

RECLAMATION

Managing Water in the West

Final

**ENVIRONMENTAL ASSESSMENT
MIDDLE ROSEWOOD CREEK RESTORATION
IMPLEMENTATION AREA A**



U.S. Department of the Interior

Bureau of Reclamation
Mid-Pacific Region
2800 Cottage Way
Sacramento, California 95825

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TABLE OF CONTENTS

1.0	Introduction	1
1.1	Background	1
1.1.1	Project Site Location	1
1.1.2	Watershed Conditions	1
1.1.3	Landowners and Project Proponents	2
1.2	Purpose and Need	3
1.2.1	Need	3
1.2.2	Purposes	4
1.3	Scope of the Environmental Document	4
1.4	Scoping and Public Outreach	5
1.4.1	Agency Scoping	5
1.4.2	Public Outreach	5
1.4.3	Scoping Issues	6
2.0	ALTERNATIVES EVALUATION	7
2.1	Alternative(s) Eliminated from Further Analysis	7
2.1.1	Stabilize In Place	8
2.1.2	Inset Floodplain	8
2.2	Design Objectives	9
2.2.1	Stream Water Quality	9
2.2.2	Flood Hazards	9
2.2.3	Forest Health/Wildlife Habitat	9
2.2.4	Aquatic Habitat	10
2.2.5	Fish Passage	10
2.2.6	Fish Access	10
2.2.7	Urban Stormwater	10
2.2.8	Construction Activities	10
2.3	Environmental Commitments	11
2.4	No Action Alternative	11
2.5	Preferred Alternative	11
2.5.1	Constructed Features	12

2.5.2 Expected Benefits	14
2.5.3 Construction Activities	14
2.5.4 Schedule and Phasing	15
2.5.5 Area to be disturbed	16
2.5.6 Operation, Maintenance and Replacement Measures	16
2.6 Selection of the Preferred Alternative	17
3.0 AFFECTED ENVIRONMENT, ENVIRONMENTAL CONSEQUENCES & PROPOSED MITIGATION MEASURES	18
3.1 Geology and Soil Resources (Geo)	18
3.1.1 Impacts	19
3.1.2 Proposed Mitigation	19
3.2 Wetlands and Stream Environment Zone (Wet)	19
3.2.1 Impacts	20
3.2.2 Proposed Mitigation	21
3.3 Floodplains (FP)	22
3.3.1 Impacts	23
3.3.2 Proposed Mitigation	23
3.4 Water Quality (WQ)	24
3.4.1 Impacts	24
3.4.2 Proposed Mitigation	25
3.5 Biological Resources – Vegetation (Veg)	25
3.5.1 Impacts	26
3.5.2 Proposed Mitigation	27
3.6 Biological Resources – Wildlife (Wild)	27
3.6.1 Impacts	29
3.6.2 Mitigation	29
3.7 Archaeological Resources	30
3.7.1 Impacts	30
3.7.2 Proposed Mitigation	30
3.8 Indian Trust Assets	30
3.8.1 Impacts	31
3.8.2 Proposed Mitigation	31

3.9	Land Use and Facility Resources	31
3.9.1	Impacts	31
3.9.2	Proposed Mitigation	32
3.10	Recreation Resources (Rec)	32
3.10.1	Impacts	32
3.10.2	Proposed Mitigation.	32
3.11	Social and Economic Factors	32
3.11.1	Impacts	32
3.11.2	Proposed Mitigation.	33
3.12	Environmental Justice	33
3.12.1	Impacts	33
3.12.2	Proposed Mitigation:	33
3.13	Summary of Mitigation Measures	33
4.0	CONSULTATION AND COORDINATION	36
4.1	Endangered Species Act	36
4.2	Fish and Wildlife Coordination Act	36
4.3	National Historic Preservation Act of 1966, as amended (16 U.S.C 470 et seq.), Historic and Archaeological Resources Protection Act (16 U.S.C 470AA et seq.), Protection of Historic Properties (36 CFR 800).	36
4.4	Clean Water Act (33 U.S.C. 1251 et seq.)	36
4.5	Executive Order 11988 – Floodplain Management	37
4.6	Executive Order 11990 – Protection of Wetlands	37
4.7	Executive Order 13112 – Invasive Species	37
4.8	Public Review of the Draft Environmental Assessment	37
5.0	References	38

TABLES

Table 1	Land Ownership for Implementation Area A	3
Table 2	Summary of Land Disturbance	16

FIGURES

Figure 1	Rosewood Creek Vicinity Map	(attachment)
Figure 2	Project Site – Implementation Area A	(attachment)
Figure 3	Rosewood Creek -Area A Proposed 100-yr 48 cfs Inundation Extent	(attachment)

APPENDICES

Appendix 1	50 percent Design Plans	(attachment)
Appendix 2	FEMA Flood Insurance Rate Maps (FIRMs)	(attachment)
Appendix 3	Sensitive Species List	(attachment)
Appendix 4	Noxious Weeds Report	(attachment)

1.0 INTRODUCTION

1.1 Background

1.1.1 Project Site Location

Rosewood Creek is a branch of Third Creek, located in the Lake Tahoe Basin within Incline Village, Washoe County, Nevada (Figure 1). The Rosewood Creek watershed encompasses a total area of 1.15 square miles with the headwaters located at an elevation of approximately 8,500 feet Mean Sea Level (MSL) in the Carson Range. The middle reach of Rosewood Creek is between State Route (SR) 431 and SR 28, and ranges in elevation from 6,835 to 6,371 feet. The Project Site (Figure 2) is between 230 feet upstream of Northwood Boulevard and SR 28 (also known as Lake Tahoe Boulevard), referred to as Area A in the Implementation Plan (Valley & Mountain Consulting 2006).

The watershed is relatively long and narrow with a 2.7 mile long channel with a low flow¹ connection to Third Creek downstream of SR 28; now configured as a structural overflow diversion to Third Creek a few hundred yards downstream of SR 28. The watershed of Third and Rosewood Creeks has been modified from its natural state since the late 1800s by intensive logging, livestock grazing, mining, fire exclusion, and urban development. In addition to increased erosion and sedimentation, these activities have degraded the mixed riparian, wetland, and fish habitats. Modern development, in particular the construction of roadways and culverts across creeks and changes to hydrology, have modified the creek beds, banks, flows, and sediment loads in such a manner that has resulted in streambed incision, a disconnected floodplain, and drying of stream environment zones, riparian areas and wetland resources.

1.1.2 Watershed Conditions

Stabilization of Rosewood Creek was identified in watershed studies as an important erosion control priority (Watershed Restoration Associates 1999 and Swanson 2000).

Based on over two decades of sampling data, out of the 63 drainages in the entire basin, only the Upper Truckee River, Blackwood, Second and Trout Creeks contribute more total suspended sediment than Third Creek, measured in mean annual tons. Normalized to drainage area, however (and using only those streams with data collected for periods longer than 5 years), Third Creek produces more total suspended sediment yield than any other drainage, except for Blackwood Creek. Third Creek also produces 94 percent of fine-grained suspended sediment mass per acres as Blackwood Creek (Mainstream 2005).

Most of Lower Rosewood Creek was constructed in 2003 as a small channel with inset floodplain areas with flows regulated by an upstream diversion structure designed to help maintain channel stability. The section of Rosewood Creek between the diversion structure and the SR 28 crossing exhibits a relatively healthy channel with well-vegetated riparian margins. This reach was relocated and stabilized as part of the construction of the Incline Village Middle School and associated sports complex and ball fields.

¹ Low flow refers to the 'lowest' elevation portion of channel, which is the portion of a single or multiple thread channel which is the first to become wet and last to dry up between storms or seasons.

Rosewood Creek exhibits advanced signs of vertical channel incision and systematic head cutting through Area A. The creek has wide top and bottom widths with a narrow inner floodplain with mature riparian vegetation including alders.

Several environmental improvement projects focused on SEZ and water quality objectives have been implemented within the Rosewood Creek/Third Creek watersheds:

The [lower] Rosewood Creek SEZ Restoration Project, completed on Incline Village Improvement District (IVGID) property in 2003 was the second sediment reduction project within the watershed, in the same area as the 1997 project undertaken in IVGID property by the Natural Resources Conservation Service (Mainstream 2005). The 2003 project involved the construction of grade control structures, extended the Rosewood Creek channel 3,000 feet further downstream, and incorporated five flow spreading basins, before entering Third Creek at Lakeshore Boulevard. Strategically placed along the stream length, the vegetated spreading basins allow fine-grain sediment to settle out before reaching Third Creek.

Restoration of Implementation Area F was completed on Middle Rosewood Creek in 2008 by Washoe County and the Nevada Tahoe Conservation District (NTCD). The Area F project was located between Village Boulevard and College Drive and was the first restoration project in Incline Village on private land. The project installed in-channel grade control structures to minimize additional down cutting of the streambed and prevent migration of existing channel knickpoints. The project also included enhancements to the existing culvert outfall at College Drive and installed new pre-treatment of urban runoff along McDonald Drive and College Drive, prior to discharge to the Rosewood Creek.

A fourth project, the Lower Third Creek Restoration Project, was completed on public land by IVGID in October of 2009. The Lower Third Creek project was located on the main stem of Third Creek between Lakeshore Boulevard and Incline Way. The project restored SEZ, enhanced aquatic and riparian habitat, and improved water quality by grading back bank slopes, excavating an inset floodplain, constructing bank stabilization treatments and installing rock and wood grade control structures.

1.1.3 Landowners and Project Proponents

Implementation Area A begins approximately 230 feet north of Northwood Boulevard and extends downstream to State Route 28 (stations 23+35 to 2+80), and includes reaches 1 through 6 as described in the 2005 Mainstream report. Most of the proposed work areas and construction access/staging sites would be sited within the Third Creek HOA, on private land with multiple-party ownership of the common areas. Third Creek HOA is led by a board of supervisors and managed by a property management service. The proposed culvert improvements at Northwood Blvd would be located in the Washoe County right-of-way (ROW). Additional site access, storage areas, staging areas, drainage easements, and temporary access easements on private parcels and/or public ROW (see Table 1) would be required as part of this proposed project.

The proposed project proponent (project owner) is Washoe County, NV assisted by the Nevada Tahoe Conservation District (NTCD). The NTCD has led the planning, design, landowner coordination and environmental review, but Washoe County would bid the project, oversee construction and provide 10 years of maintenance.

Table 1. Land Ownership for Implementation Area A

APN	Ownership Type	Ownership/Contact
132-233-01	Private, Individual	Craig Robinson
132-061-01 to 132-061-24	Private, Association	Third Creek, LLC
132-062-01 to 132-062-35	Private, Association	Third Creek, LLC
132-063-01 to 132-063-33	Private, Association	Third Creek, LLC
132-064-01 to 132-064-32	Private, Association	Third Creek, LLC
132-065-01 to 132-065-16	Private, Association	Third Creek, LLC
132-460-00*	Private, Association	Owners of the Pointe at Third Creek
131-200-00	Private, Association	Club Tahoe
SR28	Public ROW	Public Right-of-Way (NDOT)
Northwood Blvd	Public ROW	Washoe County
Northwood Blvd	Public ROW	Washoe County
131-110-02*	Private, Organization	Intl Church/Foursquare Gospel

* Parcel is not within the permanent project footprint. It may be used for construction access, staging and storage only.

1.2 Purpose and Need

1.2.1 Need

The primary need for restoration of the project area is to address its substantial source of sediment to Lake Tahoe as a result of channel erosion prompted by historic and continuing watershed and site-specific effects on hydrology and sediment loads due to human activities.

Rosewood Creek has been the focus of several studies over the years aimed at identifying, prioritizing and correcting sources of pollution, particularly degraded Stream Environment Zone (SEZ) conditions and processes that negatively affect surface and groundwater quality contributing to Lake Tahoe. Functioning SEZs have been found to be very effective in removing nutrients and sediments. Additional benefits of maintaining, restoring, and protecting SEZs are their ability to reduce flood peaks, diffuse flow, increase evapotranspiration, and increase the retention time of surface water.

The middle reach of Rosewood Creek, from SR 28 to Incline Village Mountain Golf Course in Incline Village has erosion control/sediment loading issues. In some sections the channel has become incised while in others a wide portion of the floodplain has been eroded or encroached upon by development. As a result, significant amounts of sediment are being eroded along the creek channel and are transported downstream to Lake Tahoe. The estimated channel erosion to-date within Implementation Area A is 6,533 cubic yards and anticipated future channel erosion could generate 9,934 cubic yards if left untreated (Mainstream 2005). The Third Creek drainage, of which Rosewood Creek is a sub-basin, has been identified as one of the highest contributors of sediment to Lake Tahoe on the Nevada side.

1.2.2 Purposes

The purposes of the proposed project, listed in priority order (high to low) are:

- Improve Stream Water Quality
- Protection from Flooding
- Improve Forest Health/Wildlife Habitat
- Enhance Aquatic Habitat
- Improve Fish Passage
- Pre-Treat Urban Stormwater
- Improve Fish Access

Project goals were developed based on the 19 Dec 2008 Technical Advisory Group² (TAG) discussion and follow-up discussions and research by the TAG members (see Section 1.4.1) and the design team (Valley & Mountain Consulting, Entrix, Inc. and Wood Rodgers, Inc.).

A meeting with TRPA staff on 05 Mar 2009 provided additional clarification and hierarchy for the proposed project goals. TRPA is charged with protecting the Lake Tahoe Basin as a national treasure for the benefit of current and future generations. Their vision is to have a lake and environment that is clean, healthy, and sustainable for the community and future generations. The Middle Rosewood Creek Restoration Project goals are based on one of the TRPA's Core Values:

Environmental Protection: Serving as stewards of Lake Tahoe and attaining environmental thresholds while sustaining the ecological, social, and economic well being of the Tahoe Region.

A detailed discussion of the project objectives is provided below in Section 2.2, Design Criteria.

1.3 Scope of the Environmental Document

The proposed project must meet the regulatory compliance requirements of the National Environmental Policy Act (NEPA), the Tahoe Regional Planning Agency (TRPA), Washoe County, and the Nevada Division of Environmental Protection (NDEP).

Reclamation provided grant funds to NTCD for project engineering, design, and environmental compliance of a project that would control the source(s) of sediment originating from middle Rosewood Creek Area A. The use of the Reclamation grant funds for this project constitutes a Federal action initiating compliance with NEPA. This document serves as an Environmental Assessment (EA) for the United States Department of the Interior (USDOI) Bureau of Reclamation (Reclamation), the lead federal agency. This EA has been prepared in accordance

² TAG members for the project include all the funding, planning, and regulatory agencies: Nevada Tahoe Conservation District, Washoe County, U.S. Bureau of Reclamation, U.S. Army Corps of Engineers, Nevada Division of Environmental Protection, Nevada Division of State Lands, Nevada Division of Wildlife, Nevada Department of Transportation, and the Tahoe Regional Planning Agency.

with Reclamation guidance (Reclamation 2000) and Council of Environmental Quality (CEQ) Regulations 40 CFR 1500 et seq.

This EA describes the existing environmental resources in the project site, evaluates environmental effects of the no action and preferred alternative, and proposes mitigation measures to avoid or reduce any adverse environmental effects to less-than-significant levels. The Mid-Pacific Region of Reclamation must determine, based on the EA, whether or not the proposed restoration project qualifies for a finding of no significant impact (FONSI) or whether an Environmental Impact Statement (EIS) must be prepared.

Environmental compliance for the proposed project pursuant to TRPA requirements is being completed in parallel with the Reclamation NEPA process. A TRPA expanded “Initial Environmental Checklist” (IEC) has been prepared in accordance with Article VIII of the Tahoe Regional Planning Compact, Chapter 5 of the TRPA Code of Ordinances, and Article IV of the TRPA Rules of Procedure. Based on the IEC, TRPA will make findings regarding whether sufficient information is provided by the IEC and whether the project (with mitigation measures) could have a significant effect on the environment.

1.4 Scoping and Public Outreach

NTCD, as the project planning and design sponsor, has led all public outreach and agency advisory activities since the inception of the Middle Reach Rosewood Creek project in 2005.

1.4.1 Agency Scoping

The project TAG is comprised of personnel from NTCD, Reclamation, Nevada Department of Transportation (NDOT), Nevada Department of Wildlife (NDOW), Nevada Division of State Lands (NDSL), Nevada Department of Environmental Protection (NDEP), TRPA, Washoe County Public Works (WCPW), US Army Corps of Engineers (ACOE) and the design team (Valley & Mountain Consulting, ENTRIX, Inc., Wood Rodgers, Inc.). The TAG’s purpose is to provide technical input and review, ensure that all relative agencies concerns and missions are represented, and to guide the proposed project through required processes. The TAG has coordinated on the overall Middle Reach since 2006, and the following TAG meetings specifically addressed Implementation Area A:

- Kick off meeting/25% design review: Dec 19, 2008 at NTCD Office
- Preliminary 50% design: July 1, 2009 at NTCD Office
- Final 50% design: November 17, 2009 at NTCD Office

1.4.2 Public Outreach

NTCD has facilitated meetings with affected landowners (Table 1) and other stakeholders regarding the Implementation Area A project on the following dates:

2/20/09, 2/24/09, 2/25/09, 4/6/09, 4/24/09, 4/27/09, 6/30/09, 9/9/09, and 10/5/09.

1.4.3 Scoping Issues

Specific issues that were identified by involved agencies and/or the public are listed below, and have been considered during the design process and environmental review of the proposed project.

- Determination of lead agency for NEPA compliance
- Level of NEPA compliance required to support a Reclamation decision
- Private property easements/agreements for construction and maintenance/monitoring
- Current and future funding requirements and sources
- Determination of proposed project sponsor for construction and maintenance periods
- Coordination of residential BMP (best management practices) retrofit requirements with proposed project design and construction
- Restoration revegetation coordination with adjacent private property owners
- Coordination of forest health/fuel reduction measures with proposed project implementation and revegetation maintenance
- High groundwater and surface water flooding

2.0 ALTERNATIVES EVALUATION

Alternatives analyzed in this document included the No Action Alternative and the Preferred Alternative. In addition to satisfying the requirements of NEPA, the environmental analysis per TRPA Code of Ordinances must determine that the project would not have a significant effect on the environment.

In 2005, NTCD supervised the preparation of a comprehensive geomorphic and riparian assessment of the middle reach of Rosewood Creek. Based on the results of that assessment, NTCD retained a consulting team to prepare a conceptual design for restoration of the middle reach. Detailed engineering and implementation of specific sub-reaches, known as “areas,” was initiated starting upstream with Area F and continuing with the presently proposed Area A. All of the measures would directly or indirectly reduce long-term sediment loads to Lake Tahoe and contribute positively to basin wide goals for water quality and soil conservation.

Alternatives featuring various types and degrees of treatments, such as: stabilization, reconstruction, and relocation within the existing floodplain were considered during the 2005-2006 conceptual design phase. Concept alternatives were based on technical information that indicated their potential ability to achieve the proposed project goals. The concept alternatives were screened by NTCD and the TAG, including alternatives described in the 2005 Mainstream report, the 2006 Concept Plan and Implementation Plan, and additional options considered during the 50 percent design step based on additional data collection and analyses. Alternatives were reviewed relative to project-specific goals (section 1.3.3, above) and priorities expressed by the sponsors, regulators, and landowners, within the context of funding constraints and opportunities. The final screening of alternatives rated their ability to meet design objectives (section 2.2, below) as well as the environmental commitments (section 2.3, below).

Alternatives considered during the planning process, but screened out from additional consideration, are described below, as they are not analyzed further in this document.

2.1 Alternatives Eliminated from Further Analysis

Individual restoration opportunities and an overall restoration concept for the entire middle reach of Rosewood Creek, including Implementation Area A, were presented by Mainstream (2005) based on several data sources and factors. The analysis summarized and screened conceptual restoration approaches developed by prior studies in the area (Swanson 2000, ENTRIX 2001, USACE 2004) and presented suggestions and priorities for restoration of all portions of the middle reach of Rosewood Creek. Alternatives considered for Implementation Area A at this stage of planning ranged from backfilling the entire existing channel (and relocating a new channel) to stabilizing the creek in place at the existing bed elevation (Entrix 2001 and Mainstream 2005).

The 2006 Concept Plan/Implementation Plan (Valley & Mountain Consulting 2006a & b) further developed and evaluated restoration options for the entire middle reach, including Implementation Area A. Conceptual measures were examined in regards to their engineering, environmental, and economic feasibility, and their potential to address identified problems.

Preliminary restoration options were evaluated, compared, and screened by a TAG at the time of the 2006 Concept Plan/Implementation Plan. Criteria applied at that time included how

completely a proposed measure would address the problems, how effective the proposed measure would be over the long term, its constructability and potential environmental permitting/construction phase mitigation requirements and a qualitative cost-benefit analysis relative to proposed project objectives.

A summary of the alternatives for Implementation Area A previously considered, but eliminated, are discussed below:

2.1.1 Stabilize In Place

An Alternative to stabilize the existing channel in place, at the present bed elevation and approximate size, was eliminated from further analysis because it would not raise the streambed or the water table and would not result in ecological benefits across the whole SEZ.

Due to the hydraulic and soil conditions, hardened (rock-dominated) protective treatment of most streambed and streambank surfaces would be required. Protective treatment would minimize the potential for revegetation benefits along the streambanks. Additionally, the existing streambed profile breaks (knickpoints) would likely continue to pose fish passage limitations and/or have adverse hydraulic impacts since high flows would still be confined in the incised channel. Leaving the bed elevation at its existing elevation would reduce any potential hydraulic or aquatic resource benefits to be gained from replacing/repositioning the deteriorating culvert under Northwood Boulevard.

This alternative would require extensive disturbance along the entire existing channel although its benefits would be relatively limited to water quality pollutant source reduction (control streambank and streambed erosion). Few other project goals could be realized. The extensive work along the active channel would present some construction phasing and water quality protection challenges, because the newly constructed features and disturbed area at the top-of-bank would not have a period of time for vegetation to become established before natural flows would be resumed.

2.1.2 Inset Floodplain

Another alternative would have excavated a new, inset floodplain with a small low flow channel within the existing streambed elevation. But because it would not raise the streambed or the water table and would not result in ecological benefits across the whole SEZ, it was eliminated from further analysis.

Since a small inset floodplain would be created the hydraulic conditions would be somewhat improved relative to existing conditions or the alternative to stabilize the existing channel in place (described above). However, the hydraulic conditions of the site (i.e., steepness), would make it likely that despite creating an enlarged inset floodplain by excavation, hardening of the toe of bank and/or bed of channel would still be required in portions of the site to avoid erosion during high streamflow. This would reduce the potential for revegetation benefits along the streambanks. The existing streambed profile breaks (knickpoints) would possibly continue to pose fish passage limitations and/or have adverse hydraulic impacts since high flows would still be confined in an inset floodplain, although some improvement relative to existing conditions or the stabilize-in-place alternative could result. Leaving the bed elevation at its existing elevation

would reduce any potential hydraulic or aquatic resource benefits to be gained from replacing/repositioning the deteriorating culvert under Northwood Boulevard.

This alternative would require extensive disturbance along the entire existing channel and the off haul of excavated material, although the benefits would be relatively limited to water quality pollutant source reduction (minimizing streambank and streambed erosion). Few other project goals could be realized. The extensive work in the active channel would present construction phasing and water quality protection challenges, because the revegetated areas of newly constructed low flow channel and inset floodplain, and disturbed areas at the top-of-bank would not have a period of time for vegetation to become established before natural flows would be resumed.

2.2 Design Objectives

Several design objectives and environmental commitments (see section 2.3 below) consistent with the project goals, have guided screening of the Alternatives and development of the Preferred Alternative design (see 50 percent design plans in Appendix 1). These objectives will be reflected in the final design plans and specifications. The proposed design approach features channel relocation and reconstruction, along with some areas of fill removal and channel stabilization, as described in greater detail under section 2.5, Preferred Alternative.

2.2.1 Stream Water Quality

The post-project channel capacity and floodplain topography would result in overtopping on to an active floodplain for at least several days every couple of years, assuming hydrologic conditions are similar to the historic record. Short-term potential water quality impacts would be minimized by conducting most of the construction in dry conditions (along the restored alignment); work in the active channel would be restricted to limited areas. The newly constructed channel bed and bank surfaces would be revegetated, irrigated, and allowed to establish for a minimum of one full growing season to allow vegetation to stabilize soils before releasing the full active flow Rosewood Creek.

2.2.2 Flood Hazards

The proposed channel and floodplain topography or roughness changes would not allow a 100-year flood event (1% annual chance) to expand the FEMA Special Flood Hazard areas to include any structures not already so mapped. Changes to the 100-year floodplain, required to achieve project goals of re-activating portions of the SEZ, would be limited to those that would not worsen the FEMA status of any structures, and any changes would require notification and provide a review opportunity for potentially affected property owners.

2.2.3 Forest Health/Wildlife Habitat

The short-term and long-term changes in riparian and upland plant communities would be those essential for proposed project implementation. Native species would be used for channel stabilization, erosion control, and habitat enhancement in the proposed channel, backfilled channel, and disturbed SEZ and upland areas. Proposed revegetation species would be selected to suit anticipated post-project soil and hydrologic conditions. Existing vegetation salvage and reuse would be practiced to the full extent practical. Removed trees would be reused in the proposed project as mulch, habitat features, or for some grade control structures. Live willow

and alder root wads would be pruned, and stockpiled along with cuttings with a water source to avoid desiccation, then replanted where appropriate within the site. Topsoil would be salvaged and stockpiled for reuse during revegetation treatments. Known noxious/invasive weeds within the site would be removed. To the full extent possible, short-term impacts to vegetation and wildlife habitat would be consistent with wildfire fuel reduction and enhanced habitat for wildlife species of special significance (see section 3.6 ‘Biological Resources-Wildlife’ for details).

2.2.4 Aquatic Habitat

Aquatic habitat and stream function would be improved by creating a channel system with appropriate size, slope, shape, materials, and streambank vegetation to enhance the physical habitat for potential resident fish and macroinvertebrates. The aquatic habitat would be improved over its present ‘marginal’ rating by TRPA.

2.2.5 Fish Passage

The potential for fish movement within the site would be improved by modifying the stream channel profile, shape, debris jam potential. The fish passage conditions would be improved over the present ‘marginal’ rating by TRPA.

2.2.6 Fish Access

The project would remove debris impairments to potential migratory fish access at the downstream end of the proposed project reach (at the inlet/outlet of the existing SR 28 culvert). The project would modify the culvert crossing configuration at Northwood Boulevard to improve potential migratory fish access at the upstream boundary of the project reach.

2.2.7 Urban Stormwater

The modified channel alignment and/or any floodplain topography changes would not interfere with potential installation or function of proposed landowner BMP retrofit measures. The proposed project would incorporate stormwater improvements within the public right-of-ways as requested by Washoe County and/or NDOT. A concurrent Washoe County water quality and erosion control project is likely to address stormwater treatment along adjacent roads in the same time frame as this project.

2.2.8 Construction Activities

Construction access, staging and storage would be limited to the minimum necessary. The storage and staging locations would be as close as possible to the construction area and would be coordinated with all public entities and private landowners. Wherever feasible, staging and storage areas would be sited on previously disturbed lands, areas to be disturbed by planned restoration activities or areas that would benefit from revegetation. Upon completion of construction the staging, storage, and access areas would be restored to preconstruction topography and all disturbed soils would be stabilized by the application of revegetation and other temporary and permanent stabilization treatments. The overall duration, phasing, and seasonal timing of construction activities would provide the best opportunities for water quality protection and successful revegetation, while minimizing public and private traffic and access issues.

2.3 Environmental Commitments

The proposed project, by design and regulation, is an Environmental Improvement Program (EIP) project, intended to result in long-term environmental benefits. To reduce the potential for short- or long-term adverse consequences, the proposed project design and implementation would incorporate the following environmental commitments:

Alleviate long-term adverse water quality impacts resulting from unstable and eroding stream channels within Implementation Area A of Rosewood Creek. The proposed project would prevent continued streambed and streambank erosion that generates sediment transported downstream. The proposed project would increase the opportunities for sediment transported into the project area to settle out and be sequestered on a functional, vegetated floodplain. These measures would reduce sediment loads to lower Rosewood Creek, Third Creek and Lake Tahoe.

Install or accommodate permanent BMPs to treat urban stormwater runoff prior to discharge to the creek along Northwood Boulevard

Provide long-term enhancement of the riparian plant community through a revegetation design using native species adapted to the climate, topography, and surface and ground water hydrology expected following the stream/floodplain restoration.

Provide short-term measures to protect water quality including temporary BMPs during construction. The proposed project design includes standard BMPs (Sheets D-1 and D-2, Appendix 1).

Protect the plant community by limiting disturbance to only that necessary to conduct the construction and forest health activities.

2.4 No Action Alternative

In the absence of the Preferred Alternative, no direct or indirect measures would be implemented. The expected channel response would be to continue to incise and widen into the future. Knickpoints would migrate upstream and the channel would widen via bank failures. These processes would extend and expand the incised channel, further reducing surface water overbanking and groundwater support to SEZ vegetation on the surrounding terrace surface. Decreased vigor of riparian trees, along with streambank failures would potentially create more debris jams that temporarily trap sediment and/or impair fish passage. Continued lowering of the local groundwater table and lack of overbank flows would decrease opportunities for natural riparian vegetation establishment/rejuvenation. The continued degradation and instability of the Rosewood Creek channel through Area A would perpetuate high total and fine sediment loads to Lake Tahoe. The No Action Alternative does not meet the project goals nor the Purpose and Need for the proposed project. Specific effects of the No Action Alternative are described in more detail by topic within Section 3.0, below.

2.5 Preferred Alternative

Since no single treatment would be effective at addressing all restoration objectives, the Preferred Alternative proposes a combination of channel relocation, reconstruction, and stabilization, along with reshaping of the floodplain.

2.5.1 Constructed Features

The primary features of the Preferred Alternative are to:

- relocate the stream channel within the SEZ to incorporate former channel remnants and provide a stream length and profile that is suitable for the existing valley topography.
- replace the enlarged and incised channel with a geomorphically sized low-flow channel excavated within the existing surrounding floodplain;
- modify the topography of the active floodplain adjacent to the relocated channel to accommodate overbank flows;
- backfill the existing degraded channel to reconnect the topography with adjacent surfaces and restore wetland/SEZ conditions;
- install buried grade controls at strategic locations along the new channel and across the entire floodplain to prevent re-capture of the backfilled existing channel and avoid future incision of the new channel;
- install a new culvert of appropriate size and orientation under Northwood Boulevard to improve the stream profile, connect to the reactivated floodplain and improve fish passage; and,
- remove existing fill material from within the SEZ upstream of Northwood Boulevard and restore functioning active floodplain/wetland.

The proposed improvements are shown on Sheets P-1 through P-4 of the 50% design plans, with a profile of the new channel on Sheets PR-1 and PR-2 and cross sections on sheets XS-1 and XS-6 (Appendix 1). Details for the proposed improvements (grade controls, treatment improvements, etc.) can be found on sheets D-1 through D-8 of the proposed project plans.

The alignment of the new channel is based on a combination of field inspection and map interpretation of the topography including remnant channel features on the abandoned floodplain (i.e., terrace), landowner knowledge of the historic channel positions, and iterative hydraulic modeling to minimize flood flow depths and velocities outside the channel.

The size of the new low flow channel is based on local analog creek sections (having good channel condition and floodplain connection) and statistical analysis of hydrology for the Rosewood Creek, Third Creek and Incline Creek watersheds. At the 50 percent design level the average channel dimension would, on average, be 2 feet wide and 0.75 feet deep, with a conveyance capacity of about 4.5 cfs. Due to the steep, narrow valley and the existing irregular topography, the design is driven by measures to maintain channel stability under moderate flood flows (e.g., 10-year to 20-year events) and to limit potential floodplain and channel erosion under large flood flows (e.g., 50-year to 100-year events). Within this overall framework, the design provides for a low flow channel of appropriate size, slope, and materials to have maximum ecological and water quality functions under normal flows and small peak events (i.e., 2-year to 5-year events). The proposed average channel dimensions will contain normal flows without excessive shear stress. The size and shape of the channel would be varied somewhat within the reach to match the pattern of valley slope changes, such that some steeper sections

would be slightly narrower and deeper (with coarser stable bed elements) and the gentler sections would be slightly wider and shallower (with finer grained bed material). The expected excavation depths for the new channel would typically be a little less than two feet, allowing for over excavation to prepare the streambed, which will be covered with placed material of specific size ranges (e.g., coarse sand, small gravel, large gravel). In a short section where an oversized remnant channel will be incorporated, up to 4 feet of fill may be required to establish appropriate dimensions for the new channel. Some rock steps and/or pools would be constructed within the channel mimicking natural features that would occur in channels of this average slope (~6.5 percent).

Along the new low flow channel and in the proposed active floodplain area, irregular topography that would pose erosion hazards during moderate to large flood flows would be re-contoured with local cut-and-fill, topsoil salvaged and then revegetated. The expected depths of cut and fill for topographic modifications are minor, ranging from less than one to two feet. The floodplain topography modifications are necessary to prevent flow routing that could lead to rill and gully erosion, given the steep valley slope and weak soil materials. A low earthen berm would be constructed to smooth and raise, where needed, existing irregular topography on the east margin of the active floodplain. The berm would be positioned to redirect flood waters in the unexpected event they reach low topography outside the modeled 100-floodplain. It will not modify drainage patterns or interfere with private parcel BMPs serving the existing developed properties to the east. The berm would be an additional assurance that existing structures outside the 100-year floodplain would be protected.

The existing incised Rosewood Creek channel would be abandoned (1,865 linear feet) and backfilled with 5,350 cubic yards of soil. At several locations buried sheet pilings and engineered backfill would be installed to regulate down valley and cross valley groundwater flows within the backfilled channel.

Nine grade control structures would be installed under the new channel and 13 grade control structures would be buried across the floodplain and backfilled channel. Proposed locations of the channel and floodplain grade control structures were determined by geomorphic and engineering principles to minimize and/or arrest potentially destructive geomorphic changes. These measures would prevent recapture of the existing backfilled channel alignment, even under the 100-year flood event. These measures will limit future incision, while allowing for some natural channel adjustments in planform and profile of the proposed new channel.

The proposed project would restore the disturbed SEZ/floodplain on the north side of Northwood Boulevard by removing about 300 cubic yards of fill material and recontouring the surface to form an active floodplain that also drains to the new culvert. The proposed project would construct a grass lined channel (92 linear feet) with a rock dissipater to improve conveyance and pre-treatment of storm runoff from the Washoe County ROW (Northwood Boulevard).

To take advantage of the upstream fill removal and to provide better vertical connection and alignment with remnant channels downstream of Northwood Boulevard, the Preferred Alternative would replace two existing aging, undersized corrugated metal pipe culverts under Northwood Boulevard. The replacement culvert would be an open bottom concrete box culvert (potentially up to 10 feet wide, 4'10" tall, 87 feet long). The deeply incised area near the

existing upstream culvert inlet would be partially filled and recontoured to function as a restored wetland that would discharge safely across a rock protected bank to the channel at the inlet to the new culvert.

2.5.2 *Expected Benefits*

The Preferred Alternative would alleviate long-term adverse water quality impacts resulting from unstable and eroding stream channels within Implementation Area A of Rosewood Creek. The Preferred Alternative provides a new channel and connected active floodplain with appropriately engineered grade control and would prevent continued streambed and streambank erosion that generates sediment transported to Lake Tahoe.

The Preferred Alternative would establish an adjacent active floodplain allowing for overbanking across stable, vegetated streambanks and deposition on a vegetated active floodplain. The opportunities for sediment trapping will limit sediment transported to Lake Tahoe.

The Preferred Alternative would provide or accommodate permanent BMPs to pre-treat urban runoff prior to discharge to the creek from Northwood Boulevard. The Preferred Alternative would be consistent with and accommodate permanent residential BMPs [on](#) the property on which the project is located.

The Preferred Alternative would provide benefits to fisheries resources including: improved habitat within the site, improved passage within the site, and improved access between the site and the adjacent upstream and downstream reaches.

The Preferred Alternative will limit disturbance to that necessary for access and construction and will protect healthy existing vegetation and trees 10-inches or greater in diameter. Existing down and dead fuels within the areas of proposed project disturbance would be removed.

The Preferred Alternative will use a revegetation design with native species that are adapted to wetting and drying conditions expected in this SEZ after project implementation. The plant community structural and species diversity will be enhanced, but still mimic the existing communities.

2.5.3 *Construction Activities*

Construction of the proposed improvements would be staged to minimize disturbance to the creek by conducting a majority of off-channel earthwork during dry conditions. Upon completion of the 90 percent design, a Dewatering Plan would be developed and submitted to NDEP, TRPA and Washoe County for review and acceptance. The details and provisions of the Dewatering Plan would be contained in the Project Design Special Provisions.

To properly construct the improvements as described above, temporary access would be required for work areas (see Sheet S-1, Appendix 1). The proposed access locations were sited to maximize use of currently disturbed land. Curb approaches would be installed to protect existing curb and bike path facilities. Construction access to the work areas within Implementation Area A would be required at four locations off of public roadways (see Sheet S-1 in Appendix 1). Two access points would be located on private property. Formal temporary construction access authorization would be required from the private landowners. NTCD has worked with the landowners to develop and review draft Memoranda of Agreements (MOAs) and expects to have

final versions of the MOAs prepared for landowner review and approval concurrent with the final environmental documents.

To construct the proposed improvements, multiple staging and storage areas would be required. Due to the level of urban development in the Preferred Alternative vicinity, staging and storage opportunities are limited. Wherever feasible, staging and storage areas would be sited on previously disturbed lands, areas proposed to be disturbed by restoration activities or areas that would benefit from revegetation. The staging and storage for the construction of the Project will be done by providing both permanent storage areas (as shown on the project plans) and with areas in the area of construction. As construction progresses, the storage and staging area will be adjacent to the current construction location. The storage of materials and equipment will be limited to what will be used in the working week that is occurring at the time of construction. Storage of materials over weekends, and during times of non-activity will be minimized to excess materials from the prior week/work period and equipment to be used in the following week/work period. Maximizing off street staging areas within the site will minimize traffic effects. Five potential staging and storage areas have been identified near and within the Project Site (see Sheet S-1 in Appendix 1). A temporary easement or right of entry will be obtained by NTCD for each staging/storage site.

An effort was made to minimize areas disturbed by the Preferred Alternative by locating storage, staging, and access areas in close proximity to the Project Site. Where feasible and allowed by resource agencies, construction access routes would also accommodate limited short term storage and staging for materials and/or equipment. Additionally, in some locations with suitable ground surface topography and vegetation, geotextile fabric would be installed under temporary route surfaces (see detail Sheets D-1 to D-8, Appendix 1) to protect undisturbed areas proposed as access routes.

Upon completion of construction all staging, storage, and access areas would be restored to preconstruction topography and all disturbed soils would be stabilized by the application of revegetation and other temporary and permanent stabilization treatments. The revegetation plan is depicted on Sheet R-1 (Appendix 1).

Protection of existing vegetation, jurisdictional wetlands, SEZ, and residential improvements present a significant constraint on the type of equipment that can be used for construction. Equipment that would exert low pounds per square inch (PSI) on the native soil surface is proposed.

2.5.4 Schedule and Phasing

Implementation of the Preferred Alternative is anticipated to take place over three consecutive construction seasons and an additional two years of revegetation irrigation and success monitoring. Phasing of construction activities was carefully planned to allow for adequate stabilization of the constructed channel prior to the introduction of stream flows. Year one or Phase 1 of construction would begin on August 1, 2011 and would be completed by October 15, 2011. During Year 1 construction and initial revegetation of the new channel (aside from the connection points to existing channel) is planned. During Year 2 the primary activity would be irrigation of revegetation and seasoning of the new channel bed and banks. During Year 3 the intersections of the new and existing channel would be completed, flows would be diverted into

the new channel, and the existing channel would be backfilled. Replacement of the existing culvert at Northwood Boulevard could be part of Year 1 construction, or be completed in Year 3, along with the removal of fill, construction of stormwater treatment, and channel improvements upstream of that road crossing.

2.5.5 Area to be disturbed

Preferred Alternative construction activities would include permanent and temporary disturbance summarized in Table 2. The permanent disturbance, or change in condition, includes the new in-channel grade control structures (9), floodplain grade control structures (13), one bottomless box culvert, one grass lined channel, abandonment of the existing creek channel, construction of the new channel, grading of the new floodplain and the construction of the berm outside of the floodplain.

The Preferred Alternative improvements would result in total permanent disturbance of 4.54 acres based on the 50 percent design limits of disturbance. Of the total permanent disturbance, 4.537 acres lie within the verified SEZ boundary (although the condition of the SEZ is degraded) and the remaining 0.003 acres is in upland according to TRPA land classifications. The permanent disturbance would affect 1.02 acres of wetland and 0.17 acres of other Waters of the United States under the jurisdiction of the USACE. Permanent disturbance areas will become functional portions of the new channel, active floodplain, and riparian/SEZ/upland margins once construction and revegetation are complete.

The Preferred Alternative would require temporary disturbances including construction access, storage, and staging. The temporary disturbance would cover a total area of approximately 0.37 acres. Only 0.075 acres of the temporary disturbance would occur in riparian/SEZ areas while 0.29 acres of upland would have temporary disturbance. Temporary disturbance areas would be revegetated as appropriate considering both habitat and fuel reduction status.

Table 2. Summary of Land Disturbance

Land Type	Temporary Disturbance (Acres)	Permanent Disturbance (Acres)
Riparian/SEZ	0.075	4.537
Upland	0.29	0.003
TOTAL	0.37	4.54

2.5.6 Operation, Maintenance and Replacement Measures

The Preferred Alternative was developed with in-channel features designed and spaced to withstand and perform under adverse flood conditions with no specific maintenance required.

The proposed bottomless box culvert and grass lined channel facilities would be located within Washoe County ROW. Thus, Washoe County would perform maintenance according to standard maintenance procedures.

It is possible that performance concerns or hydraulic obstructions may damage or affect the reconstructed channel and floodplain. As such, a Memorandum of Agreement (MOA) between the property owners, Nevada Tahoe Conservation District, and Washoe County will be developed. The MOA will specify that Washoe County will monitor and maintain the restored area to meet the requirements of funding entities over the period of responsibility.

2.6 Selection of the Preferred Alternative

The Preferred Alternative was selected because of its ability to meet the full range of project goals and have long-term sustainability. The Preferred Alternative would reduce water quality impacts due to construction by minimizing in-channel construction by providing a new channel stabilized prior to introducing stream flow. The Preferred Alternative allows for a majority of the new channel and its elements to be constructed during the dry season, thus reducing the amount and duration of dewatering and creek diversion activities.

3.0 AFFECTED ENVIRONMENT, ENVIRONMENTAL CONSEQUENCES & PROPOSED MITIGATION MEASURES

This chapter discusses resources that may be affected by actions taken to implement the proposed stream restoration within the middle reach of Rosewood Creek Implementation Area A Project Site. During preparation of this environmental assessment, information on issues and concerns was received from the public, regulatory and resource agencies (see Chapter 4, Consultation and Coordination).

For each resource, the potentially affected area and/or interests are identified, existing conditions described, and impacts predicted under the No Action and Preferred Alternative scenarios.

3.1 Geology and Soil Resources (Geo)

Mainstream Restoration Inc. (2005) previously researched the Geology and Soil Resources for the middle reach of Rosewood Creek as discussed below.

The middle reach of Rosewood Creek is on a broad glacial outwash sheet consisting of two large and contemporaneous alluvial fans (Saucedo 2005). The opposing flanks of these gently sloping glacial outwash fans confine the channel location or its geomorphic position. The eastern fan is composed of layers and lenses of alluvial sand and gravel derived from late Pleistocene alpine glaciers in the Third Creek watershed to the northeast. The western fan is composed of similar alluvial deposits derived from Wood Creek. These watersheds are comprised of granitic bedrock capped by volcanic rock.

Soils in the Project Site are comprised of the Inville gravelly coarse sandy loam soil, occurring on 2 to 9 percent slopes. According to the 2007 soil survey the entire Project Site is mapped as Inville gravelly coarse sandy loam soil, 2 to 9 percent slopes, stony (NRCS 2007). The soils occur on hillslopes and outwash terrace landforms. These soils typically have about one foot of gravelly coarse sandy loam, underlain by extremely cobbly sandy loam or extremely gravelly loamy coarse sand. The percent of soil (i.e., fraction finer than 2 mm) that is comprised of clay (i.e., fraction finer than .0039 mm) ranges from 0-5 percent in the subsoil to 5-20 percent throughout the upper 37 inches.

A geotechnical investigation (Wood Rodgers, Inc. 2009) was conducted for the Project Site that included specific bank sampling within the Project Site, at locations representative of the proposed new channel alignment and potential grade control structures. Fifteen hand augered exploration-sites were collected and analyzed by a Wood Rodgers geologist in 2008 and 2009 to obtain soil samples from various depths down to five feet below the ground surface. Laboratory testing was conducted which included particle size analysis, permeability testing and Atterberg limits³. Soils were found to be composed of interfingering layers of poorly graded sand, silty sand and clayey sand. The predominant types are interbedded with moderately to highly plastic silt and clay layers. The surface layer has a substantial amount of organic material (suitable for

³ Atterberg limits provide measures of the engineering properties of fine grained soil materials; distinguishing silt and clay and variations in their consistency and behavior.

topsoil salvage. Several layers may contain varying amounts of gravel, cobbles and boulders (less than four feet in diameter).

In addition, close coordination and sharing of geotechnical information has occurred with the USDA-Agricultural Research Service, National Sedimentation Laboratory (ARS-NSL) who collected data in 2007 on the existing stream banks and streambed throughout Rosewood Creek as part of an analysis in support of the Lake Tahoe Total Maximum Daily Load (TMDL) process. These data will be used to refine the final design.

3.1.1 Impacts

No Action Alternative: Under the No-Action Alternative, the current channel instability would continue, including: down cutting of the streambed as the knickpoints migrate; undercutting of stream banks; and, bank failures and erosion that generate sediment to be transported downstream.

Preferred Alternative: Implementing the Preferred Alternative will require temporary construction disturbance of surface soils at all locations of earthwork or grading, and the access routes, storage and staging sites. These areas would be vulnerable to wind or water erosion during proposed project construction and until soils are stabilized. Potential impacts would be minimized through the implementation of temporary BMPs.

The Preferred Alternative creates long term benefits in terms of reduced erosion and sedimentation from continued channel incision and widening, as well as the creation of a small channel within a connected active floodplain. Within the permanent footprint of the new channel alignment and the restored active floodplain, long-term risks of unexpected soil erosion are minimized by the design criteria and features (i.e., gravel, cobble and boulder steps in the channel, buried floodplain grade control features, revegetation) to prevent channel bed scour, channel bank erosion, or surface erosion within the floodplain.

3.1.2 Proposed Mitigation

Geo-1 During construction temporary BMPs would be installed and maintained to protect disturbed surface soils from erosion that could affect the water quality of Rosewood Creek and Lake Tahoe. The location and type of proposed temporary BMPs shown on the 50 percent design plans (Appendix 2) will be modified as the design is finalized to ensure that potential soil erosion is minimized.

Geo-2 Washoe County would maintain and monitor the constructed project as specified in the MOA to meet funding requirements for the entire period of responsibility. Because the long-term soil erosion impact of the Preferred Alternative would be beneficial compared to the No-Action Alternative, no additional mitigation is required for long-term effects.

3.2 Wetlands and Stream Environment Zone (Wet)

To meet requirements of environmental laws and U.S. Department of the Interior policies, Reclamation specifically addresses potential impact of any proposed action on unique geographic features such as wetlands or SEZs.

A Routine On-Site Wetlands Delineation and Inventory of waters of the United States (WOUS) was completed for the entire middle reach of Rosewood Creek in October 2006 and verified by

the US Army Corps of Engineers, January 26, 2007 (Regulatory Branch 200600942), and is valid for a period of five years from date of issuance. Approximately 2.5 acres of waters of the United States including wetlands (0.51 acres of 'other waters' and 1.99 acres of wetland) were verified by the US Army Corps of Engineers (2007) for the entire 7,200 foot long middle reach (from SR 431 to SR 28). Within the Implementation Area A there are approximately 0.17 acres of jurisdictional 'other waters' and 1.06 acres of 'wetland' for a total of 1.23 acres of WOUS under existing conditions.

The Rosewood Creek corridor is within a TRPA recognized SEZ with perennial runoff. Floodplain and SEZ in the Lake Tahoe Basin is highly valued habitat with floodplain processes that provide the potential for infiltration of storm flows when functional. The SEZ boundary verified by TRPA within Implementation A indicates approximately 6.48 acres of SEZ is in the project site.

3.2.1 Impacts

No Action Alternative: Under the No Action Alternative, continued degradation of the channel bed would extend the length of the incised channel, exacerbating the existing discontinuity with the floodplain. The surface water elevations within the incised channel would continue to be lower relative to the surrounding terrace, worsening soil moisture support from overbanking and groundwater. These conditions would continue and worsen the existing degraded soil moisture for adjacent riparian/SEZ and wetland community types.

Preferred Alternative: The Preferred Alternative would result in temporary and permanent disturbance to uplands, SEZ, jurisdictional wetlands and waters of the United States.

Implementing the Preferred Alternative would result in only temporarily disturbance to 0.075 acres of Riparian/SEZ (including 0.012 acres of jurisdictional wetlands) and 0.29 acres of upland, for a total of 0.37 acres.

Implementing the Preferred Alternative would temporarily disturb and permanently modify 4.54 acres of Riparian/SEZ. The Preferred Alternative would result in a long-term beneficial change in surface and groundwater support for wetland/riparian/SEZ conditions. The long term beneficial effects of improved overbank flows during streamflow peaks onto the connected active floodplain would improve soil moisture and groundwater recharge. The long term beneficial effects of the restored higher elevation streambed profile will improve groundwater support for the SEZ. The post-project Riparian/SEZ habitat in the project site will include:

- 0.11 acres of 'Restored SEZ', in the area upstream of Northwood boulevard which will experience beneficial removal of fill, re-contouring of the floodplain, revegetation, and more frequent overbanking of surface water;
- 1.24 acres of 'Enhanced SEZ' along the relocated and re-established active floodplain, mostly along the new channel, which will experience beneficial re-contouring of the floodplain, revegetation, higher groundwater, and more frequent overbanking of surface water;
- 3.19 acres of 'Improved SEZ' in the area of the backfilled channel and areas of general disturbance, which will experience beneficial replacement of eroded soils, re-contouring

of the floodplain, removal of decadent trees/down wood; revegetation, and higher groundwater; and,

- 0.78 acres of ‘Enhanced Riparian’ outside of the direct disturbance footprint, but adjacent to the relocated channel and active floodplain, which will experience a beneficial increase in surface water wetting to existing soils and vegetation.

In total, the project will improve the long term function and quality of 5.32 acres of the Riparian/SEZ habitat within the project site.

A subset of the Riparian/SEZ habitat includes jurisdictional wetlands and other waters of the U.S. Implementing the Preferred Alternative would temporarily disturb 0.012 acres of wetlands and permanently modify 1.02 acres of wetlands and 0.17 acres of other waters, for a total impact area of 1.202 acres of WOUS. The Preferred Alternative would result in long-term beneficial changes in surface and groundwater support for wetlands. The long term beneficial effects of improved overbank flows during streamflow peaks onto the connected active floodplain would improve soil moisture and groundwater recharge. The long term beneficial effects of the restored higher elevation streambed profile will improve groundwater support. The post-project wetlands and other waters of the U.S. in the project site will include:

- 1.086 acres of ‘Restored Wetlands’, primarily along the relocated, re-established active floodplain which will experience beneficial re-contouring of the floodplain, revegetation, higher groundwater, and more frequent overbanking of surface water;
- 0.78 acres of ‘Enhanced Wetlands’, outside of the direct disturbance footprint, but adjacent to the relocated channel and active floodplain, which will experience a beneficial increase in surface water wetting to existing soils and vegetation;
- 0.028 acres of ‘Existing Wetlands’, that are outside of the project disturbance area and will be avoided and protected; and,
- 0.103 acres of ‘Other Waters’ comprised of the relocated and re-sized stream channel.

Overall, the post-project condition of the site would support 1.894 acres of functional and potentially jurisdictional wetlands and 0.103 acres of other waters, for a total of 1.997 acres.

These changes would constitute net benefit compared to existing conditions as well as the No Action Alternative.

3.2.2 Proposed Mitigation

Wet-1 To the furthest extent possible, disturbance to existing wetland/SEZ/waters of the US resources would be minimized to that necessary for construction activities. Temporary BMPs would be installed and maintained during construction to protect existing wetlands, SEZ, and the water quality of Rosewood Creek. Specific protective measures would be installed (e.g., fencing/berming) around regulated resources such as wetlands, waters of the U.S., and SEZ. The location and type of proposed temporary BMPs shown on the 50 percent design plans (Appendix 2) will be modified as design is finalized to ensure that encroachment on sensitive wetlands and SEZ is minimized.

3.3 Floodplains (FP)

The upstream limit of the Federal Emergency Management Agency (FEMA) detailed study is Northwood Boulevard (FEMA FIRM panel 32031C3325G, Appendix 2). The FEMA regulatory floodplain (Zone A; representing the 1% annual chance or ~100-year event) of Third Creek is contained within the existing channel downstream from the confluence with Rosewood Creek to approximately 400 feet above SR 28 (FEMA Flood Insurance Rate Map (FIRM) panel 32031C3425G, Appendix 2). Additional reference is provided through review of older (1994) FIRM panel 32031C3225E (Appendix 2). Looking at these three maps, it may be collectively inferred that FEMA intended to depict the area upstream between SR 28 and Northwood Boulevard as having 100-year flows being contained within the channel. However, the limits of this designation for Rosewood Creek are unclear on the newer, current, FEMA mapping. FEMA designated a Zone X area (defined as locations of 0.2% annual chance (~500-year) flood or areas of 100-year flood with average depths of less than 1 foot) across most of the SEZ between Northwood Boulevard and SR 28.

Only extremely rare, large flows can overtop the banks of the incised sections of the existing Rosewood Creek, such as those throughout most of Area A. The channel is currently disconnected from its alluvial flat, and the historic floodplain has been abandoned and transformed into a terrace. Channel incision involves the lowering of a streambed by erosion, and can result from various single or combined natural and unnatural processes. Therefore, many of the positive benefits of floodplain connectivity have been lost in Area A; benefits such as sediment and nutrient storage and recycling, and adequate soil moisture necessary to support riparian habitat. The inability of the creek to overtop its banks and spread water on its floodplain contributes to further channel deepening and widening since all of the erosive energy of large flow events is confined in the channel and directed on the bed and toe of banks rather than being distributed across the floodplain.

A HEC-RAS model was created to simulate the hydraulic conditions under existing channel morphology and floodplain topography. A total of 79 cross-sections were included in the model beginning about 75 feet downstream of SR 28 and extending upstream approximately 2,200 feet to about 200 feet upstream of Northwood Boulevard.

Roughness assumptions in the model were varied to account for the high roughness of the steep channel and dense vegetation found in the existing channel. Those roughness values were updated for the Preferred Alternative to account for the likely changes in bed material sizes, streambank vegetation, and overbank conditions.

Several streamflow magnitudes of 4, 16, 23, 48 and 98 cfs were modeled in support of channel design to ensure appropriate low flow channel and material sizes and to limit any adverse changes to floodplain boundaries, water surface elevations, or velocities and shear stresses. The initial hydrologic estimates for 50% design were based on the prior recurrence interval estimates presented by Mainstream (2005). The worst-case estimate of 98 cubic feet per second (cfs) provided background information regarding maximum water depths and or extents. In late 2009, updated statistical analysis of the long-term stream gage records for the Third Creek basin, of which Rosewood Creek is a sub-basin, became available and was used in the development of the 50 percent design for the Preferred Alternative (ENTRIX 2009). These data indicate that the

100-year peak flow for the entire Third Creek basin is ~251 cfs. Using an area ratio method (which is reasonable considering that the watershed characteristics are proportionally similar), the 100-year peak flow for the Rosewood Creek sub-basin is estimated to be 19 % of the Third Creek total, or 48 cfs.

Under the existing channel conditions, streamflows as large as the estimated 100-yr flood peak flow of 48 cfs are contained in the channel throughout the site. The model was used to refine the proposed channel alignment, low flow channel dimensions, floodplain topography modifications, and replaced culvert at Northwood Boulevard, and dimensions of the potential berm.

3.3.1 *Impacts*

No Action Alternative: Under the No Action Alternative the regulatory floodplain would not be modified. The 100-year flow would continue to be fully contained within the incised channel throughout Area A. The floodwater elevations within the reach could decrease in the future as streambed degradation and channel widening continue. The enlarged channel capacity would also continue to contain smaller flows and limit the ecological and physical benefits of overbanking to the floodplain.

Preferred Alternative: The Preferred Alternative would construct a geomorphically-sized low flow channel and reshape portions of the surrounding topography to restore the functional active floodplain for overbank flows during small (i.e., 2-year to 5-year) to moderate (i.e., 10-year to 20-year) streamflow peaks. These measures to raise the streambed and water surface elevation would force major flood peak flows, up to and including the 100-year event, to spread out across portions of the existing SEZ/terrace rather than remain confined within the incised channel. Design features to modify the terrace topography for the active floodplain have been incorporated using iterative flood modeling to optimize the connection between the channel and its floodplain while not increasing flood hazards for any existing structures. The active floodplain, accessible during small and moderate streamflow peaks, is most important for achieving the ecosystem functions that support wetland and riparian plant communities and provide opportunities for sediment trapping.

Hydraulic modeling (using HEC-RAS) simulated the proposed new low flow channel dimensions and alignment and the proposed grading of the reactivated floodplain. To check for possible worst-case flood changes, no berm was assumed. Under this “worst-case” assumption, the 100-yr flow (48 cfs) would extend out-of-bank throughout the site. The profile of the 100-year water surface elevation (WSEL) would be raised, due to the restored elevation of the incised channel. The 100-year inundation area would have an average width of about 43 feet, and range from less than 10 feet to about 76 feet (Figure 3). The locations east of the proposed channel between stations 847 and 1569 would not receive flood flows due to intervening topography. The area of 100-year floodplain would still remain within the existing SEZ boundary (Figure 3). No existing or proposed structures or infrastructure are modeled to be adversely affected during the 100-year event by the changes in floodplain inundation.

3.3.2 *Proposed Mitigation*

FP-1 The final design would use updated hydraulic modeling to finalize channel and floodplain grading (including a berm outside of the 100-year floodplain if needed) to verify that 100-year flow would not cross the mid-valley irregular topographic ridge or result in any increased

hazards to existing structures from the 100-year flood or expand the FEMA Special Flood Hazard areas to include any structures not already so mapped.

3.4 Water Quality (WQ)

Water resources in the Implementation Area A include Rosewood Creek (a perennial drainage) which discharges to Third Creek and ultimately Lake Tahoe.

The estimated amount of volume eroded as a result of historic channel erosion within Implementation Area A is 6,533 cubic yards. The trend within this reach is for continued incision and eventual channel widening that would increase rates and loads generated. The proportion of fine particles less than 20 microns from bulk bank sediment samples throughout the middle reach ranges from 0.4 percent to 8.9 percent (nine samples by Mainstream 2005). Samples collected in 2009 within the proposed project reach had approximately 4 to 27 percent fines (Wood Rodgers 2009).

Changes in fine sediment loads between the No Action and Preferred Alternatives would be assumed proportional to the total sediment load changes, described below.

3.4.1 Impacts

No Action Alternative: Under the No Action Alternative, no short-term construction effects on water quality would occur, but the long-term adverse impacts of substantial amounts of sediment emanating from the Project Site making its way to Lake Tahoe would continue. The approximate volume of sediment likely to be generated in the future within the Project Site under the No Action Alternative is 9,934 cubic yards. The sediment would be released over a period of years to decades as the degraded channel continues to experience channel bed erosion and widening, with the eventual establishment of a floodplain within a deeply incised channel throughout the project reach.

Preferred Alternative: The Preferred Alternative may cause temporary adverse water quality changes during construction and until revegetation is fully established.

The Preferred Alternative would result in long-term beneficial water quality changes by decreasing channel bed and bank erosion within the Project Site. These measures would reduce sediment released downstream to Rosewood Creek, Third Creek and Lake Tahoe. The volume of sediment likely to be generated within the Project Site under the Preferred Alternative would be reduced to minimal levels because the entire length of Area A would have a geomorphically sized low flow channel with vertical stabilization (nine channel grade controls), and the floodplain would be smoothed and stabilized with 13 buried grade control structures. The geomorphic observations, geotechnical study, and hydraulic modeling of the project reach indicate that steepness of the valley slope, fine textured, loosely consolidated soil materials, and irregular existing topography could combine to increase risks of soil erosion on the floodplain during large storm events (e.g., 50-year to 100-year events). Therefore, the design incorporates re-contouring to smooth the floodplain topography, and revegetation that will improve soil cohesion and floodplain roughness without adversely routing or converging flows. Specific rock grade control structures designed to resist predicted shear stresses up to the 100-year event are proposed to cross the entire active floodplain, but be buried below the active floodplain surface.

These measures will permit overbank flows on a more frequent basis, while minimizing the risk of rills and gullies during less frequent, but larger flows.

3.4.2 Proposed Mitigation

WQ-1 During construction, temporary BMPs would be installed and maintained to protect the water quality of Rosewood Creek, Third Creek, and Lake Tahoe. The location and type of proposed temporary BMPs shown on the 50 percent design plans (Appendix 2) will be modified as design is finalized to ensure that any water quality impacts are minimized.

WQ-2 Washoe County would maintain and monitor the constructed project as specified in the MOA to meet funding requirements for the entire period of responsibility. Because the long-term water quality impact of the Preferred Alternative would be beneficial compared to the No-Action Alternative, no mitigation is required for long-term effects.

3.5 Biological Resources – Vegetation (Veg)

The Project Site is characterized by a riparian corridor adjacent to Rosewood Creek within a Sierra mixed conifer forest dominated by Jeffrey pine (*Pinus jeffreyi*) and white fir (*Abies concolor*). Dominant overstory riparian vegetation is provided by mountain alder (*Alnus incana* ssp. *tenuifolia*), Scouler's willow (*Salix scouleriana*) and Pacific willow (*S. lucida* ssp. *lasiandra*). A shrub layer is typically noncontiguous along the stream bank, except for discrete occurrences of red osier dogwood (*Cornus sericea*), Wood's rose (*Rosa woodsii*) and Lemmon's willow (*S. lemmonii*). The herbaceous understory varies from dense cover of mesic graminoids like small-fruit bulrush (*Scirpus microcarpus*) and sedges (*Carex* spp.), and dry graminoids like blue wildrye (*Elymus glaucus*) to that composed of forbs including western brackenfern (*Pteridium aquilinum*), stinging nettle (*Urtica dioica*), and Anderson's thistle (*Cirsium andersonii*).

Within Implementation Area A, a total of 32 special-status plant species were identified by the U.S. Fish and Wildlife Service (USFWS) as potentially occurring within the Project Site (Appendix 3). However, none of these 32 plant species occurs within the Project Site due to the lack of species-specific habitat requirements.

Included in the 32 USFWS species were four TRPA Species of Special Interest with potential for occurring within the Project Site. Of the total number of species considered by USFS, USFWS and TRPA (32 species) none are expected to occur in Implementation Area A due to range, elevation, and habitat limitations.

Section 7(a)(2) of the Endangered Species Act (the Act) requires federal agencies to consult with the USFWS to ensure that actions they fund, authorize, permit, or otherwise carry out would not jeopardize the continued existence of a listed species or adversely modify designed critical habitats.

A species list was requested from the USFWS Reno, Nevada office for Implementation Area A. In a letter dated December 12, 2008 (File No. 2009-SL-0077), the USFWS determined that no federally threatened or endangered plant species are known to occur within the Project Site (Wood Rodgers 2006). An updated database query was submitted on January 19, 2010 to the USFWS. Results from the updated database query will be incorporated into project documents as available.

The Tahoe Regional Planning Compact (“Compact”, P.L.96-551, 94 stat. 3233, 1980) finds that, “There is a public interest in protecting, preserving and enhancing environmental and ecological values for the residents of the region and for visitors to the region.” In order to protect the natural environment, the TRPA has established environmental threshold carrying capacities pertaining to conservation of vegetation, uncommon plant communities, and sensitive plant species.

Information on listed threatened, endangered, and candidate species, USFWS Sensitive Species and TRPA Species of Special Interest with the potential to occur within the Project Site was obtained from the TRPA, USFS, the Nevada Natural Heritage Program (NNHP) and the USFWS. Based on field studies completed to date, Implementation Area A does not support any threatened, endangered, or sensitive vegetation species (Wood Rodgers 2007). A consolidated species list is attached in Appendix 3.

Field studies identified two noxious weeds within the proposed Project Site. Two Priority Invasive Weed species of the Tahoe Basin were documented as occurring within the survey area including 12 stems of teasel (*Dipsacus fullonum* - Group 1: Watch for, Report, Eradicate Immediately, present as only small, eradicable populations) and eight stems of bull thistle (*Cirsium vulgare* - Group 2: Manage Infestations with a Goal of Eradication, isolated populations would be targeted for eradication) (Appendix 4 – Noxious Weeds Study). The two invasive weed species locations are shown on the 50 percent Design Plans in (Appendix 1).

3.5.1 Impacts

No Action Alternative: Under the No Action Alternative, the riparian/SEZ community would continue to degrade as a response to the channel instability and continued erosion and poor surface and groundwater support. Implementation Area A would likely continue to lack any threatened, endangered, sensitive vegetation species or potential habitat. The vegetation structural diversity and health would most likely continue to degrade enhancing the potential for known occurrences of invasive weeds in the proposed Project Site to expand.

Preferred Alternative: Implementing the Preferred Alternative would make long-term beneficial changes that require short-term impacts to existing riparian and upland vegetation. Implementation Area A lacks any threatened, endangered, or sensitive vegetation species, so no impacts to such species would occur.

To meet the proposed project goals, the construction access, excavation of the low flow channel, and grading of the floodplain topography, removal of fill and related activities would require removal of existing riparian vegetation and conifer trees within the disturbance footprint. Although the project feature locations have been optimized to minimize the need for conifer removal, the Preferred Alternative would remove a total of 32 conifer trees, 23 of which are between 10 and 23 inches in diameter and nine (9) conifer trees that are 24-inches or greater in diameter. The Preferred Alternative would also result in riparian vegetation removal, ranging from understory shrubs to decadent tree-form willow and alder specimens. The Preferred Alternative would salvage vegetation where possible. Salvage operations would reuse removed willow and alder stakes, willow and alder root wards (when less than 3 feet in diameter, fallen trees, sod, and any other reusable vegetation resource.

Revegetation of all areas disturbed by construction activities would enhance species structural diversity (due to the degraded existing conditions). After project completion, improved soil moisture conditions would restore opportunities for native wetland and riparian plant species to become reestablished and increase in occurrence and/or vigor. Over the long-term, the vegetation community would remain largely similar to what currently exists, but improvements in structural diversity would result. It is possible that conditions will favor an enlarged area of riparian and wetland plant communities, but the extent cannot be predicted quantitatively.

3.5.2 Proposed Mitigation

Veg-1 The location and type of revegetation measures shown on the 50 percent design plans (Sheet R-1, Appendix 1) will be modified as design is finalized to ensure that all disturbed areas are appropriately revegetated with native species that are adapted to anticipated soil and moisture conditions.

Veg-2 Prior to construction, a reconnaissance survey will be conducted to identify locations of noxious weeds in the project site. Within the disturbance footprint, any noxious weeds would be eradicated and/or treated. Any adjacent occurrences outside the work area would be isolated from disturbance by exclusion fencing.

Veg-3 During construction, all equipment will be washed prior to entering the project site to ensure that the spread of noxious weed seed is avoided. In accordance with Nevada Revised Statutes, all construction material will be certified weed free prior to use on the proposed project.

Veg-4 The proposed project sponsor will provide guidance to the private landowners regarding coordination with Washoe County on any noxious weed eradication/treatment needs outside those implemented directly by the project.

3.6 Biological Resources – Wildlife (Wild)

Wildlife habitat occurring within the Project Site includes forest and water based communities (riparian/wetland). The Tahoe Basin is home to many common species of fauna that are present within the project area. Such species are associated with wildland forests, but also tolerate forests fragmented by urbanization. The Tahoe Basin supports a wide range of common wildlife and fish species that are a natural and integral component of the Lake Tahoe ecosystem. Approximately 289 terrestrial (and semi-terrestrial) vertebrate species have been documented as residents or regular visitors. This total represents 217 bird, 59 mammal, 8 reptile, and 5 amphibian species (TRPA 2002). An additional 57 terrestrial species have been recorded in the basin as accidental visitors or as species facing extinction from the basin. Consequently, the Tahoe Basin provides environmental conditions and habitats conducive for a somewhat diverse list of species, with opportunities to fulfill their respective life history requirements.

Information on listed threatened, endangered, and candidate species with the potential to occur within the Project Site was obtained from the USFWS Sensitive Species, TRPA Special Interest Species, USFS, and NNHP through agency database queries. Consultation with these agencies and review of published biological studies and maps resulted in a list of wildlife species that warrant consideration for this project (Appendix 3). Section 7(a)(2) of the Endangered Species Act (the Act) requires federal agencies to consult with the USFWS to ensure that actions they fund, authorize, permit, or otherwise carry out would not jeopardize the continued existence of

an listed species or adversely modify designed critical habitats. In addition to the species listed under the Endangered Species Act, several additional wildlife species are given special status within the Tahoe Basin. The Tahoe Regional Planning Compact ("Compact", P.L. 96-551, 94 stat. 3233, 1980) finds that, "There is a public interest in protecting, preserving and enhancing environmental and ecological values for the residents of the region and for visitors to the region." In order to protect the natural environment, the TRPA has established environmental threshold carrying capacities pertaining to conservation of vegetation, uncommon plant communities, and sensitive wildlife species.

Based on agency lists and on-site site assessments (Entrix 2006), a total of 28 special-status wildlife species were identified by the USFS, USFWS, NDOW and the NNHP as potentially occurring at the Project Site. Of the 28 species with the potential to occur in Implementation Area A, only eight (8) are likely to occur given their range of occurrence, elevation of the project site, and habitat range limitations. A consolidated species list is attached in Appendix 3.

An updated species list was requested from the USFWS Reno, Nevada office for the Project Site dated February 3, 2010 (Wood Rodgers, 2010). In the USFWS letter (File No. 2010-SL-0138), the USFWS determined that no federally threatened or endangered wildlife species occur within the Project Site. The USFWS mentioned in the letter that they are concerned about potential impacts on migratory birds. The USFWS stated, "Based on the Service's conservation responsibilities and management authority for migratory birds under the Migratory Bird Treaty Act of 1918 (MBTA), as amended (16 U.S.C. 703 et seq.), we are concerned about potential impacts the proposed project may have on migratory birds in the area." Furthermore, "...we recommend any land clearing or other surface disturbance associated with the proposed actions within the project area be timed to avoid potential destruction of bird nests or young, or birds that breed in the area....Therefore, we recommend land clearing be conducted outside the avian breeding season.". Both the USFWS and NNHP state, "To the best of our knowledge, no listed, proposed, or candidate species (at risk taxa) occur (recorded) in the subject project area." Please refer to Appendix 3.

Common wildlife species observed on the project site include: brown creeper (*Certhia Americana*), northern flicker (*Colaptes auratus*), common raven (*Corvus corax*), Steller's jay (*Cyanocitta stelleri*), yellow-rumped warbler (*Dendronica coronata*), band-tailed pigeon (*Patagioenas fasciata*), western tanager (*Piranga ludoviciana*), mountain chickadee (*Poecile gambeli*), red-breasted nuthatch (*Sitta Canadensis*), American robin (*Turdus migratorius*), warbling vireo (*Vireo gilvus*), mourning dove (*Zenaida macroura*), Douglas' squirrel (*Tamiasciurus douglasii*), and black bear (*Ursus americanus*).

The following fish species have the potential to occur within the Project Site: brook trout (*Salvelinus fontinalis*), rainbow trout (*Oncorhynchus mykiss*), speckled dace (*Rhinichthys osculus*) and Lahontan redbreasted shiner (*Richardsonius egregius*). None of these species are threatened or endangered. There are two fish passage barriers within the project site, and at least one passage barrier upstream, and at least one known fish passage barrier situated downstream.

3.6.1 Impacts

No Action Alternative: Under the No Action Alternative the upland habitat would continue to encroach on the degrading riparian habitat within Implementation Area A. The No Action Alternative is not anticipated to substantially alter existing wildlife habitat characteristics or wildlife use of the project site over time. As such, current occurrence of common wildlife species is expected to continue. The lack of suitable habitat, urbanization, and fragmentation of habitat would continue to limit the occurrence of sensitive species.

Preferred Alternative: Construction activities associated with the Preferred Alternative would temporarily affect foraging habitats of most wildlife species. However given the fact that no critical habitat is present for sensitive species, and the proposed vegetation disturbances would be temporary, prior foraging habits are likely to resume post construction.

Of the eight sensitive species, including LTBMU Management Indicator species, that are likely to occur, only two may occur onsite. Construction of the Preferred Alternative may temporarily effect Brook trout (*Salvelinus fontinalis*), an LTBMU Management Indicator Species, movement within Rosewood Creek. Potential impacts to the Black bear (*Ursus americanus*) would include the temporary loss of foraging habitat within the project site. However this is considered to be a short term impact and is not expected to result in adverse effects on the Black bear.

Since there is no critical habitat present on the project site there would be no impacts on Threatened and Endangered Species. The Preferred Alternative has potentially suitable habitat for two sensitive species. The Preferred Alternative may result in temporary impacts to Brook trout (*Salvelinus fontinalis*) movements and to Black bear (*Ursus americanus*) foraging patterns. The project also has potential to affect migratory birds (USFWS 2010). Long-term effects of the Preferred Alternative would be neutral for terrestrial wildlife and beneficial for aquatic wildlife resources.

3.6.2 Mitigation

Wild-1 A Dewatering and Diversion plan approved by the Nevada Department of Environmental Protection (NDEP) and TRPA shall be implemented to minimize effects on aquatic resources.

Wild-2 The final plans and specifications shall incorporate a fish rescue plan to be conducted prior to flow diversion(s). Features would be installed to isolate the work area from fish re-entry, and any rescued fish shall be collected by a qualified fish biologist and relocated to adjacent (outside of the project site) habitat approved by the Nevada Department of Wildlife (NDOW).

Wild-3 Pursuant to the recommendations made by the USFWS, “land clearing activities will be scheduled outside the avian breeding period or if this is not feasible, a qualified biologist will survey the area for active migratory bird nest prior to land clearing activities.” Furthermore, “if nests are located, or of other evidence of nesting (i.e., mated pairs, territorial defense, carrying nesting material, transporting food) is observed, a protective buffer (the size depending on the habitat requirements of the species) will be delineated and the entire area avoided to prevent destruction or disturbance to nests until they are no longer active.”

3.7 Archaeological Resources

A Class III cultural resources inventory of the Middle Rosewood Creek study area was conducted in September 2006 (Zeier and Associates, 2006). The inventory included a file search at the Nevada State Museum, an archival review of the USFS files, review of previous studies near the study area, and review of site description information for the presence of prehistoric or historic period cultural resources and an intensive site visit.

Three isolated features were noted within the Middle Reach of Rosewood Creek. The nearest significant cultural resource in the Middle Reach of Rosewood Creek is situated approximately 1,000 feet upstream from the northern limits of Implementation Area A. There are no potentially significant sites, structures, objects or buildings within Implementation Area A (Zeier and Associates 2006).

After due consideration, it was recommended that none of the isolated features are eligible for listing on the National Register of Historic Places under any of the four significance criteria. As a result, no historic properties (National Register eligible resources) would be affected due to implementation of the stream restoration project. In the absence of an effect upon National Register eligible historic properties, additional management recommendations regarding possible treatment options are not necessary.

On August 24, 2007 Reclamation concurred with these findings in their letter to the Nevada State Historic Preservation Office. On September 18, 2007 the State of Nevada Department of Cultural Affairs State Historic Preservation Office (SHPO) concurred with Reclamation's determination that no historic properties were found within the area of potential effects for Implementation Area A. In addition, the SHPO concurred with Reclamation's determination that the proposed undertaking would not pose an effect to any historic properties.

3.7.1 Impacts

No Action Alternative: Under the No Action Alternative there would be no impacts to archeological resources.

Preferred Alternative: Under the Preferred Alternative, construction activities would not impact known historic or cultural resources.

3.7.2 Proposed Mitigation

No mitigation is required, as the Preferred Alternative would not affect historic or culturally significant resources.

3.8 Indian Trust Assets

Indian Trust Assets (ITA) are defined as legal interests in property held in trust by the United States for Indian Tribes or individuals, or property that the United States is otherwise charged by law to protect. On July 7, 2010, Reclamation's ITA coordinator determined the proposed action would not affect Indian Trust Assets (Reclamation 2010). The nearest known ITA to the project site is approximately 12 miles southeast of the proposed project and is a Public Domain Allotment.

3.8.1 Impacts

No Indian Trust Assets are known to occur in the project site. Thus, no impacts are projected under either of the alternatives.

3.8.2 Proposed Mitigation

No mitigation is required, as the Preferred Alternative would not affect Indian Trust Assets.

3.9 Land Use and Facility Resources

Present land use in the project area is residential, while the core of the site is open space within the TRPA-designated SEZ that has land-use restrictions. Implementation of the Preferred Alternative would require temporary restrictions of access within the project site. To ensure safety of workers and residents the construction area would be fenced off during construction. Following construction a combination of fencing and signage would be used to control access and allow vegetation to establish.

The Nevada Department of Transportation (NDOT) maintains the existing culvert under State Route 28 and has a ROW parallel to the roadway. The Preferred Alternative will conduct some activities within in NDOT's ROW, thus an NDOT Encroachment Permit will be required for construction of the proposed Preferred Alternative.

Washoe County maintains the conveyance structures (culverts) under Northwood Boulevard. The Preferred Alternative will remove fill on the north side of the roadway, replace and realign the aging culverts under Northwood Boulevard and install improved conveyance and pre-treatment of roadside drainage on the north side of the roadway which may possibly affect underground utilities within the County ROW. Natural Gas and Storm Sewer utility lines occur in the road prism at Northwood Boulevard. Utility relocation, if required, would be coordinated by the design engineer and Washoe County.

During construction, a temporary increase in noise and changes in traffic movement would occur. All construction activities would be required to comply with TRPA noise and work hour constraints. The Preferred Alternative would also prepare and comply with a construction traffic and pedestrian plan.

Additional agreements regarding access and conduct in the Project Area will be provided in a subsequent right-of-entry and Memorandum of Understanding (MOU) signed by the landowners, Washoe County and NTCD. Items of those agreements that affect the contractor will be included in the bid specifications.

3.9.1 Impacts

No Action Alternative: Under the No Action Alternative, there would be no change in land use or facility resources.

Preferred Alternative: The Preferred Alternative would not result in a change in land use, since the project would not mandate a change in the SEZ boundary.

The Preferred Alternative would make improvements to the existing public stormwater conveyance and pre-treatment facilities at Northwood Boulevard.

3.9.2 Proposed Mitigation

The project as proposed would not result in adverse impacts to land use or facility resources. As such, no mitigation is proposed.

3.10 Recreation Resources (Rec)

The value of Lake Tahoe as a tourist destination is a function of its mountain setting and the extraordinary water quality. Human disturbances, including historic logging and modern urbanization on a broad scale have caused pollutant loads to increase and reduce the clarity of the Lake. Some streams and SEZs have also been impacted by pedestrian use that compacted trail areas and/or increased erosion through destabilization of channel banks and destruction of streamside vegetation.

The Preferred Alternative would occur on private lands where access is currently limited to “by permission only,” so no adverse impact on public recreation resources would be expected.

3.10.1 Impacts

No Action Alternative: Under the No Action Alternative the project site would continue to be private property and no impact to Recreation Resources would occur. However, continued erosion would move fine sediment to Lake Tahoe and contribute to adverse effects on the clarity of the Lake, potentially impairing the associated recreation potential.

Preferred Alternative: Implementation of the Preferred Alternative would not result in an adverse impact to on-site Recreation Resources since it occurs solely on private land. The Preferred Alternative will result in long-term benefits to regional recreation potential, since it will decrease future sediment loadings to Lake Tahoe in comparison to the existing condition and No Action Alternative.

3.10.2 Proposed Mitigation.

Although the Preferred Alternative would not result in adverse impact to public Recreation Resources, the following activities are proposed to be informative to adjacent home owners.

Rec-1 Construction signs would be placed strategically along site boundaries to indicate to pedestrians private property boundaries and to inform homeowners of the need for and benefit of protecting the restored area and reestablishing vegetation communities.

3.11 Social and Economic Factors

Restoration of the project site would provide some local and regional employment during the multi-year construction project.

3.11.1 Impacts

No Action Alternative: Under the No Action Alternative no construction activities necessitating additional local and regional employment would occur.

Preferred Alternative: Implementation of the Preferred Alternative would have a temporary positive impact on social and economic factors, although not of a measurable magnitude, in the local and regional economies by providing seasonal jobs and sales contributions to business.

3.11.2 Proposed Mitigation.

Mitigation is not required as the Preferred Alternative would not have adverse impacts on Social and Economic Factors.

3.12 Environmental Justice

Executive Order 12898 established environmental justice as a federal priority to identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies, and activities on minority populations and low-income populations of the United States and its territories and possessions, and the District of Columbia, the Commonwealth of Puerto Rico, and the Commonwealth of Mariana Islands.

3.12.1 Impacts

No Action Alternative: Under the No Action Alternative no effect on environmental justice would occur.

Preferred Alternative: The Preferred Alternative would not change existing land uses, and there would be no adverse human or environmental effects to minority or low-income populations.

3.12.2 Proposed Mitigation:

Mitigation is not required as the Preferred Alternative would not have adverse impacts on Environmental Justice issues.

3.13 Summary of Mitigation Measures

The Preferred Alternative is an Environmental Improvement Program (EIP) project and the proposed restoration of Implementation Area A Rosewood Creek would result in long-term environmental benefits. However, the following mitigation measures have been identified to avoid, minimize or compensate for the potential short-term adverse effects:

Geo-1 During construction temporary BMPs would be installed and maintained to protect disturbed surface soils from erosion that could affect the water quality of Rosewood Creek and Lake Tahoe. The location and type of proposed temporary BMPs shown on the 50 percent design plans (Appendix 2) will be modified as the design is finalized to ensure that potential soil erosion is minimized.

Geo-2 Washoe County would maintain and monitor the constructed project as specified in the MOA to meet funding requirements for the entire period of responsibility. Because the long-term soil erosion impact of the Preferred Alternative would be beneficial compared to the No-Action Alternative, no additional mitigation is required for long-term effects.

Wet-1 To the furthest extent possible, disturbance to existing wetland/SEZ/waters of the US resources would be minimized to that necessary for construction activities. Temporary BMPs would be installed and maintained during construction to protect existing wetlands, SEZ, and the water quality of Rosewood Creek. Specific protective measures would be installed (e.g., fencing/berming) around regulated resources such as wetlands, waters of the U.S., and SEZ. The location and type of proposed temporary BMPs shown on the 50 percent design plans (Appendix 2) will be modified as design is finalized to ensure that encroachment on sensitive wetlands and SEZ is minimized.

FP-1 The final design would use updated hydraulic modeling to finalize channel and floodplain grading (including a berm outside of the 100-year floodplain if needed) to verify that 100-year flow would not cross the mid-valley irregular topographic ridge or result in any increased hazards to existing structures from the 100-year flood or expand the FEMA Special Flood Hazard areas to include any structures not already so mapped.

WQ-1 During construction, temporary BMPs would be installed and maintained to protect the water quality of Rosewood Creek, Third Creek, and Lake Tahoe. The location and type of proposed temporary BMPs shown on the 50 percent design plans (Appendix 2) will be modified as design is finalized to ensure that any water quality impacts are minimized.

WQ-2 Washoe County would maintain and monitor the constructed project as specified in the MOA to meet funding requirements for the entire period of responsibility. Because the long-term water quality impact of the Preferred Alternative would be beneficial compared to the No-Action Alternative, no mitigation is required for long-term effects.

Veg-1 The location and type of revegetation measures shown on the 50 percent design plans (Sheet R-1, Appendix 1) will be modified as design is finalized to ensure that all disturbed areas are appropriately revegetated with native species that are adapted to anticipated soil and moisture conditions.

Veg-2 Prior to construction, a reconnaissance survey will be conducted to identify locations of noxious weeds in the project site. Within the disturbance footprint, any noxious weeds would be eradicated and/or treated. Any adjacent occurrences outside the work area would be isolated from disturbance by exclusion fencing.

Veg-3 During construction, all equipment will be washed prior to entering the project site to ensure that the spread of noxious weed seed is avoided. In accordance with Nevada Revised Statutes, all construction material will be certified weed free prior to use on the proposed project.

Veg-4 The proposed project sponsor will provide guidance to the private landowners regarding coordination with Washoe County on any noxious weed eradication/treatment needs outside those implemented directly by the project.

Wild-1 A Dewatering and Diversion plan approved by the Nevada Department of Environmental Protection (NDEP) and TRPA shall be implemented to minimize effects on aquatic resources.

Wild-2 The final plans and specifications shall incorporate a fish rescue plan to be conducted prior to flow diversion(s). Features would be installed to isolate the work area from fish re-entry, and any rescued fish shall be collected by a qualified fish biologist and relocated to adjacent (outside of the project site) habitat approved by the Nevada Department of Wildlife (NDOW).

Wild-3 Pursuant to the recommendations made by the USFWS, “land clearing activities will be scheduled outside the avian breeding period or if this is not feasible, a qualified biologist will survey the area for active migratory bird nest prior to land clearing activities.” Furthermore, “if nests are located, or of other evidence of nesting (i.e., mated pairs, territorial defense, carrying nesting material, transporting food) is observed, a protective buffer (the size depending on the habitat requirements of the species) will be delineated and the entire area avoided to prevent destruction or disturbance to nests until they are no longer active.”

Rec-1 Construction signs would be placed strategically along site boundaries to indicate to pedestrians private property boundaries and to inform homeowners of the need for and benefit of protecting the restored area and reestablishing vegetation communities.

4.0 CONSULTATION AND COORDINATION

4.1 Endangered Species Act

The Proposed Action would have no effect on listed species and further consultation with the USFWS is not required.

4.2 Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act (FWCA) provides the basic authority for USFWS involvement in evaluating impacts to fish and wildlife from proposed water resource development projects. It requires that fish and wildlife resources receive equal consideration to other proposed project features. The FWCA does not apply to this proposed project because the Preferred Alternative does not entail the development of water resources.

4.3 National Historic Preservation Act of 1966, as amended (16 U.S.C 470 et seq.), Historic and Archaeological Resources Protection Act (16 U.S.C 470AA et seq.), Protection of Historic Properties (36 CFR 800).

Reclamation initiated consultation with the Nevada State Historic Preservation Office on August 24, 2007 seeking concurrence with their finding of no historic properties affected for the proposed stabilization of the Rosewood Creek channel (Reclamation 2007). On September 18, 2007 the State of Nevada Department of Cultural Affairs State Historic Preservation Office (SHPO) concurred with Reclamation's determination that no historic properties were found within the area of potential effects for the subject undertaking. In addition, the SHPO concurred with Reclamation's determination that the proposed undertaking would not pose an effect to any historic properties.

4.4 Clean Water Act (33 U.S.C. 1251 et seq.)

The Preferred Alternative is expected to be constructed in accordance with General Permit 16 MINIMAL IMPACT ACTIVITIES THE LAKE TAHOE BASIN (GP16) issued on October 1, 2005. This general permit is issued under the authority of Section 10 of the Rivers and Harbors Act of 1899 (33 USC 403) and Section 404 of the Clean Water Act (33 USC 1344) in accordance with provisions of "Regulatory Programs of the Corps of Engineers" (33 CFR 320-331). The General Permit is set to expire in September of 2010, and the USACE plans for modifications, extension, or changes to the permit are not known at this time. Therefore, a Pre-Application Meeting with the US Army Corps of Engineers may be held during final design to determine if the project will use GP-16, or if a different compliance process and permit will be required.

The Preferred Alternative would require a National Pollution Discharge Elimination System (NPDES) permit since it would disturb one or more acres of land and involve stormwater discharges to surface water. Prior to construction, the Contractor would be required to prepare a Storm Water Pollution Prevention Plan (SWPPP), and submit a Notice of Intent to the NDEP Bureau of Water Pollution Control requesting approval of the proposed work. The SWPPP would identify best management practices to be used to avoid and minimize any adverse effects of construction activities on surface waters. The project will obtain a temporary discharge permit associated with creek and/or groundwater diversion and dewatering, for the potential short-term effects during construction of the new/existing channel connections.

4.5 Executive Order 11988 – Floodplain Management

The order generally directs Federal agencies to avoid adverse impacts associated with occupancy or modification of floodplains, and direct or indirect support of floodplain development. The Preferred Alternative would modify floodplain on site because it is not possible to restore Rosewood Creek and achieve the floodplain ecosystem and water quality benefits without changes to the floodplain. However, flood hazards would not be adversely affected, as described in more detail above in section 3.3 of this document.

4.6 Executive Order 11990 – Protection of Wetlands

The order directs Federal agencies to avoid adverse impacts associated with the destruction or modification of wetlands, and to avoid support of new construction in wetlands. The Preferred Alternative would result in temporary and permanent impacts to wetlands, although the long-term effects are largely beneficial. Wetland resources will be avoided where possible, but due to the nature of the proposed project, it is not feasible to restore/relocate Rosewood Creek without wetland impacts. This topic is discussed in detail above in section 3.2 of this document.

4.7 Executive Order 13112 – Invasive Species

The order directs Federal agencies to prevent the introduction of invasive species and control, monitor, and provide restoration to native environment that have been invaded by invasive species. Invasive species occurrences, potential impacts, and mitigations are discussed above within section 3.5 of this document.

4.8 Public Review of the Draft Environmental Assessment

The draft environmental assessment was made available for public review on August 12, 2010 for a two-week comment period. No comments were received.

5.0 REFERENCES

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FIGURES

(separate attachments)

Figure 1 Rosewood Creek Vicinity Map

Figure 2 Project Site – Implementation Area A

Figure 3 Rosewood Creek - Reach A Modeled 100-yr 48 cfs Inundation Extent

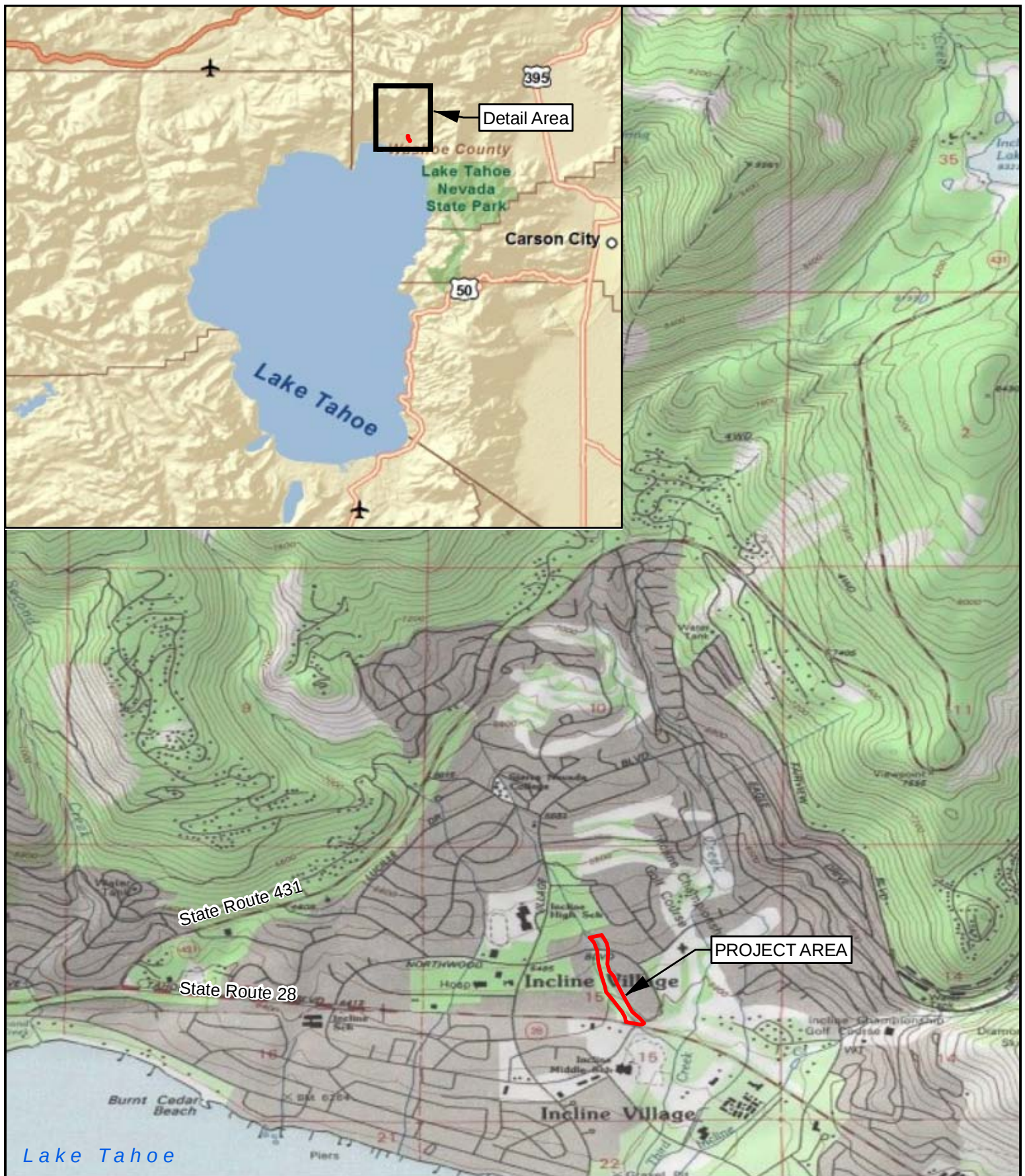
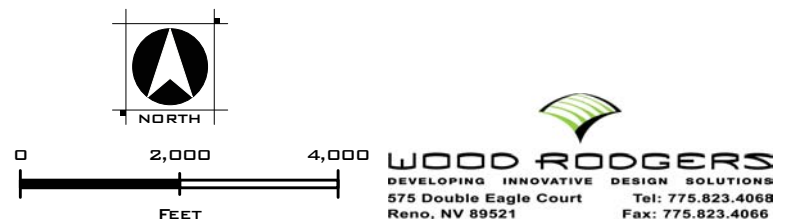


FIGURE 1
VICINITY MAP
ENVIRONMENTAL ASSESSMENT
MIDDLE ROSEWOOD CREEK RESTORATION
IMPLEMENTATION AREA A
FEBRUARY, 2010



WOOD RODGERS
DEVELOPING INNOVATIVE DESIGN SOLUTIONS
575 Double Eagle Court Tel: 775.823.4068
Reno, NV 89521 Fax: 775.823.4066

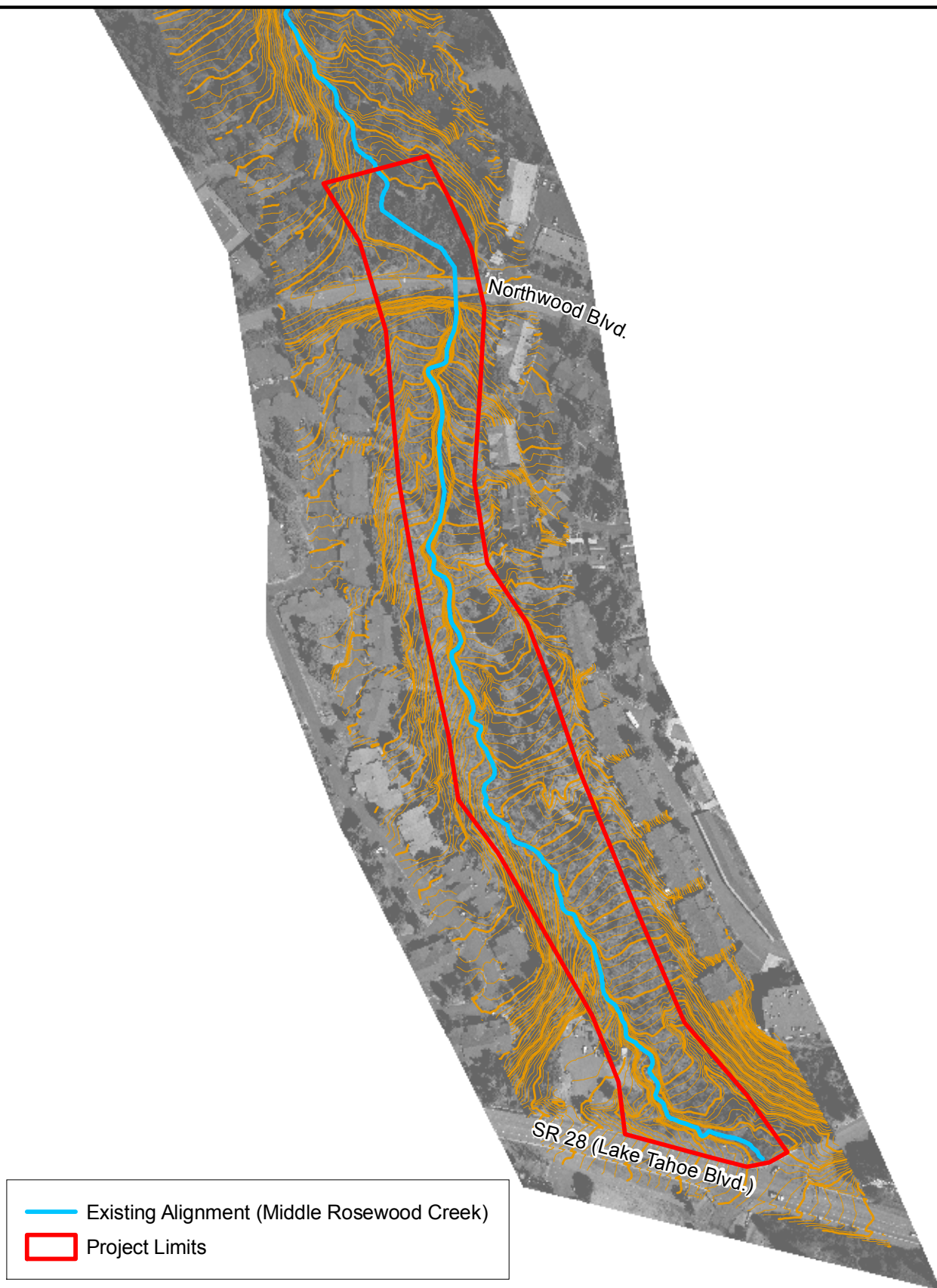
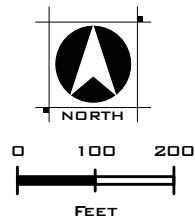


Figure 2
 Project Limits
 Environmental Assessment
 Middle Rosewood Creek Restoration
 Implementation Area A
 Incline Village, NV
 February, 2010



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Nevada Tahoe Conservation District
Rosewood Creek - Reach A
Proposed Design
Modeled 100-yr 48 cfs Inundation



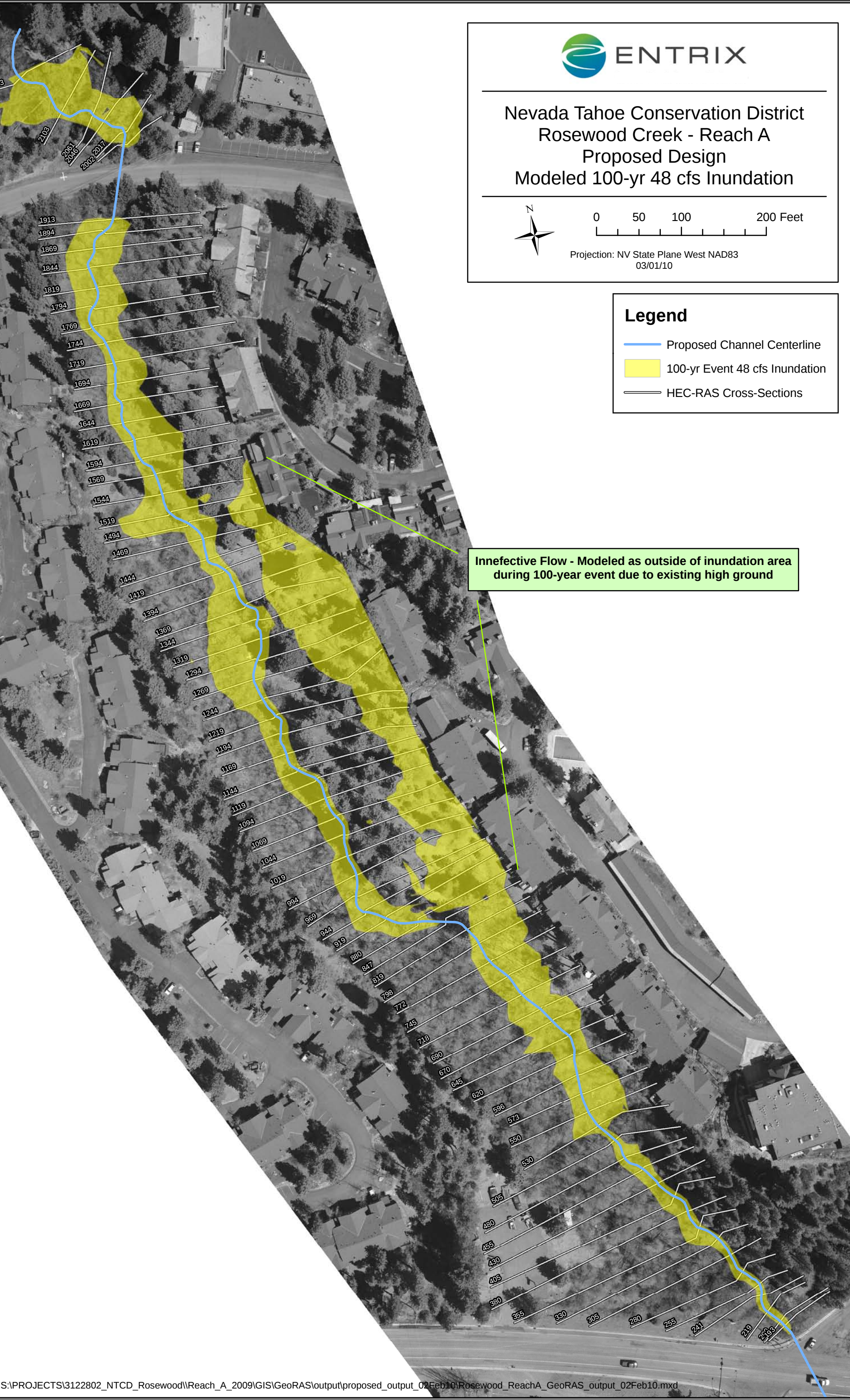
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Projection: NV State Plane West NAD83
03/01/10

Legend

- Proposed Channel Centerline
- 100-yr Event 48 cfs Inundation
- HEC-RAS Cross-Sections

Inneffective Flow - Modeled as outside of inundation area during 100-year event due to existing high ground



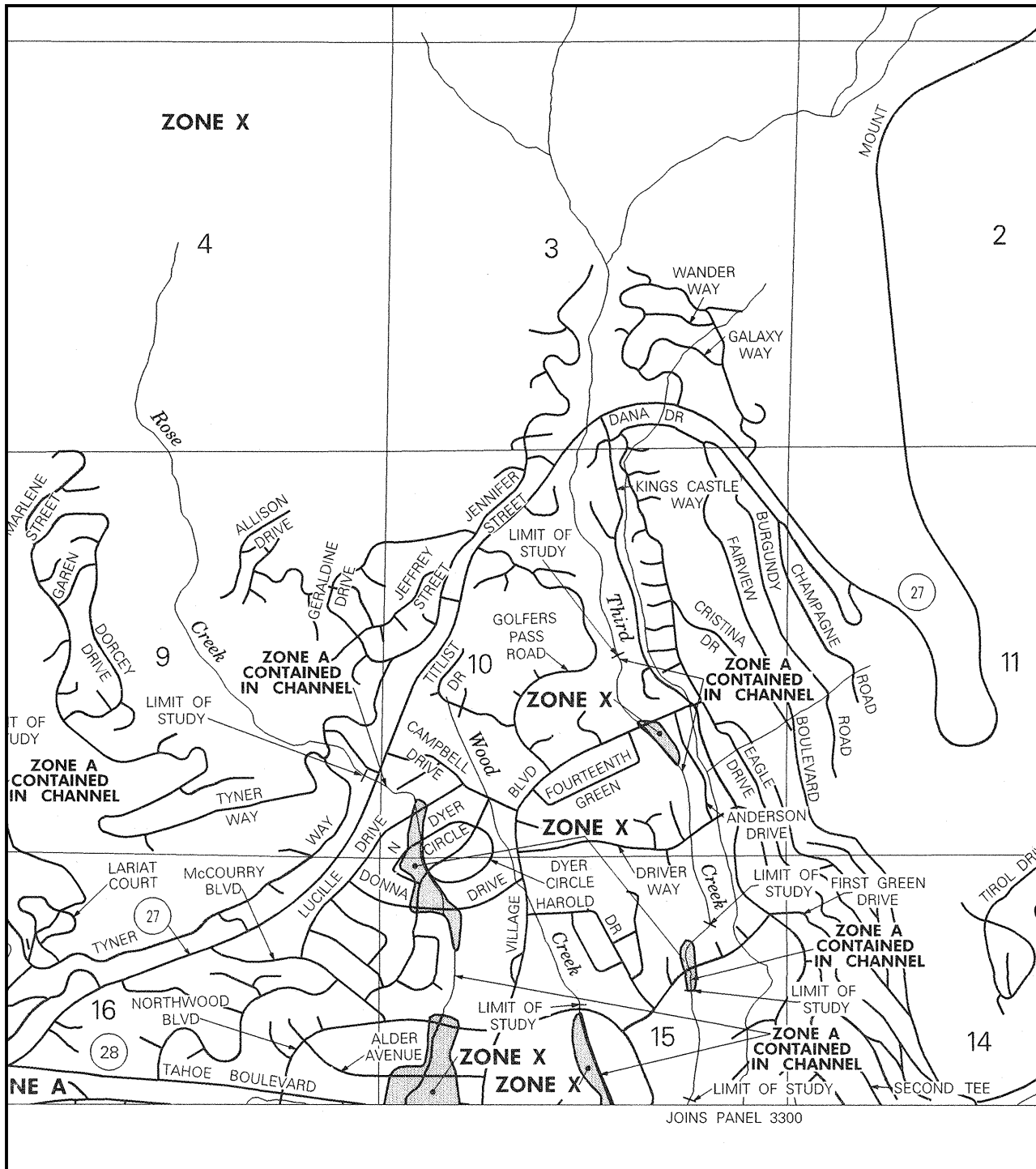
APPENDICES
(separate attachments)

APPENDIX 1 50 percent Design Plans

APPENDIX 2 FEMA Flood Insurance Rate Maps 1994 and 2009

APPENDIX 3 Sensitive Plant and Wildlife Lists

APPENDIX 4 Noxious Weeds Report



APPROXIMATE SCALE IN FEET
2000 0 2000

NATIONAL FLOOD INSURANCE PROGRAM

FIRM FLOOD INSURANCE RATE MAP

WASHOE COUNTY,
NEVADA AND
INCORPORATED AREAS

PANEL 3225 OF 3350
(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:	NUMBER	PANEL	SUFFIX
COMMUNITY			
WASHOE COUNTY, UNINCORPORATED AREAS	320019	3225	E

MAP NUMBER
32031C3225 E

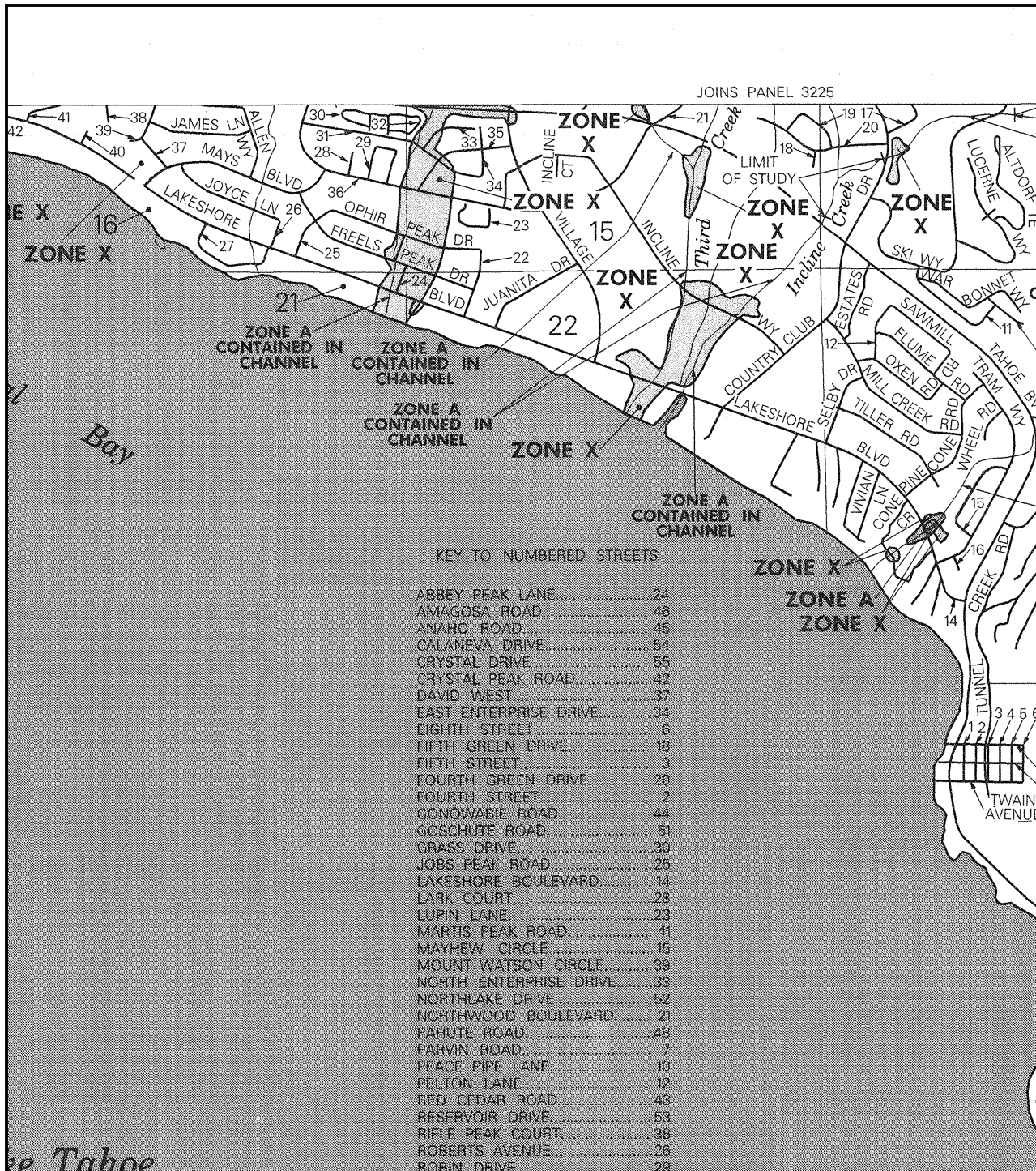
EFFECTIVE DATE:
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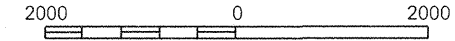
Federal Emergency Management Agency

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JOINS PANEL 3300



APPROXIMATE SCALE IN FEET



NATIONAL FLOOD INSURANCE PROGRAM

FIRM FLOOD INSURANCE RATE MAP

WASHOE COUNTY,
NEVADA AND
INCORPORATED AREAS

PANEL 3300 OF 3350
(SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS:	NUMBER	PANEL	SUFFIX
COMMUNITY			
WASHOE COUNTY, UNINCORPORATED AREAS	320019	3300	E

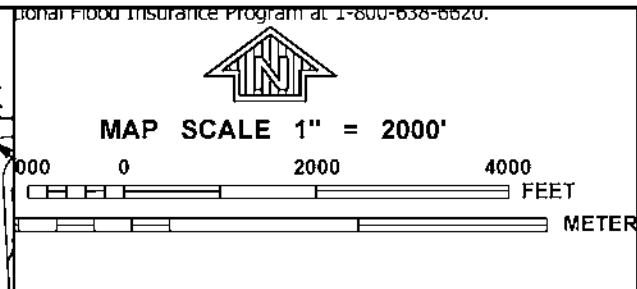
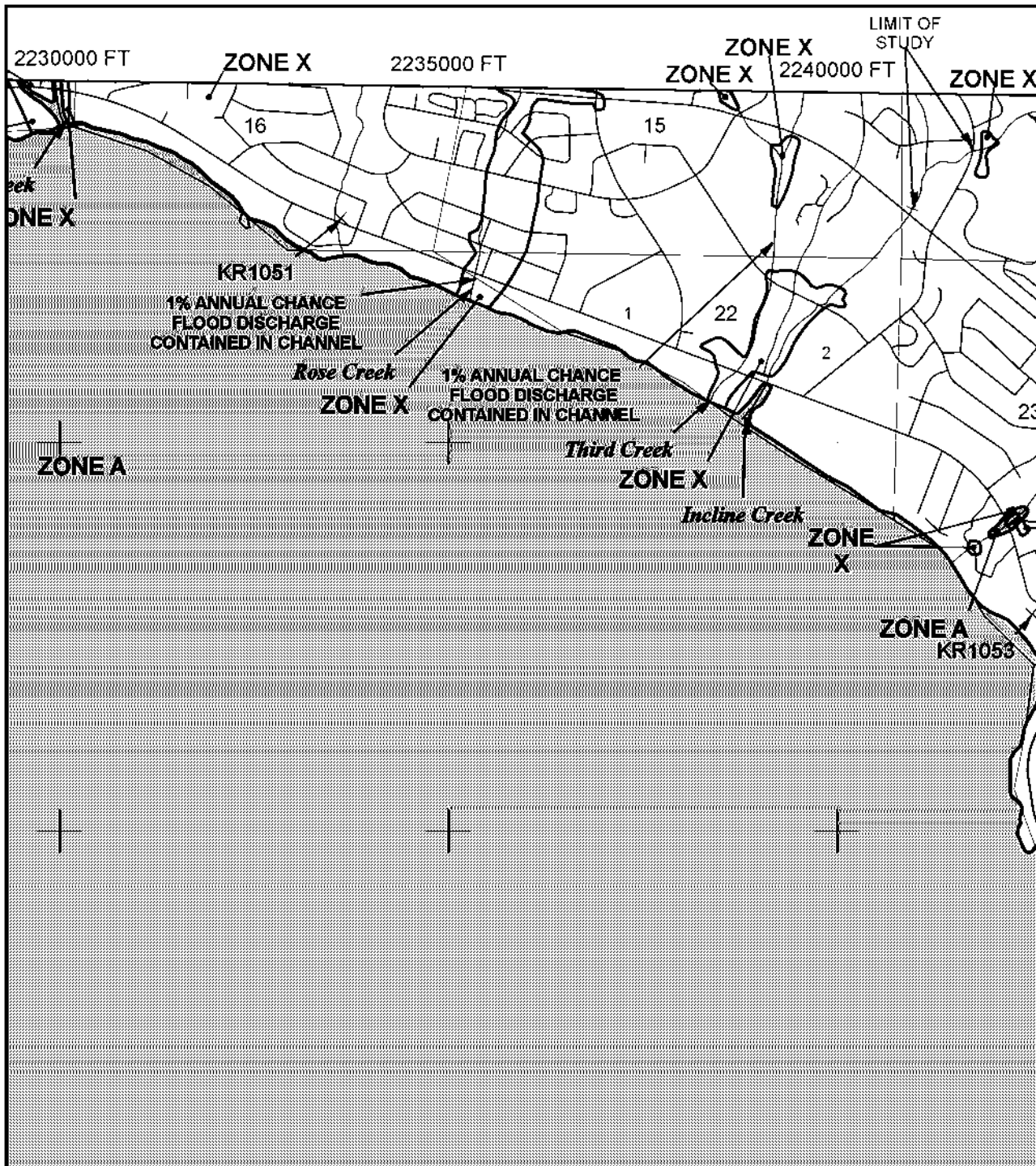
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EFFECTIVE DATE:
SEPTEMBER 30, 1994



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NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 3425G

FIRM

FLOOD INSURANCE RATE MAP

WASHOE COUNTY,
NEVADA
AND INCORPORATED AREAS

PANEL 3425 OF 3475

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS

COMMUNITY	NUMBER	PANEL	SUFFIX
WASHOE COUNTY	320019	3425	G

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.

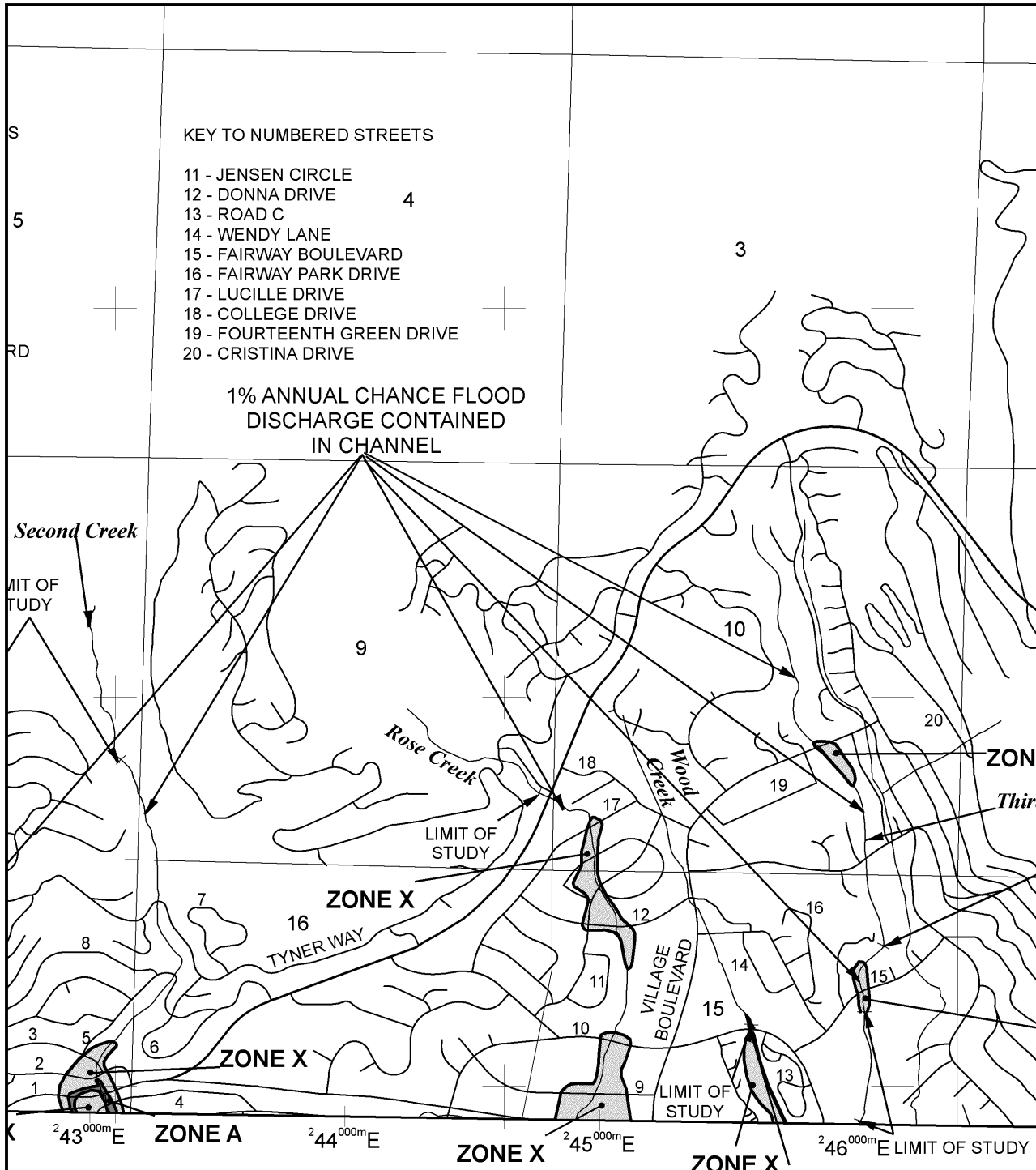


MAP NUMBER
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MAP REVISED
MARCH 16, 2009

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National Flood Insurance Program at 1-800-638-6620.



MAP SCALE 1" = 2000'

0 0 2000 4000
FEET

0 0 2000 4000
METER

NFI

PANEL 3325G

FIRM

FLOOD INSURANCE RATE MAP

WASHOE COUNTY, NEVADA AND INCORPORATED AREAS

PANEL 3325 OF 3475

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
WASHOE COUNTY	320019	3325	G

Notice to User: The Map Number shown below should be used when placing map orders; the Community Number shown above should be used on insurance applications for the subject community.



MAP NUMBER
32031C3325G

MAP REVISED
MARCH 16, 2009

Federal Emergency Management Agency

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Appendix 3: Special-Status Plants with Potential to Occur in the Middle Rosewood Creek Project Areas

Scientific Name	Common Name	Status ¹			Habitat	Project Area		
		Fed	State	Other		Known to Occur Within 0.5 mi	Habitat Within 0.5 mi	Reasoning
Plants								
<i>Arabis rectissima</i> var. <i>simulans</i>	Washoe tall rockcress	LSI			Dry, sandy, granitic or andesitic soil on mostly gentle slopes of all aspects, in full or filtered sunlight of thinly littered openings in mature, open <i>Pinus jeffreyi</i> - <i>Abies concolor</i> forests. Densities highest on very light and recovered disturbances, excluded from areas of bare ground, deep litter, dense tree or shrub cover, or intense disturbance.	Y	Y	A known population is recorded approximately 0.5 miles north of the project site at the west side of the stream on fill at the northeast corner of Harold and Village.
<i>Arabis rigidissima</i> var. <i>demota</i>	Galena Creek rockcress	FSS, SC 1,2	-	-	Species is found in open, rocky areas along forest edges of conifer and/or aspen stands. Usually found on northerly aspects above 7,500 feet (ft).	N	N	Outside of elevational range for species.
<i>Arabis tiehmii</i>	Tiehm rockcress	FSS, SC 1,2	-	-	Species is found on high elevation metavolcanic or decomposed granite ridges and steep slopes.	N	N	Outside of elevational range for species.
<i>Botrychium ascendens</i>	Upswept moonwort	FSS, SC 1,2	-	-	<i>Botrychium</i> species share similar preferences in habitat, i.e. wet or moist soils such as marshes, meadows, and along the edges of lakes and streams. They generally occur with mosses, grasses, sedges, rushes, and other riparian vegetation.	N	N	No know populations recorded within 1 1/2 miles of project site. Marginal to poor habitat present on site.
<i>Botrychium crenulatum</i>	Scalloped moonwort	FSS, SC 1,2	-	-	See above	N	N	No know populations recorded within 1 1/2 miles of project site. Marginal to poor habitat present on site.
<i>Botrychium lineare</i>	Slender moonwort	C, FSS	-	-	See above	N	N	No know populations recorded within 1 1/2 miles of project site. Marginal to poor habitat present on site.
<i>Botrychium lunaria</i>	Common moonwort	FSS, SC 1	-	-	See above	N	N	No know populations recorded within 1 1/2 miles of project site. Marginal to poor habitat present on site.
<i>Botrychium minganense</i>	Mingan moonwort	FSS	-	-	See above	N	N	No know populations recorded within 1 1/2 miles of project site. Marginal to poor habitat present on site.
<i>Botrychium montanum</i>	Western goblin	FSS	-	-	See above	N	N	No know populations recorded within 1 1/2 miles of project site. Marginal to poor habitat present on site.
<i>Bruchia bolanderi</i>	Bolander's candle moss	FSS	-	-	Montane meadows and steam banks are favored habitat. This moss tends to grow on bare, slightly eroding soil where there is little competition from other vegetation.	N	N	No know populations recorded within 1 1/2 miles of project site. Marginal to poor habitat present on site.
<i>Draba asterophora</i> var. <i>asterophora</i>	Tahoe draba	FSS, SC 2	-	TRPA	Species is found in rock crevices and open granite talus slopes at high elevations between 8,000 to 10,200 ft on north-east facing slopes.	N	N	Outside of elevational range for species.
<i>Draba asterophora</i> var. <i>macrocarpa</i>	Cup Lake draba	FSS, SC1		TRPA	This species is found on steep, gravelly or rocky slopes at elevations to 8,400 to 9,235 ft.	N	N	Outside of elevational range for species.
<i>Epilobium howellii</i>	Subalpine fireweed	FSS	-	-	Plants are known from wet meadows and mossy seeps at 6,500 to 9,000 ft in subalpine coniferous forest.	N	N	No know populations recorded within 1 1/2 miles of project site. Marginal to poor habitat present on site.
<i>Erigeron miser</i>	Starved daisy	FSS	-	-	Plants are known from granitic rock outcrops above 6,000 ft.	N	N	Suitable habitat not present within Project area.
<i>Eriogonum umbellatum</i> var. <i>torreyanum</i>	Donner Pass buckwheat	FSS	-	-	This species grows in dry gravelly or stoney sites, often on harsh exposures such as ridge tops or steep slopes.	N	N	Suitable habitat not present within Project area.
<i>Hulsea brevifolia</i>	Short-leaved hulsea	FSS, SC 1	-	-	This species is found on gravelly soils within montane and mixed conifer forests, often with red fir between elevations of 4,900 and 8,900 ft.	N	N	Suitable habitat not present within Project area.
<i>Lewisia kelloggii</i> ssp. <i>Hutchinsonii</i>	Hutchinson's lewisia	FSS	-	-	Habitat for this plant occurs on ridge tops or flat open spaces with widely spaced trees and sandy granitic to erosive volcanic soil from about 5,000 to 7,000 ft.	N	N	Suitable habitat not present within Project area.

Appendix 3: Special-Status Plants with Potential to Occur in the Middle Rosewood Creek Project Areas

Scientific Name	Common Name	Status ¹			Habitat	Project Area		
		Fed	State	Other		Known to Occur Within 0.5 mi	Habitat Within 0.5 mi	Reasoning
<i>Lewisia kelloggii</i> ssp. <i>Kelloggii</i>	Kellogg's lewisia	FSS	-	-	See above	N	N	Suitable habitat not present within Project area.
<i>Lewisia longipetala</i>	Long-petaled lewisia	FSS, SC 1	-	TRPA	This species occurs on the northerly exposures on slopes and ridge tops at elevations between 8,000 and 12,500 ft.	N	N	Suitable habitat not present within Project area.
<i>Rorippa subumbellata</i>	Tahoe yellow cress	C, FSS	-	TRPA	This species grows within the shore zone of Lake Tahoe.	N	N	Shore zone area does not exist within the Project area.
Moss								
<i>Helodium blandowii</i>	Blandow's bog moss	FSS	-	-	Habitat for this moss is in bogs and fens, wet meadows, and along streams under willows.	N	N	No known populations recorded within 1 1/2 miles of project site. Marginal to poor habitat present on site.
<i>Meesia triquetra</i>	Three-ranked hump-moss	FSS, SC 2	-	-	This moss prefers bogs and fen habitats, but is also found in very wet meadows.	N	N	Suitable habitat not present within Project area.
<i>Meesia uliginosa</i>	Broad-nerved hump-moss	FSS	-	-	This moss prefers bogs and fen habitats, but is also found in very wet meadows.	N	N	Suitable habitat not present within Project area.
<i>Meesia longisetata</i>	Long-stalked hump-moss	LSI	-	-	Usually in fens but sometimes along freshwater streams at high elevations	N	N	Suitable habitat not present within Project area.
<i>Myurella julaceae</i>	Myurella moss	LSI	-	-	Soil over rocks or within crevices of alpine boulders and rock fields, often within subalpine coniferous forest.	N	N	Suitable habitat not present within Project area.
<i>Orthotrichum praemorsum</i>	Orthotrichum moss	LSI	-	-	Shaded, moist habitats of Eastside Sierra Nevada rock outcrops up to 2,500 m (8,200 ft).	N	N	Suitable habitat not present within Project area.
<i>Orthotrichum shevockii</i>	Shevock's moss	LSI	-	-	Dry granitic rock outcrops in Carson Range, Douglas and Carson City Counties.	N	N	Suitable habitat not present within Project area.
<i>Orthotrichum spjutii</i>	Spjut's moss	LSI	-	-	Continually misted, shaded granitic rock faces at high elevations of Sonora Pass.	N	N	Suitable habitat not present within Project area.
<i>Pohlia tundrae</i>	Tundra pohlia moss	LSI	-	-	Gravelly, damp soils of alpine boulder and rock fields. Elevation ranges from 2,700 m (8,860 ft) to 3,000 m (9,840 ft).	N	N	Suitable habitat not present within Project area.
<i>Sphagnum</i> spp.	Sphagnum moss	LSI	-	-	Usually in fens and bogs, sometimes in very wet, non-acidic habitats that remain saturated.	N	N	Suitable habitat not present within Project area.
Lichen								
<i>Peltigera hydrothyrta</i>	Veined water lichen	FSS	-	-	Species is found in cold unpolluted streams in mixed conifer forests.	N	N	No known populations recorded within 1 1/2 miles of project site. Marginal to poor habitat present on site.
Fungi								
<i>Dendrocollybia racemosa</i>	Branched collybia	FSS	-	-	This species is a mycoparasite growing on old decayed or blackened mushrooms or occasionally in coniferous duff, usually within old growth stands.	N	N	Suitable habitat not present within Project area.

^aStatus explanations

1- LTBMU list revised November 2006

1- No species in LTBMU are currently listed as threatened or endangered by USFWS under ESA.

1- No species in LTBMU are currently listed as MIS

C = USFWS Candidate species for listing as threatened or endangered under ESA

SC = USFWS Species of concern (1 California SC, 2 Nevada SC)

FSS = LTBMU Sensitive Species, Regional Forester's Sensitive Species List

TRPA = TRPA special interest species, Regional Plan for the LTBMU: Goals and Policies (1986) and Code of Ordinances (1987)

LSI = USFS LTBMU Special Interest Species

Appendix 3: Special-status Wildlife with Potential to Occur in the Middle Rosewood Creek Project Areas

Scientific Name	Common Name	Status ¹			Habitat	Project Area		
		Fed	State	Other		Known to Occur Within 0.5 mi	Habitat Within 0.5 mi	Reasoning
Fishes								
<i>Gila bicolor pectinifer</i>	Lahontan Lake tui chub	FSS	-	-	Inhabit large, deep lakes. Tolerate a wide range of physiochemical water conditions. Spawn in near-shore shallow areas over beds of aquatic vegetation	N	N	Lake habitat does not occur within the Project area.
<i>Hypomesus transpacificus</i>	delta smelt	FT	-	-	Endemic to the upper San Francisco Estuary, principally in the Delta and Suisun Bay. Typically rear in open, shallow waters of the estuary.	N	N	This species does not occur in the Lake Tahoe Basin.
<i>Oncorhynchus clarkii henshawi</i>	Lahontan cutthroat trout	FT	S3	MIS, TRPA	Historically in all accessible cold waters of the Lahontan Basin in a wide variety of water temperatures and conditions. Requires gravel riffles in streams for spawning.	N	N	The Project reach does not provide adequate habitat and is isolated from potential habitat.
<i>Oncorhynchus mykiss</i>	rainbow trout	FT ³	-	MIS	Cold mountain streams, rivers, and lakes. Introduced throughout Tahoe basin as a game fish. FT status does not include the Lake Tahoe Basin population.	N	Y/N	The FT populations of <i>O. mykiss</i> do not occur in the Lake Tahoe Basin. Introduced populations, which are MIS but not FT, do occur in the Lake Tahoe Basin.
<i>Salvelinus fontinalis</i>	brook trout	-	-	MIS	Cold mountain streams and rivers. Introduced throughout Tahoe basin as a game fish.	N	Y	-
Invertebrates								
<i>Helisoma (Carninifex) newberryi</i>	Great Basin rams-horn	FSS	-	-	Larger lakes and slow rivers, including larger spring sources and spring-fed creeks. Characteristically burrow in mud.	N	Y	-
Reptiles and Amphibians								
<i>Rana muscosa</i>	mountain yellow-legged frog	FC	-	-	In the Sierra, this species is associated with streams, lakes, and ponds in montane riparian, lodgepole pine, subalpine conifer, and wet meadow habitat types, above 5,940 feet.	N	Y	-
<i>Rana pipiens</i>	northern leopard frog	FSS	-	-	Uncommon and localized in California. Occurs in or near quiet, permanent and semi-permanent water in many habitats. In northern California, the leopard frog is established in Modoc County, and possibly eastern Lassen County. The status of introduced populations in the Tahoe Basin is unknown. Elevation range extends from sea level to 7,000 ft.	N	Y	-
Birds								
<i>Accipiter gentilis</i>	northern goshawk	FSS	S3	MIS, TRPA	Within and in vicinity of coniferous forest. Uses old nests, and maintains alternate sites. Usually nests on north slopes, near water. Red fir, lodgepole pine, jeffrey pine, and aspens are typical nest trees.	N	N	May occur incidentally, but suitable nesting habitat does not occur within the Project area due to the potential for disturbance and lack of canopy.
<i>Anas platyrhynchos</i>	mallard	-	-	MIS	Found throughout the state in fresh emergent wetlands, estuarine, lacustrine, and riverine habitats, ponds, pastures, croplands, and urban parks; and less commonly on saline emergent wetlands and mudflats.	N	Y	-
<i>Aquila chrysaetos</i>	golden eagle	-	-	TRPA	Rolling foothills mountain areas, sage-juniper flats, desert. Cliff walled canyons provide nesting habitat in most parts of range; also, large trees in open areas.	N	N	Appropriate foraging and nesting habitat does not occur in the Project area.

Appendix 3: Special-status Wildlife with Potential to Occur in the Middle Rosewood Creek Project Areas

Scientific Name	Common Name	Status ¹			Habitat	Project Area		
		Fed	State	Other		Known to Occur Within 0.5 mi	Habitat Within 0.5 mi	Reasoning
<i>Dendragapus obscurus</i>	blue grouse	-	-	MIS	Uncommon to common permanent resident at middle to high elevations. Occurs in open, medium to mature-aged stands of fir, Douglas-fir, and other conifer habitats, interspersed with medium to large openings, and available water.	N	Y	-
<i>Dryocopus pileatus</i>	pileated woodpecker	-	-	MIS	An uncommon, yearlong resident of mature, montane conifer habitats in the North Coast, Klamath, Cascade Ranges and the Sierra Nevada.	N	N	Not expected to occur - riparian habitat does occur, but the Project area lacks snags and is too vulnerable to disturbance for this species to occur.
<i>Empidonax traillii</i>	willow flycatcher	FSS	-	MIS	Inhabits extensive thickets of low, dense willows on edge of wet meadows, ponds, or backwaters; 2,000-8,000 feet elev. require dense willow thickets for nesting/roosting. low, exposed branches are used for singing posts/hunting perches.	N	Y	-
<i>Falco peregrinus anatum</i>	American peregrine falcon	FD	S2	MIS, TRPA	Uncommon breeding resident and uncommon as a migrant. Breeds in woodlands, forests, coastal habitats, and riparian areas near wetlands, lakes, rivers, or other water on high cliffs, banks, dunes, or mounds. Active nesting sites are known along the coast, in the Sierra Nevada, and in the mountains of northern California. Migrants occur along the coast and the western Sierra Nevada in spring and fall.	N	N	Not expected to occur - appropriate nesting and foraging habitat does not occur in the Project area.
<i>Haliaeetus leucocephalus</i>	bald eagle	FT	S1B	MIS, TRPA	Ocean shore, lake margins, and rivers for both nesting and wintering. Most nests within 1 mi of water. Nests in large, old-growth, or dominant live tree w/open branches, especially ponderosa pine. Roosts communally in winter.	N	N	Not expected to occur - appropriate nesting, foraging, and perching habitat does not occur in the Project area.
<i>Pandion haliaetus</i>	osprey	-	-	TRPA	Ocean shore, bays, fresh-water lakes, and larger streams. Large nests built in tree-tops within 15 miles of good fish-producing body of water.	N	N	Not expected to occur - appropriate nesting and foraging habitat does not occur in the Project area.
<i>Strix nebulosa</i>	great gray owl	FSS	-	-	Resident of mixed conifer or red fir forest habitat, in or on edge of meadows. Require large diameter snags in a forest with high canopy closure, which provide a cool sub-canopy microclimate.	N	N	Not expected to occur - appropriate nesting and foraging habitat does not occur in the Project area.
<i>Strix occidentalis occidentalis</i>	California spotted owl	FSS	S1N	MIS	Resides in dense, old growth, multi-layered mixed conifer, redwood, Douglas fir, and oak woodland habitats, from sea level up to approximately 7600 feet.	N	N	Not expected to occur - appropriate nesting and foraging habitat does not occur in the Project area.
--	waterfowl	-	-	TRPA	Preferred habitats for waterfowl includes marsh, wet meadow, creek drainage, and along the shallow shoreline of lakes.	Y	Y	-
Mammals								
<i>Corynorhinus townsendii</i>	Townsend's big-eared bat	FSS	S3B	-	Found throughout California in all but subalpine and alpine habitats, and may be found at any season throughout its range. Once considered common, now considered uncommon in California. It is most abundant in mesic habitats.	N	N	Not expected to occur - no known abandoned structures within the Project area and vicinity.

Appendix 3: Special-status Wildlife with Potential to Occur in the Middle Rosewood Creek Project Areas

Scientific Name	Common Name	Status ¹			Habitat	Project Area		
		Fed	State	Other		Known to Occur Within 0.5 mi	Habitat Within 0.5 mi	Reasoning
<i>Gulo gulo</i>	California wolverine	FSS	-	-	Mixed conifer, red fir, and lodgepole habitats, and probably subalpine conifer, alpine dwarf shrub, wet meadow, and montane riparian habitats. Occurs in the Sierra Nevada from 4,300 to 10,800 feet. Majority of recorded sightings are found above 8,000 ft elevation.	N	N	Not expected to occur in the Project area - disturbance from residential area.
<i>Martes americana sierrae</i>	Sierra Marten	FSS	-	-	Mixed evergreen forests with more than 40% crown closure along north coast, Sierra Nevada, and Klamath and Cascade Ranges. Needs variety of different-aged stands, particularly old-growth conifers and snags which provide cavities for dens/nests.	N	N	Not expected to occur aside from incidentally - no snags or logs for denning or cover.
<i>Odocoileus hemionus</i>	mule deer	-	-	MIS, TRPA	Common to abundant, yearlong resident or elevational migrant with a widespread distribution throughout most of California, except in deserts and intensively farmed areas without cover. Occur in early to intermediate successional stages of most forest, woodland, and brush habitats. Prefer a mosaic of various-aged vegetation that provides woody cover, meadow and shrubby openings, and free water.	N	Y	-
<i>Ursus americanus</i>	black bear	-	-	MIS	Widespread, common to uncommon resident occurring from sea level to high mountain regions. Found in the North Coast Ranges, Cascades, Sierra Nevada, parts of the South Coast Ranges, and in the San Gabriel and San Bernardino Mts. Occurs in fairly dense, mature stands of many forest habitats, and feeds in a variety of habitats including brushy stands of forest, valley foothill riparian, and wet meadow.	N	Y	-
<i>Vulpes vulpes necator</i>	Sierra Nevada red fox	FSS	-	-	Occurs throughout the Sierra Nevada at elevations above 7,000 feet in forests interspersed with meadows or alpine forests. Open areas are used for hunting, and forested habitats are used for cover and reproduction.	N	N	Not expected to occur in the Project area - elevation, disturbance from residential area.

¹ Status

Federal - USFWS

FT = Federal listed species

FC = Federal candidate for Proposed listing

FD = Delisted

S1 = Critically imperiled due to extreme rarity, imminent threats, or and/or biological factors

S2 = Imperiled due to rarity and/or other demonstrable factors

S3 = Rare and local throughout its range, or with very restricted range, or otherwise vulnerable to extinction

_B = Breeding status within the state; rank for breeding occurrences only

_N = Non-breeding status within the state; rank for non-breeding occurrences only

FSS = LTBMU Forest Service sensitive

MIS = LTBMU management indicator species

TRPA = TRPA special interest species

² Source: NatureServe 2006

³ Federal "threatened" listing does not include Lake Tahoe Basin populations.

: These species do not need to be analyzed in the USFS BE or MIS Assessment

2009 Noxious Weed Survey
Middle Rosewood Creek Implementation Area A
Incline Village, Nevada

A noxious weed survey was conducted June 23, 2009 by a Wood Rodgers botanist for Middle Rosewood Creek Area "A" SEZ Restoration Project in Incline Village, Nevada. This area was resurveyed subsequent to a preliminary noxious weed survey conducted in December 2008 to ensure an adequate level of survey as the December 2008 survey may have missed some weedy species due to winter dormancy. The project area was traversed in a series of meandering, pedestrian transects on each side of the creek, with particular attention paid to areas with fill, and disturbed areas exhibiting bare soil, including road shoulders, creek banks, and trail crossings. Conditions during the survey consisted of clear, sunny weather, with plant species identifiable to the species level.

The project area is characterized by a riparian corridor adjacent to Rosewood Creek within a Sierra mixed conifer forest dominated by Jeffrey pine (*Pinus jeffreyi*) and white fir (*Abies concolor*). Dominant overstory riparian vegetation is provided by mountain alder (*Alnus incana* ssp. *tenuifolia*), Scouler's willow (*Salix scouleriana*) and Pacific willow (*S. lucida* ssp. *lasiandra*). A shrub layer is typically noncontiguous along the stream bank, except for discrete occurrences of red osier dogwood (*Cornus sericea*), Wood's rose (*Rosa woodsii*) and Lemmon's willow (*S. lemmonii*). The herbaceous understory varies from dense cover of mesic graminoids like small-fruit bulrush (*Scirpus microcarpus*) and sedges (*Carex* spp.), and dry graminoids like blue wildrye (*Elymus glaucus*) to that composed of forbs including western brackenfern (*Pteridium aquilinum*), stinging nettle (*Urtica dioica*), and Anderson's thistle (*Cirsium andersonii*).

Most of the survey area exhibited a thick litter layer composed of pine needle duff/bracken fern in the uplands and decomposing, deciduous herbaceous material at the ordinary high water mark, precluding the establishment of weedy species. Additionally, considerable clearing of dead and dying woody material and undergrowth has been accomplished over the last year between the established homes/condominiums and the creek, with some pathways more well-defined and wood chips put down as cover. Some willows appeared to be regenerating from the cut stumps. Erosion control species have been seeded adjacent to SR28 and include the grasses bottlebrush squirreltail (*Elymus elymoides*), California brome (*Bromus carinatus*) bluegrass species (*Poa secunda*, *P. ampla*), and wheatgrasses (*Agropyron cristatum*, *Elytrigia intermedia*). Additionally, mountain big sagebrush (*Artemisia tridentata* ssp. *vaseyana*), blue flax (*Linum lewisii*) and beardtongue (*Penstemon* sp.) were evident.

Disturbed habitat that might support weedy species was observed adjacent to SR28 and Northwood Boulevard, and the real estate office parking lot/boat storage near the northwest start of the project area. In a few places creek banks, and trails crossing the creek also exhibited bare ground, but did not support any herbaceous vegetation in those cases. Common weedy species observed included yard knotweed (*Polygonum aviculare*), curlycup gumweed (*Grindelia squarrosa*), prickly lettuce (*Lactuca serriola*), tumble

mustard (*Sisymbrium altissimum*), bulbous bluegrass (*Poa bulbosa*) and filaree (*Erodium cicutarium*).

The Nevada Department of Agriculture Noxious Weed List (2005) and the Priority Invasive Weeds of the Tahoe Basin list (LTBWCG 2007) were reviewed to ascertain the status of potentially weedy species found within the project area. No Nevada noxious weeds were identified as occurring within the project area. Two Priority Invasive Weed species of the Tahoe Basin were identified as occurring within the survey area, teasel (*Dipsacus fullonum* -Group 1: Watch for, Report, Eradicate Immediately, present as only small, eradicable populations) and bull thistle (*Cirsium vulgare* - Group 2: Manage Infestations with a Goal of Eradication, isolated populations will be targeted for eradication). Teasel clumps identified in December 2008 on the west side of the creek and north of SR28 are still present: two clumps are present adjacent to the parking area for the real estate office, and one clump just below this on the west bank of Rosewood Creek. Last year's flowering stalks were present and 10+ basal rosettes evident. Near the teasel clumps located by the parking area, one bull thistle plant was also found. Additionally, two other locations of bull thistle plants were located between this parking lot, west and south of the creek and north of SR28, for a total of seven additional bull thistle plants in both the flowering stalk and basal rosette stages.

Recommendations:

It is recommended that prior to any construction or other ground disturbance associated with any riparian enhancement/restoration project, that the teasel and bull thistle are removed. Additionally, the entire project area should be monitored for these and other noxious and priority weed species post-project implementation.

References

Lake Tahoe Basin Weeds Coordinating Group (LTWCG). 2007. Priority Invasive weeds of the Lake Tahoe Basin, revised December 2007. Accessed June 25, 2009 @ http://tahoeinvasiveweeds.org/weeds/pdf/PriorityWeedList_12_2007.pdf

Nevada Department of Agriculture. 2005. Noxious Weed List updated 11/06/08. Accessed June 25, 2009 @ http://agri.nv.gov/nwac/PLANT_NoXWeedList.htm

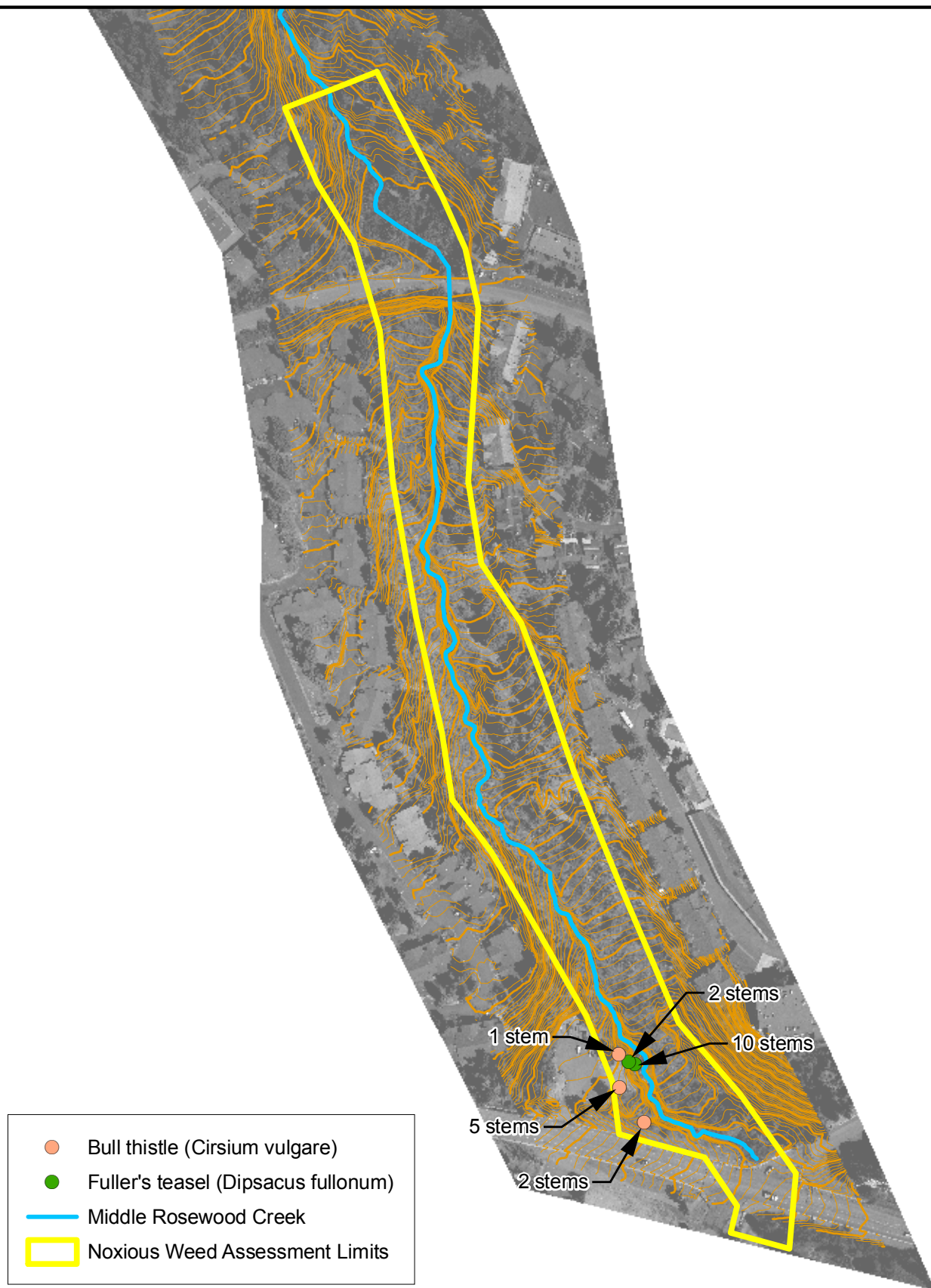
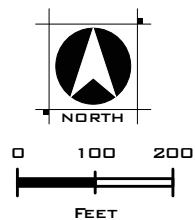


Exhibit A
 Noxious Weed Locations
 Middle Rosewood Creek Area "A" Restoration Project
 Incline Village, NV
 July, 2009

NOTES



Plant Species List Rosewood Creek
Incline Village, Nevada
December 2008

Family	Scientific Name	Common Name
Apocynaceae	<i>Vinca major</i>	periwinkle
Asteraceae	<i>Achillea millefolium</i>	common yarrow
	<i>Artemisia tridentata</i> ssp. <i>vaseyana</i>	mountain sagebrush
	<i>Cirsium andersonii</i>	Anderson's thistle
	<i>Cirsium vulgare</i>	bull thistle
	<i>Grindelia squarrosa</i>	curlycup gumweed
	<i>Lactuca serriola</i>	prickly lettuce
	<i>Solidago</i> sp.	goldenrod
	<i>Taraxacum officinale</i>	common dandelion
	<i>Tragopogon dubius</i>	goatsbeard
	<i>Wyethia mollis</i>	mule's ears
Berberidaceae	<i>Berberis aquifolium</i>	Oregon-gape
Betulacaceae	<i>Alnus incana</i> ssp. <i>tenuifolia</i>	mountain alder
Boraginaceae	<i>Cryptantha affinis</i>	quill cryptantha
	<i>Hackelia</i> sp.	stickseed
Brassicaceae	<i>Arabis</i> sp.	rockcress
	<i>Descurainia californica</i>	Sierra tansymustard
	<i>Lepidium campestre</i>	field pepperweed
	<i>Lepidium virginicum</i>	Virginia pepperweed
	<i>Sisymbrium altissimum</i>	tumble mustard
Caprifoliaceae	<i>Symphoricarpos mollis</i>	creeping snowberry
	<i>Symphoricarpos rotundifolius</i>	mountain snowberry
Chenopodiaceae	<i>Chenopodium album</i>	lamb's quarters
Cornaceae	<i>Cornus sericea</i>	redosier dogwood
Cupressaceae	<i>Calocedrus decurrens</i>	incense cedar
Cyperaceae	<i>Carex amplifolia</i>	bigleaf sedge
	<i>Carex</i> sp.	rhizomateous sedge
	<i>Carex deweyana</i>	Dewey's sedge
	<i>Carex fracta</i>	fragile sheath sedge
	<i>Scirpus microcarpus</i>	small-fruit bulrush
Dennstaedtiaceae	<i>Pteridium aquilinum</i>	western brackenfern
Dipsacaceae	<i>Dipsacus fullonum</i>	teasel
Ericaceae	<i>Arctostaphylos patula</i>	greenleaf manzanita
	<i>Pyrola picta</i>	white-veined wintergreen
	<i>Sarcodes sanguinea</i>	snowplant
Fabaceae	<i>Astragalus cicer</i>	cicer milkvetch
	<i>Lotus nevadensis</i> var. <i>nevadensis</i>	Sierra Nevada lotus
	<i>Lupinus</i> sp. (<i>L. lepidus</i> var. <i>sellulus</i> ?)	lupine
	<i>Melilotus</i> sp.	sweetclover
	<i>Vicia</i> sp.	vetch
Fagaceae	<i>Chrysolepis sempervirens</i>	Sierra chinquapin
	<i>Quercus vaccinifolia</i>	huckleberry oak
Geraniaceae	<i>Erodium cicutarium</i>	filaree
Grossulariaceae	<i>Ribes cereum</i>	wax currant
	<i>Ribes nevadense</i>	Sierra currant
Hydrophyllaceae	<i>Phacelia hastata</i>	silverleaf phacelia
Juncacaceae	<i>Juncus balticus</i>	Baltic rush
Liliaceae	<i>Smilacina stellata</i>	starry false-Solomon's-seal
Linaceae	<i>Linum lewisii</i>	blue flax
Malvaceae	<i>Sidalcea oregana</i>	bog mallow
	<i>Malva neglecta</i>	common mallow

Plant Species List Rosewood Creek
Incline Village, Nevada
December 2008

Family	Scientific Name	Common Name
Onagraceae	<i>Epilobium angustifolium</i>	fireweed
	<i>Gaophytum diffusum</i>	groundsmoke
Pinaceae	<i>Abies concolor</i>	white fir
	<i>Pinus contorta</i>	lodgepole pine
	<i>Pinus jeffreyi</i>	Jeffrey pine
Plantaginaceae	<i>Plantago lanceolata</i>	English plantain
Poaceae	<i>Agropyron cristatum</i>	crested wheatgrass
	<i>Bromus carinatus</i>	California brome
	<i>Bromus tectorum</i>	cheatgrass
	<i>Dactylis glomerata</i>	orchard grass
	<i>Elymus elymoides</i>	bottlebrush squirreltail
	<i>Elymus glaucus</i>	blue wildrye
	<i>Elytrigia intermedia</i>	intermediate wheatgrass
	<i>Leymus triticoides</i>	creeping wildrye
	<i>Poa ampla</i>	big bluegrass
	<i>Poa bulbosa</i>	bulbous bluegrass
	<i>Poa pratensis</i>	Kentucky bluegrass
	<i>Poa secunda</i>	Sandberg bluegrass
Polygonaceae	<i>Eriogonum nudum</i>	nakedstem buckwheat
	<i>Polygonum aviculare</i>	yard knotweed
	<i>Rumex crispus</i>	curly dock
Ranunculaceae	<i>Aquilegia formosa</i>	crimson columbine
	<i>Thalictrum fendleri</i>	Fendler's meadowrue
Rhamnaceae	<i>Ceanothus cordulatus</i>	whitethorn ceonothus
	<i>Ceanothus prostratus</i>	squawcarpet
	<i>Ceanothus velutinus</i>	snowbrush ceonothus
Rosaceae	<i>Fragaria virginiana</i>	Virginia strawberry
	<i>Geum macrophyllum</i>	largeleaf avens
	<i>Potentilla glandulosa</i>	sticky cinquefoil
	<i>Purshia tridentata</i>	antelope bitterbrush
	<i>Rosa woodsii</i>	Woods rose
	<i>Rubus parviflorus</i>	thimbleberry
Salicaceae	<i>Salix lemmonii</i>	Lemmon's willow
	<i>Salix lucida</i> ssp. <i>lasiandra</i>	Pacific willow
	<i>Salix scouleriana</i>	Scouler's willow
Scrophulariaceae	<i>Penstemon</i> sp.	beardtongue
Urticaceae	<i>Urtica dioica</i>	stinging nettle