FOR PHASE 1
OF THE
MARTIS VALLEY REGIONAL TRAIL PROJECT

PLACER COUNTY, CALIFORNIA

Prepared for:

Northstar Community Services District
908 Northstar Drive
Northstar, CA 96161

Prepared by:

north fork associates
110 Maple Street, Auburn, California 95603
(530) 887-8500

August 4, 2011

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ADDENDUM
TO VISUAL IMPACT ANALYSIS FOR PHASE 1
OF THE
MARTIS VALLEY REGIONAL TRAIL PROJECT

INTRODUCTION

This report is an addendum to the *Visual Impact Analysis for Phase 1 of the Martis Valley Regional Trail Project* (2009 Analysis) prepared by North Fork Associates in October 2009. This addendum is provided to address public comments related to visual resources that were received in response to circulation of the Notice of Preparation and the public scoping meeting for the Martis Valley Trail Environmental Impact Report. These comments are summarized at the end of this addendum and addressed as noted following each comment. This addendum also expands the analysis provided in the visual impact analysis to Segments 3A, 3B, and 3F, which are being evaluated as an alternative to the Segment 2 alignment for Phase 1 of the trail project. Segments 3A, 3B, and 3F are shown in Figure 1A. The Segment 2 alignment is shown in Figure 1 of the 2009 Analysis. Also included in this addendum is an analysis of impacts to visual resources related to the proposed new parking lot south of State Route (SR) 267 and across from Martis Creek Road. This addendum provides an inventory of viewer and landscape setting characteristics and a description of the aesthetic effects anticipated to result from implementation of these features of the proposed Martis Valley Trail Project.

Project Location – Alternative Alignment Segments 3A, 3B, and 3F, and New Parking Area

The proposed Phase 1 Martis Valley Trail alignment stretches from the eastern limits of the Town of Truckee east and south through Martis Valley to the Village at Northstar, as shown in Figures 1 and 2 of the 2009 Analysis. The Phase 1 alternative alignment is within Townships 16N and 17N and Ranges 16E and 17E of the Truckee and Martis Peak U.S. Geological Survey 7.5 minute quadrangles. Figure 2B depicts the alternative alignment and general location of the proposed parking lot on an aerial photograph.

Project Description – Alternative Alignment Segments 3A, 3B, and 3F, and New Parking Area

The 2009 Analysis includes a description of the proposed Phase 1 alignment. The alternative alignment is comprised of Segments 3A, 3B, and 3F, and would replace Segment 2 of Phase 1, connecting the southern terminus of Segment 1 at the Wildlife Viewing Area to the Village at Northstar. From the terminus of Segment 1, Segment 3A would generally follow the alignment of the existing unpaved Tompkins Memorial Trail (TMT) east and parallel to SR 267 until its junction with Segment 3B at an existing golf course service road on the south side of 267. Segment 3A would cross Martis Creek on a bridge at the existing TMT bridge (Frank's Fish Bridge) location. Segment 3B would generally follow the existing alignment of the TMT, ascending slightly on Porcupine Hill, then generally follow the elevation contour of the slope south to a crossing of the north and west legs of the Northstar Drive/Trimont Lane roundabout, where it would meet the northern terminus of Segment 3F. The Segment 3B crossing of Middle Fork Martis Creek would be achieved over the existing drainage culvert under the golf course service road. Segment 3F would run generally along the west side of Trimont Lane and Highlands View Road, at a slightly lower elevation than the roadway, ascending the forested slope via climbing turns before contouring west to the segment termination at the south side of the Village at Northstar.

The design of the alternative segments would be generally the same as that described in the 2009 Analysis for the proposed alignment, with a maximum grade of five percent and a paved section width of ten feet, with two-foot unpaved shoulders on either side. The alternative trail alignment has been located to minimize visibility by taking advantage of screening afforded by existing vegetation and topographical relief, while generally following existing trails to minimize new impacts.

Primary access to the alternative alignment from the north would be from Segment 1 of the trail, which would be accessed from existing trails and roadways within the Town of Truckee, from the proposed new parking lot, or from the existing Wildlife Viewing Area parking lot. Access to the alternative alignment from the south would be from the Village at Northstar.

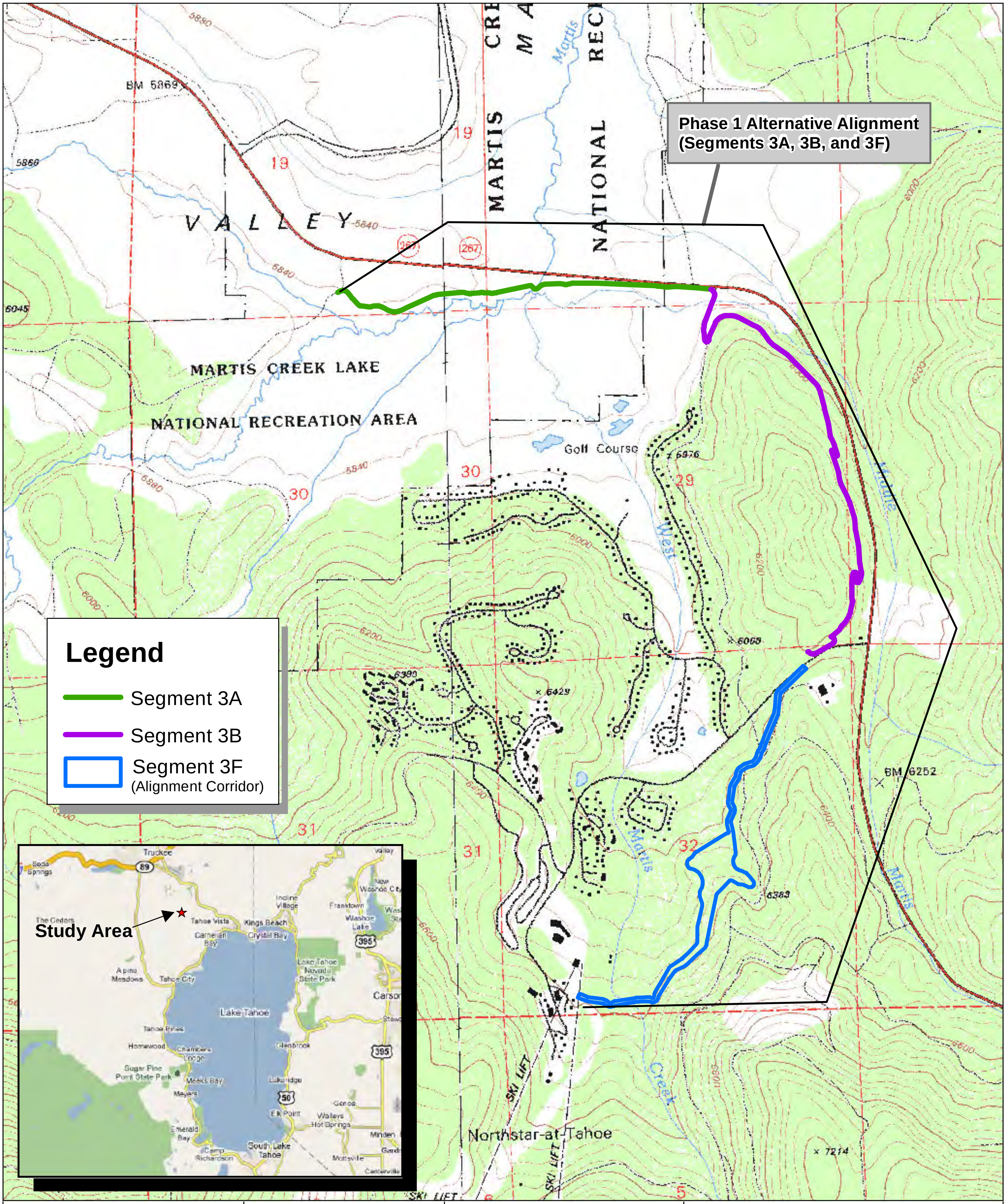
Environmental Setting

Landscape Character

A description of the landscape character of the proposed Phase 1 trail alignment is included in the 2009 Analysis, including a description of natural, constructed, and regional features, and is applicable to Segments 3A and 3B. Further detailed descriptions are not provided for these trail segments except in the case of landscape elements which are particularly relevant to the analysis of visual impacts for these segments of trail. While the description of the landscape character included in the 2009 Analysis is generally applicable to the area traversed by Segment 3F, this area was not specifically described in the 2009 Analysis, and so is described in greater detail in this addendum.

Segment 3F traverses steep, forested slopes from Northstar Drive to the Village at Northstar. Adjacent land uses include the Sawmill Heights employee housing development, the Northstar Resort horse stables, and development associated with the Village at Northstar. Primary viewing areas for the area surrounding this segment of trail include Northstar Drive, Trimont Lane, and Highlands View Road.

Figure 2 of the 2009 Analysis identifies photopoints for that analysis. The alternative to the Segment 2 alignment (Segments 3A, 3B, and 3F) is represented by Figures 1A and 2A of this Addendum. Figure 2A also identifies the location and direction for photos in Figures 3G and 3H (Figures 3A – 3F are part of the 2009 Analysis).



N

0 500 1,000 2,000

Scale in Feet

USGS Base Map:
Truckee & Martis Peak, CA
7.5 minute topographic quadrangle
Sections: 19,20,28, 29,32
Township: 17N
Range: 17E

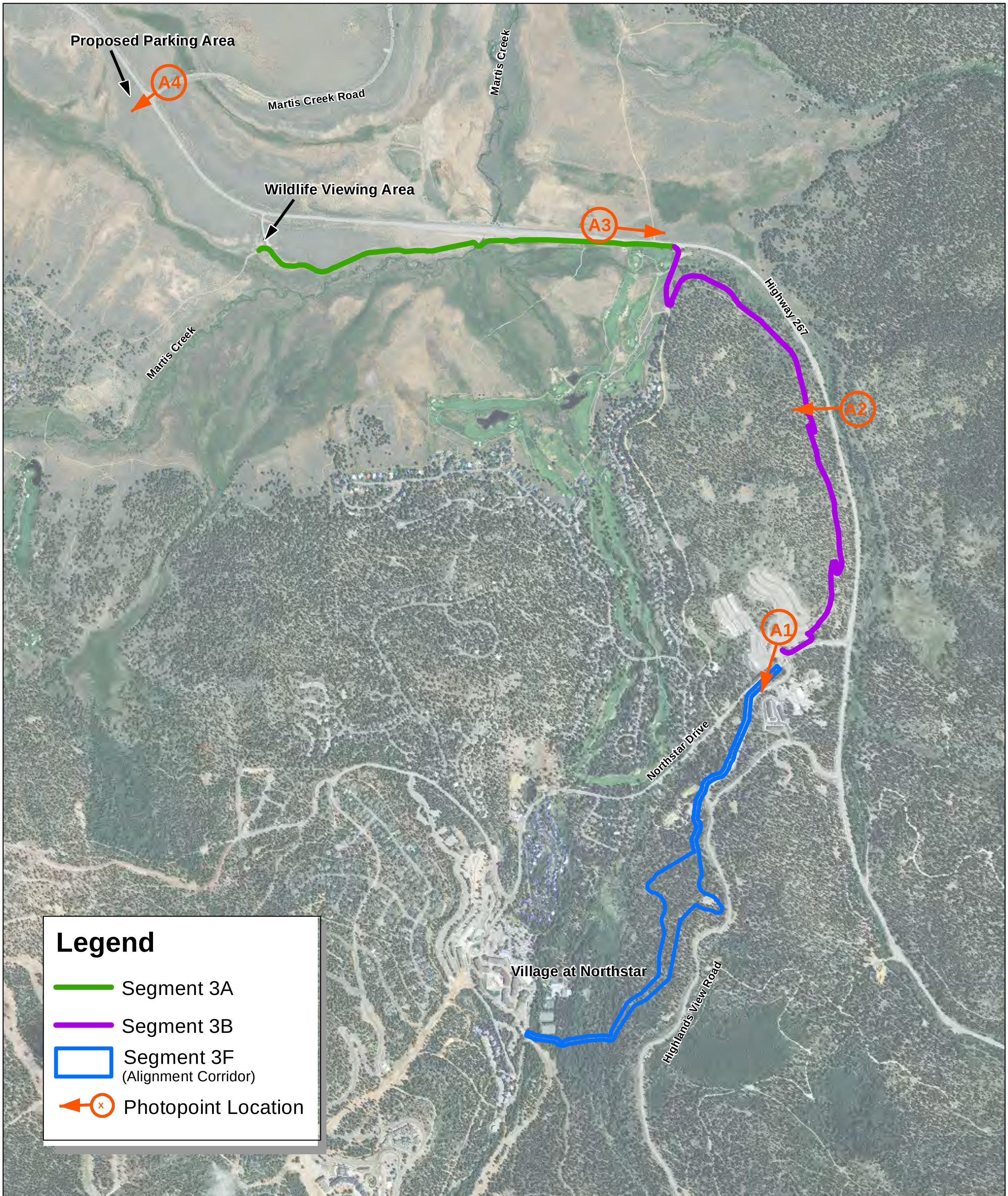
Figure 1A

SITE & VICINITY MAP

Alternative Alignments

Martis Valley Regional Trail

Placer County, California



N
0 425 850 1,700
1 inch = 1,800 feet

Aerial Photo: Placer County, 2005

Figure 2A

PHOTOPOINT MAP
Alternative Alignments
Martis Valley Regional Trail
Placer County, California

Natural Features: Segment 3A is located within a strip of sagebrush scrub vegetation between the toe of the fill slope for SR 267 and Martis Creek and a tributary to Martis Creek. Natural vegetation, including sagebrush and meadow and riparian vegetation are the primary natural landscape features, and are described in further detail in the 2009 Analysis. The area around Segment 3B is characterized by dense conifer forest upslope and to the west of SR 267.

The area around the Segment 3F trail alignment is characterized by relatively dense, even-aged coniferous forest interspersed with resort development (Photo A1). The forest in this area has been thinned in places and the brush understory cleared as part of what is assumed to be forest health and fire-safety operations. The alignment crosses the small West Fork of Martis Creek, which runs in a channel west of the Village at Northstar. This area is characterized by dense riparian vegetation.

Constructed Features: Constructed features that visually characterize Martis Valley and the area surrounding Segment 3A of the alternative alignment are described in the 2009 Analysis. These constructed features include existing trails, SR 267, and golf course and other resort development in the area.

Segment 3B: SR 267 is a visually dominant constructed feature in the area of this proposed segment of trail. Other constructed features include the small commercial plaza at the corner of Northstar Drive and SR 267, Northstar Drive, and the large parking area north of the Trimont Lane/Northstar Drive roundabout. The existing unpaved multi-use trail along this alignment is nearly entirely obscured from view from SR 267 by topography and forest vegetation and is not a dominant visual component of the landscape as viewed from either SR 267 or Northstar Drive (Photo A2). A sewer lift station, the Northstar-at-Tahoe sign, the golf course service road, and the golf course, are all visually prominent constructed landscape features located at the north end of this segment near the eastern termination of Segment 3A (Photo A3).

Segment 3F: Dominant constructed features in the area of this segment of trail include Northstar Drive, the large parking lot north of the Trimont Lane/Northstar Drive roundabout, Highlands View Road, the Northstar stables, and development associated with the Village at Northstar. Views to these constructed features from Northstar Drive, Trimont Lane, and Highlands View Road are generally near-distant as views of these features from farther away are obstructed by intervening topography and dense conifer forest.

Regional Features: Long range views to regional features from SR 267 and Northstar Drive in the vicinity of Segments 3B and 3F are largely precluded by the low elevation position of the roadways in relation to surrounding steep topography. Views to regional features from SR 267 are possible only in the vicinity of the northernmost portion of Segment 3B (near the golf course) and along the Segment 3A alignment. These views are described in the 2009 Analysis. Filtered views northwest to Castle Peak and the Sierra Crest are visible from Northstar Drive in the vicinity of the Trimont Lane / Northstar Drive roundabout. Highlands View Road is located on a steep slope which allows for expansive views to Martis Valley, the Sierra Crest, and other regional features from much of the roadway south of its intersection with Trimont Lane.

Existing Trail Facilities

Views typical of the existing trail system in Martis Valley are described in the 2009 Analysis. Primary views from the existing portion of the TMT east of the Wildlife Viewing Area are generally to the meadow, forested slopes, and golf course; views to the north are restricted by the elevated SR 267 alignment. The road surface of SR 267, and vehicles traveling the roadway, are a prominent visual feature farther east on this segment of existing trail where it is nearly level with SR 267. Long distance views from the existing unpaved multi-use path contouring around Porcupine Hill are mostly obscured by vegetation and forest immediately surrounding the trail. However, SR 267 is visible from the trail in many places and is considered a dominant constructed landscape feature along this portion of existing trail. No existing trails are in the immediate vicinity of the proposed Segment 3F.

Guidance Documents

Guidance documents and applicable policies relied upon for this analysis are identified in the 2009 Analysis.

METHODOLOGY AND IMPACT ANALYSIS

Method of Analysis

The methodology for impact analysis used in this addendum is described in the 2009 Analysis.

Viewer Groups and Viewer Sensitivity - Alternative Alignment Segments 3A, 3B, and 3F

Key viewpoints and photo locations, shown in Figure 2A, were chosen to represent typical views with potential to be affected by implementation of Segments 3A, 3B, and 3F of the alternative alignment. Photos depicting these views are provided in Figures 3G and 3H.

Viewpoints looking toward the proposed alternative alignment segments lie within *external viewsheds*. The primary external viewsheds for portions of the alternative alignment within the Valley and along SR 267 are those experienced from SR 267; the viewshed from homes within the Northstar Community, particularly those on the north side of Basque Drive and near the end of Skidder Trail; and viewsheds available to users of the existing TMT. These views are generally characterized by meadow and riparian vegetation, SR 267, golf course greens and fairways, conifer forest, adjacent residential development, and distant views of mountains along the Sierra Crest. When snow cover is present, meadow and riparian vegetation, and golf course features are not as visually prominent. The primary external viewshed for portions of the alternative alignment along Northstar Drive is characterized by conifer forest interspersed with constructed resort features including parking lots, roadways, and buildings.

Viewpoints located along the alternative alignment project corridor looking outward are considered to be within the *internal viewshed*. The view from the alternative alignment is characterized by meadow, riparian, and sagebrush scrub vegetation within the Valley, and conifer forest on slopes south and east of the Valley. SR 267 and vehicles traveling the road are an important visual element of the internal viewshed experienced from Segments 3A and 3B of the trail alignment. The viewshed from portions of Segments 3B and 3F that travel through conifer forest are generally characterized by near-distant views of dense forest and understory forest shrubs, and filtered views to resort development and regional features.

Factors that influence the visual quality of the local landscape character, as identified by the 2009 Analysis include:

- The intact nature of the large meadow and linear riparian habitat on the valley floor;
- Intact long distance views west to the Sierra Crest and Castle Peak;
- Seasonal variety in views;

- Visual contrast and continuity associated with constructed and natural elements of the existing landscape;
- Presence of existing alterations of the natural aesthetic state by constructed features including SR 267 and other roads (and cars traveling these roads), office / commercial development, golf courses, trails, ski area development, power lines, Martis Creek Dam, and residential development;

When assessing the above factors with respect to the project vicinity, the visual quality of the area may be characterized as moderate in terms of vividness, intactness, and unity, since the site includes a mix of natural and constructed visual components. However, visual response to the area is considered to be high, as the meadow and valley floor are the primary and dominant visual component of the landscape and, although bisected by SR 267 and altered by Martis Creek Dam, trails and other constructed features, remains largely intact and is a popular recreation area. As a result of existing resort development, roadways, steep topography that restricts long distance views, and a relatively homogeneous natural landscape typified by conifer forest, viewer response to views in the area along Segments 3B and 3F is considered to be moderate.

Changes to the visual environment and aesthetic character of the project area resulting from implementation of the alternative alignment were evaluated based on the trail design proposed by Northstar CSD. In particular, impacts have been evaluated in response to Appendix G of the CEQA Guidelines as it applies to evaluating project impacts to aesthetic values. Questions from Appendix G, below, have been used to determine the significance of impacts to visual resources that would result from implementing the trail project on the alternative alignment.

Would the proposed project:

a) Have a substantial adverse effect on a scenic vista?

b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

c) Substantially degrade the existing visual character or quality of the site and its surroundings?

d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

Impact Analysis

a) Would the project have a substantial adverse effect on a scenic vista?

The primary viewshed from the Wildlife Viewing Area overlook is generally to the valley southwest, south, and southeast and is characterized by views of the natural valley features of meadow, riparian, conifer, and sagebrush vegetation. From the termination of Phase 1, Segment 1 of the proposed trail at the Wildlife Viewing Area scenic overlook, an existing dirt trail is visible leading east along the narrow band of sagebrush scrub separating the fill slope of the elevated SR 267 roadway alignment from the riparian area associated with Martis Creek. The dirt track of the trail viewed from this location is approximately eight feet wide and is only visible for a short distance. Views to other portions of the trail to the east from the Wildlife Viewing Area are obstructed by the elevated alignment and fill slope of SR 267, which is the dominant landscape feature in this direction.

Segment 3A of the alternative alignment would follow the alignment of the existing dirt track east from the Wildlife Viewing Area, adjacent to SR 267, generally following the base of the fill slope of the roadway. Segment 3A would cross Martis Creek over a bridge at the existing trail bridge crossing location (Frank's Fish Bridge) and generally follow the alignment of the existing trail through sage scrub and between the northern perimeter of the golf course and the shoulder of SR 267 to its junction with Segment 3B.

Segment 3A of the alternative alignment would replace the existing dirt trail with a wider paved trail, introducing a more visually prominent linear constructed feature to the view east from the Wildlife Viewing Area. However, since the view east from the Wildlife Viewing Area is dominated by the SR 267 roadway alignment, and the proposed trail would replace the linear constructed feature of the existing trail which runs generally parallel to the highway, Segment 3A of the alternative alignment would not be expected to result in a substantial adverse impact to the quality of the scenic views of the Valley presently experienced from the Wildlife Viewing Area. The view from the Wildlife Viewing Area along the SR 267 alignment is considered of lower quality and importance than views in other directions that are not dominated by the constructed feature represented by SR 267. Segment 3A of the alternative alignment is considered appropriately sited to avoid substantial impacts to scenic views experienced from the Wildlife Viewing Area.

Segments 3B and 3F would have no effect on the quality of the scenic views enjoyed from the Wildlife Viewing Area overlook, since these segments would not be visible from the overlook.

The proposed parking lot would be adjacent to SR 267 at a distance and direction from the Wildlife Viewing Area overlook that would not substantially affect the primary views of the Valley available from the Wildlife Viewing Area overlook. The lot would be subject to design review and approval by the Army Corps of Engineers. The proposed new parking lot is expected to have no substantial effect on views from the Wildlife Viewing Area.

Recommendations to Minimize Impacts

No recommendations are necessary for minimizing impacts to views from the Wildlife Viewing Area.

b) Would the project substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?

No roadways in the vicinity of the proposed trail are designated State Scenic Highways. However, Policy 4.C.1 of the MVCP designates Northstar Drive, SR 267, and Schaffer Mill Road as County Scenic Routes.

The 2009 Analysis provides a description of the scenic resources viewable from SR 267 and important viewshed features. As discussed in a) above, Segment 3A would replace an existing dirt trail along the south side of SR 267. In areas where it is positioned near the toe of the highway fill slope at a lower elevation than the roadway, the existing dirt trail is only intermittently visible to motorists from the southbound lane of SR 267 (in this location the southbound lane travels in an easterly direction). Farther east, where the existing trail and SR 267 are at similar elevations, the existing dirt trail appears as a narrow path between the highway and the golf course and sewer lift station. Since Segment 3A would occupy an area in the Valley dominated by existing constructed landscape features, including SR 267, the golf course, and the sewer lift station, and would be only intermittently visible from the highway, Segment 3A is considered appropriately sited to avoid substantial impacts to resources that contribute to the scenic values of SR 267.

The Segment 3B alignment would depart slightly from, but would generally follow, the existing dirt trail on the slope above and parallel to SR 267 as it contours around Porcupine Hill to the south. While the existing dirt track in this location is wider than a typical foot path and accommodates maintenance vehicle access, vegetation and topographical undulations provide near total screening of it from SR 267. Where Segment 3B is proposed to run parallel to Northstar Drive up to the Trimont Lane/Northstar Drive roundabout, it would depart slightly from the alignment of the existing dirt trail, but would be visually consistent with other resort development in this area, including parking lots, roads, and commercial structures. Similar to Segment 3B, portions of Segment 3F visible from Northstar Drive would be visually consistent with other resort development in the area, and most of the alignment would be screened from view by dense conifer forest. Natural screening and compatibility with the existing recreation uses in the vicinity would ensure that Segments 3B and 3F would result in no substantial impacts to scenic resources viewed from SR 267 or Northstar Drive.

Proposed alternative Segments 3A, 3B, and 3F would not be visible from Schaffer Mill Road and would result in no impact to scenic resources viewed from this road.

The proposed new parking lot area would be visible from Schaffer Mill Road and from SR 267. It is located within a portion of the sagebrush terrace along SR 267. In this location, the parking lot and vehicles using it would be clearly visible from SR 267, and would detract from views of the Valley for motorists on SR 267. To minimize these effects, it is recommended that the parking lot surface be constructed with natural or earth tone surfacing to minimize the contrast with the natural colors of the vegetation and soils of the valley. It is further recommended that all areas temporarily disturbed during construction of this lot be revegetated.

At the viewing distance from Schaffer Mill Road the parking lot itself would not substantially alter views from Schaffer Mill Road, although vehicles parked in the lot would be visible. Since vehicles traveling the raised SR 267 alignment are clearly visible from Schaffer Mill Road in the vicinity of the proposed parking lot, this change in the viewshed is not considered to substantially degrade scenic resources as viewed from Schaffer Mill Road.

Recommendations to Minimize Impacts

1. The parking lot surface, walkways, trail connection and trail kiosk shall be constructed using natural or earth tone surfacing. A revegetation plan should be prepared and implemented for all areas disturbed by construction of the new parking lot. The plan should specify native vegetation and provide monitoring and maintenance of plantings for a period of time appropriate to ensure their survival.

c) Would the project substantially degrade the existing visual character or quality of the site and its surroundings?

As discussed in a) and b) above, the alternative alignments would be largely screened from view by topography or vegetation and would be subject to design review and approval by either Placer County or the Corps. Alternative Segment 3A would be the most visible in its alignment crossing the Valley, but would have little impact on the visual character or quality of the Valley since it would run parallel to the SR 267 alignment and would follow the route of an existing dirt trail. The alternative multi-purpose trail segments would be consistent with other resort, recreational, and transportation development visible along SR 267 and Northstar Drive, as well as within the Northstar Community, and from the existing TMT trail system. These segments would not be expected to substantially degrade the visual character or quality of the site and its surroundings.

As discussed above, the new parking area is not expected to have a substantial impact on the overall visual quality or character of the area since it would place a developed parking lot and associated vehicles within view of SR 267 in a viewshed that is presently characterized by natural vegetation and topography. Recommendation 1 in section b) above would help to minimize the effect that the parking lot would have on views from SR 267.

Recommendations to Minimize Impacts

Recommendation 1 in section b) above would help to minimize this impact. No additional recommendations are necessary.

d) Would the project create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?

The alternative segments and new parking lot would include no new sources of lighting. The discussion of lighting and glare impacts included in the 2009 Analysis is applicable to the alternative segments. Glare could reflect towards SR 267 from the windows and surfaces of vehicles using the parking lot. While revegetation of areas disturbed by parking lot construction is recommended above, the native vegetation in the area is not of sufficient height to provide screening that would prevent this effect. Use of vegetation that reaches a higher height would not be compatible with the existing vegetation. Therefore no additional recommendations are provided, and the parking lot would have a substantial effect related to glare.

Recommendations to Minimize Impacts

No recommendations are identified for minimizing impacts related to new sources of light and glare.

PUBLIC COMMENTS AND RESPONSES

The following provides a summary of comments pertaining to visual resources received in response to the Environmental Impact Report Notice of Preparation. Responses to these comments are given within the context of the analyses of the overall trail segments provided in this Addendum and the 2009 Analysis.

1. ***Where will equipment staging and material storage areas be located? If they are near 267, how will they be screened from view?***

This comment requests clarification regarding possible means of adequately screening construction equipment and material from view from SR 267. Construction of the trail would require temporary staging and storage of construction materials and use of construction equipment within the Valley. The impact to scenic views resulting from construction activities would be temporary, occurring only during the construction period, and would therefore be less than significant. However, it is recommended that construction material storage and staging areas and vehicle parking areas be located to take advantage of screening available in the project area. Screening could be provided by vegetation, topography, other constructed features (such as the sewer lift station or existing Wildlife Viewing Area parking area), or by other means determined appropriate by Northstar CSD, Placer County, or the Army Corps of Engineers at the time of construction.

2. ***Will there be lighting along the trail and/or at the parking lot? Will there be any night use of the trail?***

Please refer to the discussion of lighting and glare impacts in this Addendum and the 2009 Analysis. No lighting is proposed as part of the trail project. No prohibition on night use of the trail has been proposed. It is anticipated that the trail would receive little use outside of daylight hours. Lighting used by individual trail users at night would be of short duration and would not be expected to result in substantial glare or impacts to nighttime views.

3. ***The signs and trail amenities are visually obtrusive.***

The analysis contained in this Addendum and the 2009 Analysis addresses impacts to visual resources and aesthetics associated with implementation of the trail project and provide recommendations to mitigate impacts identified. Trail map and interpretive signs would be generally consistent with existing signs for the TMT. Bicycle and pedestrian traffic control signs would be placed only as required by trail design standards. It is anticipated that traffic control signs would be limited primarily to trail and road intersections and trailheads, and that few would be required in the Valley. Interpretive signs are proposed in the vicinity of the Wildlife Viewing Area and would not substantially alter the visual character of the area. The Wildlife Viewing Area is presently developed with trailhead amenities including parking, boulders, bollards, informational kiosk, dog clean-up bag dispenser, and a plastic portable water closet (some items are placed seasonally). The signage and trail amenities in this area would be consistent with the existing features associated with the Wildlife Viewing Area.

4. ***Martis Creek Master Plan objectives include protecting aesthetics of the area; paving would violate this objective. Color added to paving could wash out, need to be redone.***

As noted in the 2009 Analysis, the Martis Creek Master Plan includes preserving the aesthetics of the Valley as a resource use objective. This addendum and the 2009 Analysis provide an analysis of impacts to scenic resources that would result from the proposed trail project. The 2009 Analysis determines that asphalt paving in certain areas of the Valley could result in substantial impacts to important scenic qualities of the Valley and recommends colored paving to reduce contrast with natural features. Paving materials and colors would be selected to ensure long-term durability and would be subject to approval by the Corps and Placer County as part of the design review process.

5. ***Visibility of trail from SR 267 should be minimized; trail should blend with natural environment in all seasons.***

This addendum and the 2009 Analysis provide an analysis of impacts to views of the Valley from SR 267 of both the preferred and alternative alignments. The trail alignments are designed to take advantage of natural screening afforded by vegetation and topography. Recommendations are included in the 2009 Analysis to reduce contrast with natural landscape features that contribute to the scenic quality of views from SR 267.

6. ***A paved trail decreases scenic quality of the area; simply coloring the pavement doesn't reduce or avoid this effect.***

This Addendum and the 2009 Analysis identify existing constructed landscape features in the Valley that affect the integrity and intactness of the important natural landscape features that contribute to the scenic values of the area. These include existing gravel roads and trails, dirt trails, the Wildlife Viewing Area parking lot, SR 267 and roadway signing, a golf course, a utility building, utility poles, and other constructed features. The proposed trail would be consistent with existing constructed features in the area. This analysis recommends that segments of the trail most visible from primary viewpoints be colored to reduce contrast with surrounding natural features. The segment of the

Valley Alignment leading south into the Valley from the Wildlife Viewing Area would follow the alignment of an existing and visually prominent gravel access road, thereby reducing the impact associated with introducing a new constructed feature in the Valley. See also the response to item *4* above.

7. ***Any signs placed on Corps' property must comply with Corps' sign standards, graphics manuals, and Martis Creek Lake and Dam Sign Plan.***

Signs would be designed to comply with Corps standards and would be subject to approval by the Corps as part of the design review process.

8. ***What lighting is included in the project?***

No lighting is proposed as part of the trail project. However, no prohibition on night use of the trail is proposed. Please refer to *2* above.

Photo A1 – View southwest to Trimont Lane / Northstar Drive roundabout. The north terminus of Segment 3F would begin in the forested area beyond the roundabout.

Photo A2 – View from SR 267 west to Porcupine Hill. Segment 3B would generally follow the existing trail in forested area. The existing trail is not visible due to topography and vegetation.

Photo A3 – View east from shoulder of east bound SR 267. The Segment 3A alignment would parallel the road following the alignment of the existing dirt path.

north fork associates

Photo Date: August 2, 2011

Figure 3G

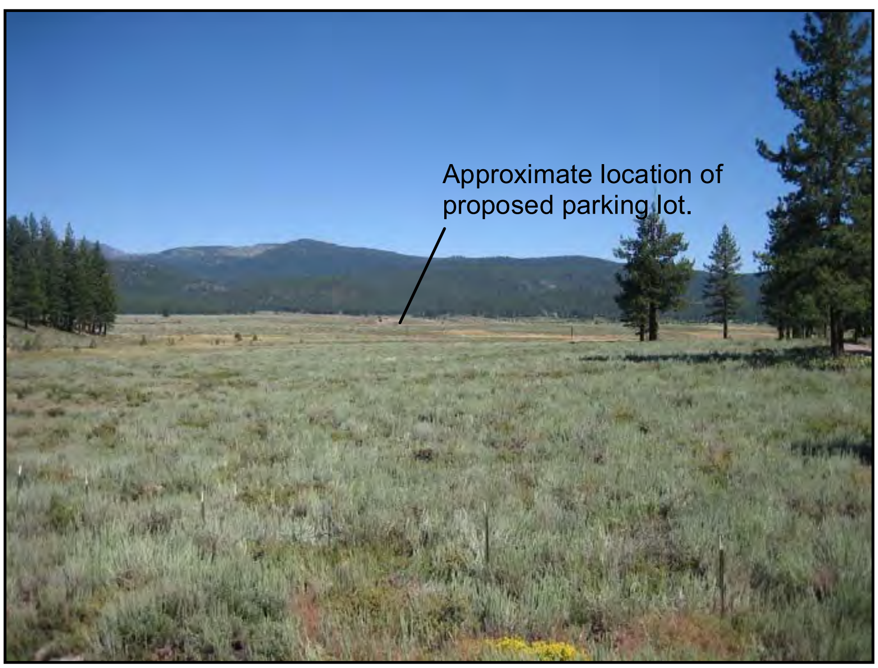
Photopoints

Alternative Alignment

Martis Valley Regional Trail

Placer County, California

Photo A24– View to southwest from the SR 267/
Martis Creek Road intersection. Proposed parking
lot would be in sagebrush area adjacent to SR 267.



(Photopoint not shown on Figure 2A) – View to southeast
from Schaffer Mill Road. Proposed parking lot would
be in sagebrush area adjacent to SR 267.

north fork associates

Photo Date: August 2, 2011

Figure 3H

Photopoints

Proposed Parking Area

Martis Valley Regional Trail

Placer County, California

REFERENCES AND OTHER SOURCES

Auerbach Engineering Corporation. *Martis Valley Trail Alignment.* AutoCAD file. April, 2011.

Federal Highway Administration. Memorandum to Regions "Aesthetics and Visual Quality Guidance Information". August 1986.

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Town of Truckee. *Trails & Bikeways Master Plan.* May 2007.

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