4.10 Geology and Soils

The study area for geology and soils includes the area located along the UTR at the Airport Reach. This section describes the existing geologic and soils conditions, which includes a characterization of the fill to be excavated. The section analyzes impacts from the No Action/No Project Alternative and Alternative 2. Environmental commitments and mitigation measures are identified to reduce potential impacts to geology and soils to a less than significant level.

4.10.1 Existing Conditions

This section presents information about the existing geologic and soil conditions within the UTR Airport Reach project area. CDM compiled available material to characterize the geology and soils information in and around the project area. Information for this section was derived from the results of previous investigations including:

- *Upper Truckee River Reclamation Project, Environmental Assessment, Feasibility Report and Conceptual Plans (EA),* Tahoe Resource Conservation District, 2003.
- *Geomorphic Assessment of Upper Truckee River Watershed and Section 206 Aquatic Ecosystem Restoration Project Reach,* U.S. Army Corps of Engineers (USACE, 2001)
- *Surface and Ground Water Characteristics in the Upper Truckee River and Trout Creek Watersheds,* United States Geological Survey, 2000.
- *Soil Survey Tahoe Basin Area California and Nevada,* United States Department of Agriculture Soil Conservation Service, 1974.
- *Upper Truckee River Restoration Reach 3 Airport Fill Site, Preliminary Characterization Report*, CDM, June 2006.
- *Upper Truckee River Restoration Project Existing Conditions Memorandum,* CDM, January 2005.

The geology and soil types vary over the UTR drainage area from lake and glacial deposits at the lower altitudes to granitic rocks that make up the high mountain peaks (USGS, 2000). The project area is located in the lower watershed where the river flows through sediment deposited from Lake Tahoe during the Quaternary period as a result of a high stand of Lake Tahoe. Just downstream of the Airport the valley floor is composed of more recent Holocene lake deposits (USACOE, 2001).

The project area is approximately three miles south of Lake Tahoe and consists of a river channel and floodplains that are generally bounded by uplands to the east and a fence line paralleling the Airport runway to the west.

4.10.1.1 Soils

The USDA/SCS soil survey identifies three soil types in the Upper Truckee River area which are defined and characterized as follows:

- Loamy alluvial land (Lo) makes up approximately 60% of the city owned property in Reaches 2 through 4. The Alluvial soil types are characterized by the presence of surface or subsurface water and are usually adjacent to stream channels and in meadows. These areas tend to be nearly level to gently sloping and runoff is generally slow with moderate permeability. The erosion hazard is slight; however, the potential for flooding can be hazardous in the spring or during periods of high runoff (USDA/SCS 1974).

  The soil profile of Loamy alluvial land starts with a surface layer of "dark grayish-brown to dark-brown, slightly acid to medium acid sandy loam to silt loam" (USDA/SCS 1974). Below the surface layer is a "stratified, mottled sandy loam to silty clay loam" (USDA/SCS 1974). "The substratum, at a depth of more than 48 inches, is gravel, lake sediment, or loamy alluvium" (USDA/SCS 1974).

- Jabu sandy loam (JgC) originates from the toe slope of old lateral moraines deposits and can be found on either side of the Airport property. This soil type is only a small portion of Reach 3 and 4 located in the upland region in the eastern portion of the project area. JgC is moderately well drained and even with little to no vegetation the surface runoff is slow and the erosion hazard is slight to moderate (USDA/SCS 1974).

  The first six to ten inches of the JgC soil profile ranges between a "brown to grayish brown and from coarse sandy loam to fine sandy loam" (USDA/SCS 1974). The subsoil ranges from "pale brown to white" and the substratum or lake sediment, is of "clay loam to clay texture" (USDA/SCS 1974).

- Pits and dumps soils (Px) is located at the very northeastern portion of the project area in Reach 3. Px consists of sand and gravel pits, refuse dumps, and rock quarries. These areas are typically barren and vary in natural drainage, permeability, erosion hazard, runoff, and available water capacity (USDA/SCS 1974).

Tables 4.10-1 presents the important characteristics of the soils found in the UTR project area and Figure 4.10-1 illustrates the locations of each soil type.

Table 4.10-1
Upper Truckee River Area Soil Characteristics

Map Symbol	*Soil Name*	*Approximate Percentage of Project Area*	*Runoff Speed*	*Permeability*	*Hydrologic Group*	*Erosion Hazard*
JgC	Jabu sandy loam, moderately fine subsoil variant, 0 to 9 percent slopes	10%	Slow	Varies (<0.06 to 6.3)	C	Slight
Lo	Alluvial loamy land	60%	Slow	Moderate	D	Slight
Px	Pits and dumps	30%	Varies	Varies	D	Variable

US 50

Reach 1
Reach 2

Reach 2
Reach 3

Tahoe Airport

Reach 3
Reach 4

No Data

Upper Truckee River
River Reaches
Parcels
Project Area

Soils

EbC	Ev	JaD	Px
EbE	GeC	JgC	Ra
EfB	JaC	Lo	TrF

N

400 0 400 Feet

NOTE: See table for explanation of soils abbreviations.

Source: Soils data obtained from TRPA FTP site, ftp://ftp.trpa.org

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Figure 4.10-1
Area Soils

4.10.1.2 Hydrologic Group Definitions

Group B—Soils have moderate infiltration rate when thoroughly wetted and moderately low runoff potential; chiefly moderately deep and deep, that are moderately fine textured to moderately coarse textured and have moderately slow to moderately rapid permeability. These soils have a moderate rate of water transmission.

Group C—Soils have a slow infiltration rate when wetted and a moderately high runoff potential; well drained and moderately well drained soils that have a slowly to very slowly permeable layer at a depth of 20-40". These soils have a slow rate of Water transmission.

Group D--Soils have a slow infiltration rate when wetted and a high runoff potential; Clays that have a high swell potential; soils that have a permanent high water table; or soils that are shallow over a nearly impervious material. These soils have a very slow rate of water transmission.

4.10.1.3 Airport Fill

During the initial construction of the Lake Tahoe Airport in 1958 and subsequent expansion during the 1960's, fill material was placed in the UTR streambed, which altered the UTR River from its historical meandering channel. According to the City and a letter dated June 16, 2004 from Reinard W. Brandley, geotechnical engineer involved in the construction of the Airport and runway extension, the fill soil was placed during two separate events. The first filling, in approximately 1959, occurred during initial Airport runway construction. The second filling occurred in approximately 1966-1967 during an Airport runway extension. According to Mr. Brandley's letter, the fill depth during the first filling was no deeper than two to four feet in most locations and three to four feet deeper in areas where minor stream beds were filled. During the relocation of portions of the UTR for the runway extension in the late 1960s, fill soils were placed at depths up to ten feet in thickness in the river bed and fill ranged from zero to four feet in other areas. Mr. Brandley recalls that the fill was obtained from the hills located east of the control tower and at the north end of the runway. He states in his letter that no trash was ever buried in the fill soils because the fill was placed to provide a foundation and support for the runways, taxiways and aprons. According to the City, as-builts for the Airport are not available.

The current UTR channel flows relatively straight paralleling the Airport runway. The existing channel is lined with riprap with little vegetation or other coverage for aquatic species. During an initial site reconnaissance on June 25, 2004, CDM observed the project area to consist of exposed sandy soils with upland vegetation, as well as grassy meadows with a variety of evergreen and deciduous trees.

Alternative 2 includes removal of this fill from the terrace between the river channel and the Airport fence line in order to lower the terrace to the bank full floodplain elevation. A soils characterization study of the fill material was completed. The

investigation included drilling of temporary soil borings and soil sample collection and analysis.

The soils encountered during the soil boring investigation were consistent with the reported fill thicknesses and descriptions provided by the geotechnical engineer who oversaw the filling of the stream bed for the Airport runway construction and expansion. Fill was not observed in the southern section of the site adjacent to the current UTR channel. Closer to the original Airport runway, fill was observed at depths of up to 3-feet below ground surface. The area of the site adjacent to the northern runway expansion and the former river channel contained fill soils as deep as 10 feet below ground surface. Fill soils consisted of mostly well graded sands with gravel and some poorly graded sands. No debris, trash or staining was observed in the fill soils. The fill, where encountered, was underlain by silts and clays. Groundwater was observed at depths ranging from 4 feet in the southern portion of the site to 13 feet below ground surface in the northern portion of the site.

Total Petroleum Hydrocarbons (TPH), diesel range organics and gasoline range organics (DRO and GRO) was not detected in the soil samples collected and analyzed from each of the 30 soil borings. Laboratory analysis for Title 22 metals indicated the presence of arsenic, barium, beryllium, chromium, cobalt, copper, lead, molybdenum, nickel, selenium, vanadium, and zinc above the laboratory reporting limits. The metals concentrations are well below the Title 22 Total Threshold Limit Concentration (TTLC) levels for total metals.

According to the El Dorado County Environmental Management Department, the soils are not a hazardous waste and do not require special handling or disposal. The soils are suitable for reuse as fill material for the UTR restoration project or other construction projects within the City.

The *Upper Truckee River Restoration Reach 3 Airport Fill Site, Preliminary Characterization Report*, CDM, June 2006 includes a more detailed description and soil sample results of the fill soils located in Reach 3.

4.10.1.4 Geology

The Lake Tahoe Basin spans the border between the Sierra Nevada Batholith to the west and the Basin and Range province to the east and shares the character of each province (USACOE, 2001). The current geologic conditions found in and around the UTR project area were mainly formed over the last two million years by various geological and glacial processes. Tectonic uplift and periodic volcanic eruptions have resulted in steep mountainous terrain with areas of thick layers of ash and fine erodible soils. In the UTR watershed many of these areas have experienced years of grazing, mining, logging, and other disturbance (TRCD, 2003).

The oldest of five major periods of glaciation identified in the Lake Tahoe Basin is the only one that directly relates to the project area. This glaciation (the pre-Tahoe) was the most extensive, and created large lateral moraines containing highly weathered

boulders such as the one just east of the Airport in the project area (USACOE, 2001). The valley floor of the UTR within the project area is comprised of lake deposits from high stands of Lake Tahoe, up to 900 feet above present levels, during the Quaternary period and more recent Holocene period. In some areas, the UTR has deposited alluvial materials over the top of the lake deposits. High rates of runoff and sediment loads from glaciers associated with the high lake stands resulted in the large deltaic deposits upon which South Lake Tahoe sits; these deltaic deposits of well sorted sands have become lithified (hardened into rock) and now form hard ledges under the river streambed and along banks. Figure 4.10-2 depicts the major geologic formations in and around the UTR area.

4.10.1.5 Seismicity

The Lake Tahoe Basin is located in an area of low to moderate seismicity (USGS 2003). Active faults in the area include the North Tahoe and East Tahoe faults beneath Lake Tahoe and the Genoa-Carson Range Fault System in the east.

4.10.1.6 Existing River Channel Characteristics

This section describes the existing river channel characteristics as they relate to geology and soils. Descriptions in this section have been obtained from the *Upper Truckee River Reclamation Project Final Environmental Assessment, Feasibility Report, and Conceptual Plans,* dated January 2003 by TRCD.

The UTR in the project area has been degraded from historical deepening and straightening. Sediment transport and deposition processes now occur within the channel instead of in the natural floodplain along the valley. Within the project area, there is currently no area of inundation receiving overbank flow from a 2-year (760 cfs) streamflow event (Entrix 2006). Meadows surrounding the river that once received water from flooding are now dry, leading to a change in diversity of the vegetation. Deepening the channel has also increased the flow in the river and has resulted in an increase in erosion of fine sediments near the root zones of bank vegetation. Straightening the stream channel has created a flat streambed with poor habitat for fish and other aquatic species. Overall, deepening and straightening of the channel has altered the natural fluvial processes, reducing habitat and increasing sedimentation (TRCD 2003).

Reach 2

Reach 2 includes 3,788 feet of existing UTR channel and approximately 8 acres of meadow. Reach 2 flows along the eastern edge of the valley and is bounded by hillslope and upland to the east. The channel in Reach 2 has several areas of bank erosion that are resulting in the loss of meadow floodplain and erosion of upland bluffs. These areas of erosion are contributing fine sediment to the river and to Lake Tahoe (TRCD 2003).

Reach 3

Reach 3 is 1,350 linear feet of channel and approximately 17 acres of modified floodplain and meadow. The channel has been straightened, deepened, and lined

completely in riprap. The eastern bank abuts the upland hills and in some areas the channel abuts tributary valley alluvial fans. A 250 – 300 foot wide terrace that is comprised of fill from the Airport development binds the west bank.

The existing channel has a uniform trapezoidal shape with low aquatic and riparian habitat value. The channel bed is predominately sandy. The floodplain areas are 4-6 feet above the low flow water surface elevation in the channel and support only sparse vegetation (TRCD 2003).

Reach 4
Reach 4 consists of a 1,350-foot long reach of channel bounded closely by the hillslope and uplands to the east and the Airport fence line to the west. The lower 385 feet of this reach is lined with riprap. The floodplain area is severely limited (TRCD 2003).

4.10.1.7 Regulatory Framework

The Clean Water Act (CWA) includes provisions for reducing soil erosion relevant to water quality. The CWA made it unlawful for any person to discharge any pollutant from a point source (including construction site), into navigable waters, unless a permit was obtained under its provisions. This pertains to construction sites where soil erosion and storm runoff as well as other pollutant discharges could affect downstream water quality.

The NPDES process, established by the CWA, is intended to meet the goal of preventing or reducing pollutant runoff. Projects involving construction activities (e.g., clearing, grading, or excavation) involving land disturbance greater than one acre within the Lake Tahoe Basin must file a NOI with Lahontan to indicate their intent to comply with Board Order No. R6T-2—5-0007, Updated Waste Discharge Requirements and NPDES General Permit No. CAG616002. This Permit establishes conditions to minimize sediment and pollutant loading and requires preparation and implementation of a SWPPP prior to construction.

TRPA
TRPA has criteria and guidelines for construction projects that occur in the Lake Tahoe Basin. Grading, excavation, and filling can only occur between May 1st and October 15th. Grading, excavation, or filling is not permitted:

- After October 15th;
- During periods of precipitation;
- When the site is covered with snow; or
- When the site is saturated, muddy, or unstable.

Proper erosion control measures, such as erosion control fences, must be in place before any grading, excavation, or filling is initiated.

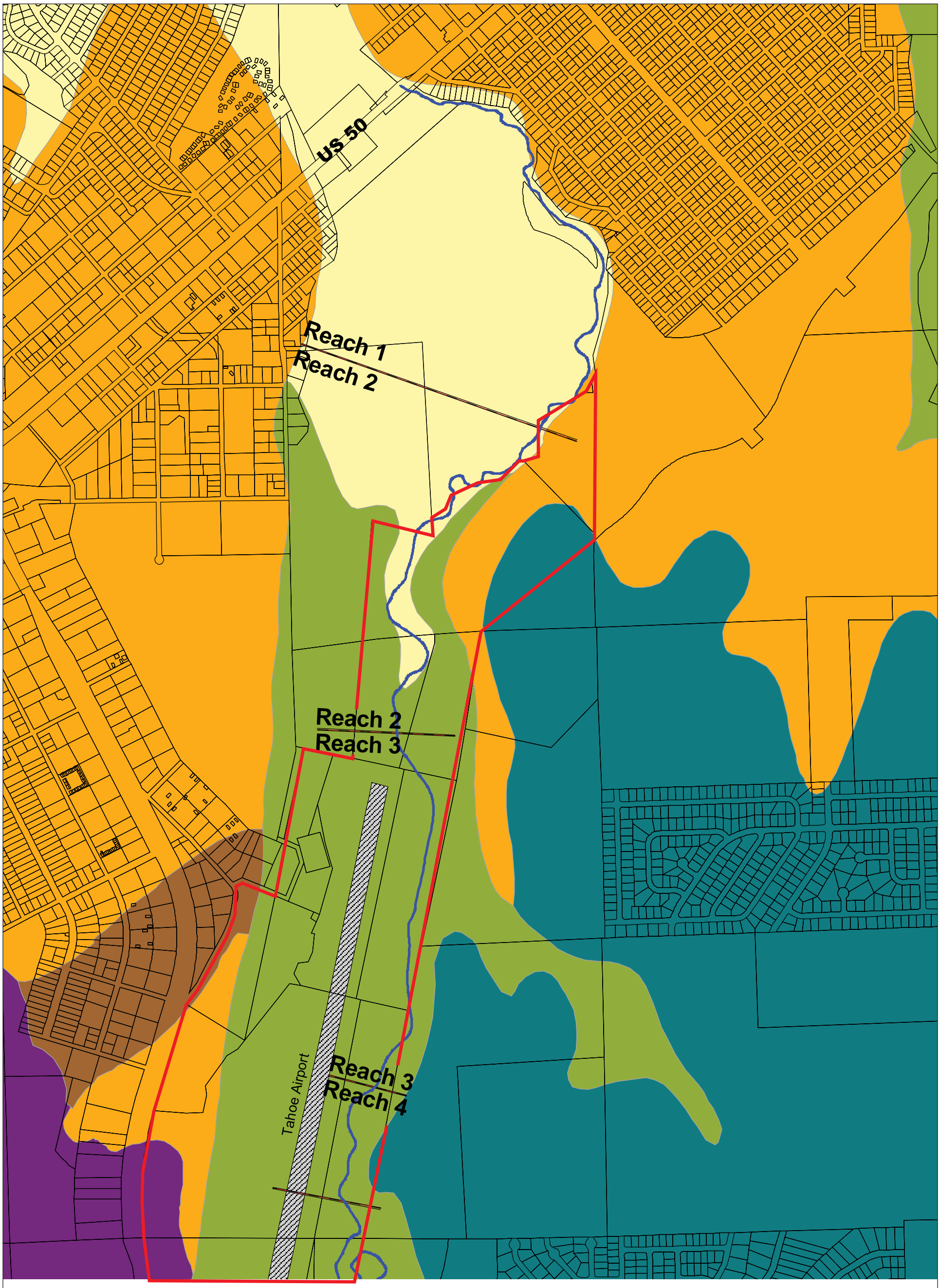

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Figure 4.10-2
Area Geology

For any activities that require excavation greater than 5 feet, or excavation that has the potential to impact groundwater, a Soils/Hydrologic report must be submitted to the TRPA. However this requirement is being waived by TRPA given the nature and location of the project as well as consideration of the expected environmental benefits to be realized once construction is complete. (Gustafson 2007)

TRPA also has guidelines for grading for winterization of a construction site, erosion control, protection of soil mounds, dust control and runoff containment within their *Code of Ordinances,* Chapter 64, Grading Standards.

4.10.2 Significance Criteria and Assumptions

4.10.2.1 NEPA and CEQA

According to CEQA the project would have a significant effect on the environment if it would:

- Result in substantial soil erosion or the loss of topsoil?
- Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?

4.10.2.2 TRPA

TRPA maintains several environmental criteria for establishing the significance of impacts of a project on land. For the purposes of this analysis, a significant impact would result if the project would result in one or more of the IEC questions answered Yes. The TRPA IEC was completed for the Recommended Alternative, Alternative 2. The results of the checklist questions are discussed in the analysis. A copy of the TRPA IEC is included in Section 5.

4.10.2.3 Assumptions

Because this is a restoration project, it is expected that after construction, the river would more closely mimic natural processes and therefore no adverse significant effects to geology would occur.

4.10.3 Environmental Consequences/Environmental Impacts of the No Action/No Project Alternative

The No Action/No Project Alternative is the future condition without the project. Under this alternative, no work would be performed in the project area, however there could be projects within the project area implemented or constructed in the future.

Under the No Action/No Project Alternative, the geology and soils of the area would be similar to existing conditions. Bank erosion is expected to continue in portions of Reach 2, as described under existing conditions. Reaches 2, 3, and 4 would continue to contribute fine sediment to the river and Lake Tahoe due to a reduced floodplain, a

deeper, straightened channel, and a higher rate of flow. The area of inundation receiving overbank flow from a 2-year (760 cfs) streamflow event would be similar to existing conditions (0 acres) (Entrix 2006).

Any river restoration projects implemented in the future that would occur upstream of the project area could reduce channel erosion and sediment in the Upper Truckee River over the long-term. This could be beneficial. Impacts to soil erosion from such projects would likely be temporary and less than significant with sound BMPs. The South Lake Tahoe Airport is finalizing plans to reconstruct the existing runway adjacent to the restoration project area. The runway will be constructed in the same configuration as the existing runway and will not have any effect on new or expanded uses at the airport. This work is scheduled to begin in the summer of 2008. A categorical exclusion has been prepared for this work. No geologic impacts were identified.

The remaining future projects would not occur in the project area and would therefore be unlikely to affect the geology and soils within the project area. The future projects would likely result in less-than-significant impacts to the project area geology and soils.

Under the No Action/No Project Alternative, the current and future condition of the river channel could be considered inconsistent with the TRPA standards because it has unstable soil conditions. Additionally, the channel has been modified and the natural fluvial process has been altered. This impact would be potentially significant.

The No Action/No Project Alternative would be considered potentially significant under the TRPA significance criteria because the existing streambanks continue to erode and deposit fine sediment to the river and Lake Tahoe.

Although the impact associated with the No Action Alternative would exceed the significance threshold presented in Section 4.10.2.2, it is not necessary or appropriate to formulate mitigation measure(s) and ascribe mitigation responsibility for that impact. In accordance with the intent and requirements of CEQA (Guidelines Section 15126.6), delineating the nature and significance of impacts associated with the No Action Alternative serves to provide a basis for comparing the impacts of approving the proposed project with the impacts of not approving the proposed project. In particular, the evaluation of alternatives, including the "no project" alternative, serves to determine whether the significant impacts of the proposed project can be avoided or substantially lessened. The analysis presented above for the No Action Alternative determined that the unstable soil conditions and the modified channel would be significant for reasons not attributable to the proposed project, which provides information to be considered by decision-makers in evaluating the impacts that are attributable to the project.

4.10.4 Environmental Consequences/Environmental Impacts of Alternative 2 – New Channel East of the Airport (Recommended Alternative)

4.10.4.1 Seismicity

This alternative would not involve the construction of any buildings; therefore it would not expose people or property to the risk of earthquakes. There would be no impacts associated with earthquakes.

4.10.4.2 Soil Loss

Grading for construction areas and for the creation of a new floodplain would have the potential to introduce sediments into the existing river channel. In order to reduce this, grading at lower areas and within the river channel would take place in the drier months of August, September and October. Grading in upland areas would take place between May 1 and October 15. Grading activities would comply with all ordinances and standard conditions established by jurisdictional agencies including TRPA, Lahontan, USACOE, and CDFG. This impact would be less than significant.

Approximately 52,000 cubic yards of material including soil and existing vegetation would be excavated to create the new river channel. Approximately 35,000 cubic yards of this material would be temporarily stockpiled and then used to fill the existing river channel. The remaining 17,000 cubic yards of material would be permanently stockpiled. Stockpiled material would be covered to reduce dust, stormwater run off and erosion. Excavated areas would be revegetated to reduce soil erosion. Topsoil and salvageable vegetation removed during construction of the new channel would be preserved and reused. With the appropriate erosion and revegetation measures, excavation would be unlikely to cause a large loss in soil or topsoil. This impact would be less than significant.

Soil erosion could occur in construction zones, along access routes, and in staging areas that have been cleared of vegetation. The potential for soil erosion would increase during months of high precipitation and run-off, especially if vegetation has not yet been established. The construction contractor would be required to implement a SWPPP that details BMPs that will be implemented to eliminate stormwater runoff and reduce erosion at the construction site. Measures would likely include, but are not limited to revegetation, silt fences, waddles, water filled berms, mulching of unstabilized areas, settling basins, pumps for dewatering, gravel sand bags, stormwater drainage system and construction fencing. These measures would help to prevent runoff into the existing waterway. All access routes would be constructed using gravel, to reduce the chance of wind and water erosion. Construction vehicles would be confined to specific construction zones to reduce dust and would use existing roads whenever possible. During each year of construction, the project site would be winterized to exceed design requirements according to TRPA and Lahontan requirements. Implementation of a SWPPP and proper BMPs, along with winterization of the site, would result in a less-than-significant impact associated with soil loss and erosion.

The first flushing of the new channel would likely result in a limited amount of sediment transport. The new channel would be flushed with water several months before actual diversion of the river would occur. This would allow the new channel to be flushed clean of debris and materials. Water resulting from the flush would remain in the channel to infiltrate or would be used to irrigate the vegetation. This impact would be temporary and less-than-significant.

4.10.4.3 Bank Failure and Stabilization

Channelization of the airport reach and reaches downstream has straightened the river channel and increased the channel slope, leading to an increase in the rate of flow. During periods of high flow, an increase of erosive energy is exerted on the bed and banks that could contribute to undercutting and bank failure, as seen at RS 8000 (Entrix 2006). Under this alternative, the sinuosity of the channel would be increased and aquatic habitat features constructed in the channel. This would decrease the velocity of the water. This would help to reduce the potential for bank failure.

During construction, portions of the new channel banks would be stabilized using rocks at the head and toe of the banks, wood jams to direct flow away from banks, and where necessary, steep slopes would be excavated to create more stable slopes. Staked fascines with live willows would be placed along sections of the banks to hold the soil in place and reduce erosion. The first flushes of the new channel would be monitored to look for any erosion or bank failure issues. These areas would be stabilized, as appropriate. Implementation of the measures described above would reduce the potential for bank failure to a less-than-significant impact.

4.10.4.4 Sediment Loading

Alternative 2 would provide beneficial impacts by increasing overbank flow. The area of inundation receiving overbank flow from a 2-year (760 cfs) streamflow event would be 17.3 acres under this alternative, compared to 0 acres under existing conditions and the No Action/No Project Alternative (Entrix 2006). Allowing the river to overflow its banks more often would help to increase the potential for sediment deposition onto the floodplain and would add channel complexity. Over the long-term, this would help to reduce sediment loading downstream and to Lake Tahoe. This would be a potentially beneficial impact.

4.10.4.5 TRPA Standards

The purpose of this alternative would be to restore a disturbed SEZ to its previous natural function. This is consistent with TRPA goals.

Most of the TRPA IEC Land questions were either answered "No" or "No, with mitigation" with the exception of question 1f which was answered "Yes" (Section 5). The alternative would involve changes in topography to restore the river to its previous functions and would therefore be consistent with natural surrounding conditions. The alternative would involve revegetation of the entire disturbed area to stabilize soils. Specific materials would be placed within the river channel to help reduce bank erosion and undercutting. These measures would help to stabilize soil

conditions after completion of the project. They would also reduce the potential for wind and water erosion.

This alternative would involve changes to soil as the area would be excavated and graded. However, the area primarily consists of Airport fill and has therefore been previously disturbed.

Alternative 2 would change the erosion and deposition potential of the river (TRPA IEC Question 1f). The alternative proposes to restore the natural floodplain and create a shallow channel that would overflow its banks more frequently. These changes would restore the natural processes of the river and would reduce sedimentation. Alternative 2 would have a less-than-significant impact associated with TRPA goals and soil standards.

4.10.5 Cumulative Impacts

The majority of the cumulative projects would not occur directly within the project area and would therefore be unlikely to affect geology or soils in the area.

Many of the cumulative projects involve construction activities that could increase the potential for soil loss and erosion. When considered in conjunction with the proposed project, a cumulative impact could occur. However, all the cumulative projects, including the proposed project, would implement erosion and runoff measures required by the TRPA, Lahontan, CDFG, and the NPDES permit and SWPPP. It is expected that the implementation of these measures would result in a less than cumulatively considerable impact associated with soil loss and erosion because discharge levels would be below reportable limits.

The cumulative projects that involve river restoration upstream of the project area (Sunset Stables Reach, and Golf Course River Restoration) could have long-term cumulative benefits because they would stabilize the stream banks and restore the river to its previous natural function. They would involve increasing overbank flow, reducing the Upper Truckee River flow rate, and increasing the sinuosity to mimic natural fluvial processes. This would reduce erosion and sediment transport. The proposed project would also help to restore a portion of the river. When considered together, these projects, including the proposed project, could reduce the potential for bank failure and sediment loading to Lake Tahoe. This would be a cumulatively beneficial impact.

4.10.6 Environmental Commitments and Mitigation Measures

Implementation of the following environmental commitments and mitigation measures in addition to those identified in Section 4.12.7 would reduce all impacts to geology and soils to less than significant:

- The contractor will implement appropriate bank stabilization measures to reduce erosion as described in the project description and Section 4.12 Hydrology and Water Quality. This information will be included in the plans and specifications.

- Revegetate all disturbed areas and reuse excavated top-soil and vegetation whenever possible. This information will be included in the plans and specifications.

- Use gravel with road base to construction access roads. This information will be included in the plans and specifications.

- Cover all exposed stockpiles to reduce wind and water erosion. This information will be included in the plans and specifications.

- Keep construction vehicles and equipment within designated areas. This information will be included in the plans and specifications.

- Implement environmental commitments and mitigation measures described in Section 4.12.7. This information will be included in the plans and specifications.

4.10.7 Comparative Analysis of Alternatives

The No Action/No Project Alternative could result in long-term bank failure and erosion because the UTR channel in Reaches 2, 3 and 4 has been deepened and widened, resulting in an increase in the rate of flow.

Alternative 2 would restore the river to a more natural state, reducing the velocity and increasing the potential for overbank flow. Portions of the new and existing channel banks would be stabilized using vegetation, rocks, and other natural materials. Although soils would be excavated, they would be kept onsite and a large majority would be used to fill the existing channel. Construction activities would have the potential for soil loss and erosion; however, numerous erosion control measures would be implemented to reduce or eliminate this impact.

4.11 Public Safety and Hazards/Risk of Upset

This section evaluates potential public safety and hazards/risk of upset issues. STPUD underground facilities are within close proximity of excavation areas and the UTR. The project requires a large amount of soil excavation, hauling of soil material, stockpiling of soil material for future re-use in the river channel, and disposal of excess fill onsite. Lake Tahoe Airport is within the project area and adjacent to the construction and staging areas. Access would be provided to the construction area through designated runway safety area (RSA) and the runway object free area (OFA). Potential impacts to public safety and hazards/risk of upset are presented in this section. Environmental commitments and mitigation measures are also presented to reduce potential impacts to a less than significant level.

4.11.1 Existing Condition

4.11.1.1 South Tahoe Public Utility District Facilities

Three STPUD sewer lines run somewhat parallel to the existing river alignment. On the west side of the river is a secondary sewer force main that is currently not in service. However, the STPUD wishes to keep this line in place if needed in an emergency. A gravity line is also located on the west side of the river servicing the Meyers area. An STPUD export line is located on the east side of the river as well that is not in close proximity to any excavation activities. (Figure 4.11-1)

4.11.1.2 Fill Removal

A large amount of fill is located between the Airport fence and the river. This fill was placed in the area when the Airport was constructed. CDM prepared the *Upper Truckee River Restoration Reach 3 Airport Fill Soils Preliminary Characterization Report* in June of 2006. The report includes analytical data of samples taken from the fill area for hazardous or contaminated materials. None were found to be above levels for concern. El Dorado County reviewed the results and determined that the removed fill would be suitable for disposal in a landfill, reuse on the site or on another project in the Tahoe Basin. (CDM 2006)

4.11.1.3 Airport

The Lake Tahoe Airport is located within the project area and adjacent to the construction area and river. This Airport was constructed for commercial aviation, however, it has not been used for commercial aviation for several years. It is now operating as a B-3 airport facility which uses the Runway Safety Zone as shown on Figure 4.11-1. The safety parameters for the RSA include the following.

- The RSA is 300 feet centered on the runway centerline (150 feet on either side) and 600 feet past the end of the runway.

- The runway OFA is 800 feet wide centered on the runway centerline (400 feet on either side) and 600 feet past the end of the runway. Objects may not be higher than the runway in the OFA unless you have some controls which may include a notice to airmen (NOTAM).

The Airport is now used for general aviation, small private planes and jets. Portions of the proposed project area are located within the runway safety zone required by the FAA for airplane take off and landing. The existing fence is the eastern edge of the runway safety zone. The existing air traffic control tower is currently closed.

An above ground fuel storage facility providing jet fuel, aviation fuel diesel and automotive fuel is located onsite. The Lahontan RWQCB Leaking Underground Fuel Tanks (LUFTs) website was reviewed for any reported hazardous materials spills or discharges at the project area. One report was found for Oasis Aviation at the Lake Tahoe Airport. A leak was reported in June of 1992, the contaminated soil was excavated and hauled to an approved facility. The case was closed in July of 2004. No other incidences have been reported (Lahontan 2007).

Preliminary project comments received from FAA and Caltrans Aeronautics Division expressed the need to be in conformance with FAA Advisory Circular, Wildlife Attractants Near Airports. Caltrans Aeronautics Division sent comments in response to distribution of the informal NOP/NOI discussed in Section 1.7. FAA provided comment from review of a 7460-1 application submitted to FAA by the City. Preliminary plans were sent to the FAA with the Form 7460-1 Notice of Proposed Construction or Alteration to solicit comment from the agency. The comments received from both agencies are discussed in Section 4.11.4 which prompted the need to prepare a preliminary wildlife hazard assessment to determine if the project could increase the potential for aircraft and wildlife collisions along with other comments.

Preliminary Wildlife Habitat Assessment
As part of the PWHA, on Tuesday, October 9, 2008 and the morning of Wednesday, October 10, 2008, a windshield tour and a site visit was made of the airport facilities, the area of the proposed restoration, and lands adjacent the restoration area. (CDM 2007)

Species of wildlife observed in the area during the site visit included mallard ducks, mountain bluebirds, red-tailed hawks, northern flicker, hairy woodpecker, white-crowned sparrow, belted kingfisher, Stellar's jay, dark-eyed junco, mountain chickadee, common raven, killdeer, spotted towhee, red-breasted nuthatch, American robin, chipmunk, and Douglas's squirrel. (CDM 2007)

According to the Airport Director during the tour of the airport facility, an occasional coyote will be seen within the boundaries of the airport property. Canada geese will also congregate on the runway from time to time and swallows do nest in some of the airport buildings. (CDM 2007)

According to the Airport Director, bird strikes are very uncommon at the airport. Neither FAA nor airport staff were able to provide any record of bird strikes occurring at the Lake Tahoe Airport. No species of concern with regard to air strikes are known at the airport at this time and air strikes are expected to continue to be very rare in the future. (CDM 2007)

N

400 0 400

Feet

Project Area

Proposed Construction
Travel Route

Runway Safety Zone

Runway 18 – 36

Airport Fence

STPUD Sewer

River

Upper Truckee

STPUD Sewer

Staging Storage
& Stockpiling Area

Staging
Stockpiling

Construction
Trailer
& Parking

Staging
Stockpiling

STPUD Sewer

Source: Entrix

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CDM

Figure 4.11-1
Potential Safety Hazards

4.11.2 Significance Criteria and Assumptions

4.11.2.1 NEPA and CEQA

The project would result in significant impact if:

- The project creates a significant hazard to the public or environment through the routine transport, use, or disposal of hazardous materials;
- The project creates a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.
- The project would emit hazardous emissions or handle hazardous or acutely hazardous materials substances, or waste within on-quarter mile of an existing or proposed school.
- The project is located on a site which is included on a list of hazardous materials sites compiled pursuant to Governing code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment.
- The project may result in a safety hazard for people residing or working in the project area within two miles of a public airport.

4.11.2.2 TRPA

TRPA maintains several environmental criteria for establishing the significance impacts of a project on risk of upset and human health. For the purposes of this analysis, a significant impact would result if the project would result in one or more of the IEC questions answered Yes. The TRPA IEC was completed for the Recommended Alternative, Alternative 2. The results of the checklist questions are discussed in the analysis. A copy of the TRPA IEC is included in Section 5.

4.11.2.3 Assumptions

- The project does not involve the transport of hazardous materials.
- The project is not located within one-quarter mile of an existing or proposed school.
- The project is not located on a site that is listed as a hazardous materials site according to Government Code Section 65962.5.

4.11.3 Environmental Consequences/Environmental Impacts of the No Action/No Project Alternative

The No Action/No Project Alternative would result in no direct impacts to the existing STPUD sewer lines or the removal of the Airport fill within the project area. No construction activities would take place within the project area next to the existing Airport which eliminates potential safety and hazard impacts during construction. The No Action/No Project Alternative would not require conformance with FAA

Circular, Wildlife Attractants Near Airports because no changes to the project area would be proposed.

Construction activities upstream and downstream of the reaches 3 and 4 would not directly impact STPUD sewer lines or the Airport fill within the Airport Reach project area. Restoration activities would be implemented and wildlife populations would likely not increase eliminating the risk of increasing aircraft and wildlife collisions. Therefore, the No Action/No Project Alternative would not have any impact to public safety and hazards/risk of upset.

4.11.4 Environmental Consequences/Environmental Impacts of Alternative 2 – New Channel East of the Airport (Recommended Alternative)

4.11.4.1 South Tahoe Public Utility District Facilities

Alternative 2 would excavate approximately 52,000 cubic yards of fill between the Airport fence and the UTR. The design of the project avoids grading conflicts to existing STPUD sewer lines as shown on Figure 4.11-1. The exact location of the sewerlines would be determined and marked prior to beginning excavation in the project area.

The new river channel constructed during the project would be closer to the existing sewer lines on the west side of the river than the existing river channel is now. However, the project design includes construction of engineered bank toe protection along the Airport easement to offset the potential lateral movement of the channel into the Airport or existing sewer lines. Protection would be composed of rock as shown in the plans in Appendix B. Therefore, construction of Alternative 2 would have a less than significant impact to hazards associated with existing STPUD facilities in the project area.

4.11.4.2 Fill Removal

As discussed in Section 4.11.1.2, the fill that is proposed to be removed has been studied and determined to be non-hazardous and suitable for disposal onsite. Therefore, removal and disposal of excess fill onsite as a result of Alternative 2 would have no hazardous materials impacts or safety impacts from transport of materials on or off site.

4.11.4.3 Airport Safety

The Runway Safety Zone is shown on Figure 4.11-1. The majority of the grading and construction activities would be outside of the safety areas except for the occasional transport of equipment and materials to and from Highway 50, through the Airport runway area to the construction areas. This could be a safety issue with Airport operations and construction personnel. Coordination with Airport staff on a daily basis is necessary to avoid conflicts. It would also be necessary to prepare a construction safety plan in accordance with FAA guidelines for *Air Operations Area*

Construction Rules to coordinate travel through the RSA and OFA including a schedule, coordination of personnel with aviation radios, and notice requirements.

There may be height issues for certain types of equipment used on the site if they are within or close to the Runway Safety Zone. If they are determined to pose a height conflict to airmen a NOTAM would be issued by the Airport administration prior to use of this equipment.

Airport take off and landing procedures would be altered during construction of the project in Year 1 or Year 2 as a result of the proposed Airport Runway Reconstruction project scheduled for the summer of 2008 or 2009. During the Runway Reconstruction project the runway will be closed and aircraft will land on the taxiway. Airport personnel equipped with aviation radios will be controlling aircraft and vehicle movements during construction hours.

Construction of the project within close proximity to an Airport and within Airport property could have potentially significant public safety and hazard impacts. Environmental commitments and mitigation measures are listed in Section 4.11.6 that would reduce potential significant impacts to less than significant during construction. Normal operations at the Airport would already be altered during Year 1 or Year 2 of construction. Years 1 and 3 would experience the majority of travel through Runway Safety Zones. Therefore, Alternative 2 would pose a less than significant impact to public safety and hazards/risk of upset within the project area and surrounding the project area.

FAA Comments
FAA reviewed the preliminary project plans in conjunction with Form 7460-1 Notice of Proposed Construction or Alteration and stated in letters responding to the application submittal that they did not object to project provided that the project comply with the following.

- Requirements set forth in FAA Advisory circular 150/5370-2C, Operational Safety on Airports During Construction.
- The project does not penetrate the Runway Safety Area and the Object Free Area for FWY 18/36.
- The Airport manager issues a local NOTAM advisory whenever personnel or equipment are within 125 feet of the runway centerline.
- FAA Advisory Circular 150/5300-33, Hazardous Wildlife Attractions on or Near Airports.

During construction the contractor would be required to comply with FAA Advisory Circular 150/5370-2C, Operational Safety on Airports During Construction. Daily meetings with Airport staff and development of a safety plan prior to beginning mobilization of equipment and materials to and from Highway 50 and the

construction area would be included in the construction plans and specifications. This measure would help to maintain compliance with operation safety requirements during construction. The Construction Safety Plan would include information about when a NOTAM advisory would need to be implemented and the procedures to provide the notice. It would also discuss procedures for traveling through Runway Safety Zones.

The project may penetrate the Runway Safety Zone and Object Free Zone where staging and stockpiling areas are sited. However, plans for construction use of these areas is in compliance with safety zone requirements and have been reviewed by the Airport Manager for compliance. Therefore, impacts to public safety and hazards/risk of upset from project construction would be less than significant.

Therefore, the project will comply with FAA requirements and advisory circulars stated above.

Wildlife Hazard Assessment

Since there is concern that the proposed Airport Reach restoration project along the UTR could attract wildlife, a review of the FAA AC 150/5200-33B has been completed with the following observations that apply to the Airport Reach restoration project. (CDM 2007)

The area of the proposed restoration is within the existing area of the current Upper Truckee River Airport Reach and the associated floodplain. Currently the river is within the 5,000 ft separation distance recommended by FAA. (CDM 2007)

The current habitats within the river include shallow areas where puddle ducks and geese can feed and a shoreline of variable plant species including willows, shrubs, grasses, and pines. Some upland habitat currently exists, that will be replaced with willow wetland habitat. (CDM 2007)

Section 2-4 of FAA AC 150/5200-33B discusses FAA concerns with wetlands and standing water near airports. Recommendations generally express the desire to discourage wetlands and standing water from the areas near airports as they tend to attract wildlife. The restoration project would generally increase the depth of the river in some locations and thereby make the river less desirable to puddle ducks and geese that prefer shallow water (i.e., 2 ft or less) where they can feed. Although the Upper Truckee River in places would be a little closer to the airport property, the decrease in the amount of desirable habitat for ducks and geese could decrease the potential bird strike hazards at the Lake Tahoe Airport. (CDM 2007)

Some upland habitat would be replaced with wetland habitat, along the river. Currently this upland habitat is used by hawks (e.g., red-tailed hawks) and other predatory species. Of the "FAA potential species of concern", red-tailed hawks have the highest strike percentage of the species for the January 2006 to May 2007 time period. Decreasing upland habitat may decrease hawk activity near the airport. This

could result in the potential for bird strikes involving red-tailed hawks and other raptors to decrease. (CDM 2007)

Native willow habitats would be restored and enhanced where it currently exists. This restored and enhanced willow habitat would be an attractant to small song birds, which normally do not pose significant bird strike hazards at airports. (CDM 2007)

In addition to the habitat alterations that would occur as part of the wetland restoration, other improvements would include stabilization of the banks of the Upper Truckee River between the airport and the river to decrease the potential for flooding of airport property. A decrease in flooding on airport property would decrease the potential for standing water on the airport property. This in turn would decrease the use of the airport property by wildlife attracted to standing water. (CDM 2007)

As a result of the above observations, the proposed wetland restoration project seems to be in full compliance with the intent of FAA AC 150/520-33B. The project would not increase the potential for wildlife strikes. The project could actually decrease the potential for bird strikes with ducks, geese, and hawks, as the amount of preferred habitats near the airport would decrease with the implementation of the wetland restoration project at the Lake Tahoe Airport. (CDM 2007)

All TRPA IEC Risk of Upset Questions were answered "No" and Human Health questions were answered "Data insufficient" pending completion of the PWHA.

Implementation of Alternative 2 with the incorporation of the environmental commitments and mitigation measures discussed in Section 4.1.1.6 and construction controls identified in Section 3.3.5 would reduce potential impacts to Public Safety and Hazards/Risk of Upset to less than significant.

4.11.5 Cumulative Impacts

Alternative 2 would have a less than significant impact to public safety and hazards/risk of upset provided the environmental commitments and mitigation measures listed in Section 4.11.6 are implemented during construction. However, most of the public safety and hazard/risk of upset issues, except the wildlife hazard issue, are limited to the project area boundary and would not result in cumulative impacts to public safety and hazards/risk of upset.

The Lake Tahoe Airport Preliminary Wildlife Hazard Assessment findings stated that implementation of Alternative 2 would not increase the potential for wildlife strikes from aircraft. (CDM 2007) Therefore, the project would not contribute to cumulative impacts to public safety and hazards/risk of upset for wildlife strikes.

4.11.6 Environmental Commitments and Mitigation Measures

The following environmental commitments and mitigation measures would reduce potential significant impacts to public safety and hazards/risk of upset to less than significant.

- Determine and mark the location of existing STPUD facilities near the excavation area prior to construction. Contractor shall conduct an Underground Service Alert (USA) notice prior to excavation. Excavation will not begin until all utilities in the area have been marked.

- Construct engineered bank stabilization at the edge of the Airport easement to protect STPUD facilities and the Airport runway from complications due to lateral movement of the river.

- The contractor shall develop and implement a construction safety plan that will include safety measures for travel through the RSA and OFA to include a schedule of travel, procedures to ensure Airport Safety, NOTAM procedures, and responsible personnel.

- Daily coordination between the contractors for both the River Restoration project and the Runway Reconstruction project for safety related issues shall be conducted.

4.11.7 Comparative Analysis of Alternatives

The No Action/No Project Alternative would have no impacts to public safety or hazards/risk of upset. Alternative 2 would have a less than significant impact to public safety and hazards/risk of upset with environmental commitments and mitigation measures being implemented. The potential for public safety and hazards/risk of upset is greater with Alternative 2 than with the No Action/No Project Alternative although those impacts have been determined to be less than significant. This should not be a deterrent from constructing the project as proposed.

4.12 Hydrology and Water Quality

Because rivers are dynamic and continuous, work to be performed within one reach may affect other reaches either upstream or downstream of the proposed improvements. The direct area of influence is contained in Reaches 2, 3 and 4 as well as downstream to Lake Tahoe. Stream channel restoration and bank stabilization can reduce the production of sediment caused by channel erosion. Reduced fine sediment delivery to the river can improve the water quality of discharge to Lake Tahoe. Aquatic and terrestrial wetland habitat restoration can increase wildlife populations and diversity in other areas of the river upstream and downstream. Construction activities within the watershed have the potential to reduce water quality downstream of the project site on a short-term basis and incrementally affect habitat and Lake Tahoe clarity.

The entire Middle Reach restoration project is approximately 2.6-miles long, between RS zero at the Highway 50 bridge in South Lake Tahoe upstream to RS 13600. This area of the river encompasses USACOE (2000) Reaches 1 – 6. This section focuses specifically on the portion of the Middle Reach where the UTR flows through property owned by the City. All of the lands adjacent to the UTR channel from approximately RS 13600 downstream to approximately RS 6450 are owned by the City. There are a few areas in Reach 2, downstream of RS 6450, which are owned by the City, but no work is proposed for these areas. For simplicity in describing the existing geomorphic conditions, the study area included most of Reach 2 and is defined as the 1.6-mile section between RS 13600 and RS 5050 or the Airport Reach.

4.12.1 Existing Conditions

This section describes the existing hydrologic and geomorphic conditions of the Airport Reach. The section begins by first describing the hydrology of the UTR watershed and follows with a description of the UTR's geomorphic form and channel stability.

4.12.1.1 Hydrology

Hydrologic Setting

The UTR watershed covers 56.9 square miles and constitutes 18 percent of the total area draining to Lake Tahoe (Rowe and Allander 2000). The watershed has a north-south alignment, with a total valley distance of about 21 miles from the southern headwaters to the lake (Figure 4.12-1). Its highest headwater areas generally face north and west, and elevations range from approximately 6,225 ft at Lake Tahoe to about 10,000 ft. The UTR watershed has about 20 percent of its area below 6,500 ft (Figure 4.12-2). Major tributaries to the UTR upstream of the City study area include Angora Creek, Echo Lake, and Grass Lake.

Various geologic conditions impact hydrology throughout the UTR watershed. Along the upper reach headwaters, the UTR flows through volcanic rock before becoming largely confined to granitic bedrock canyons with steep slopes that route high velocity flows downstream. Along the lower reaches, the UTR flows through glacially carved U-shaped valleys containing glacial moraines, glacial-fluvial terraces, and lacustrine sediment overlain by an alluvial and fluvial sediments (USACOE 2000). Floodplain storage areas increase in the lower watershed. The Airport Reach is located within the fluvial/**lacustrine deposits** that comprise the parent material for Mosher Meadow soils (Figure 4.12-3).

The largest urban area in the Lake Tahoe Basin significantly affects the lower UTR hydrology. The drainage of water into the UTR and its tributaries has been altered by the increase of impervious surface area due to urban development. In general, urbanization concentrates runoff into conduits (e.g. gutters, storm sewers, roadways) that more rapidly deliver the flows into the channels, resulting in a hydrograph with an increased frequency of larger magnitude events, but of a shorter duration.

Precipitation

The climate in the Tahoe Basin consists of cool, dry summers with maximum average daily temperatures around 75 degrees Fahrenheit and cold winters with daily average temperatures around 30 degrees Fahrenheit (USACOE 1999). Precipitation primarily occurs as snow or mixed rain and snow between November and March (Jeton 1999). Annual snowpack in the UTR averages over ten feet of accumulation in the upper elevations of the watershed and around three feet within the Middle Reach (TRCD 2003).

The California Department of Water Resources (DWR) provides access to snow and rain precipitation data measured by various agencies at several sites within and adjacent to the UTR watershed at high and low elevations. Sites selected for analysis in this report are those within or very near the UTR watershed that represent typical precipitation conditions at varying altitudes. Some of these sites are active weather stations, while others have been discontinued. The data demonstrate the large precipitation variability between wet and dry years, and large seasonal variability from month to month. The data also illustrate how precipitation decreases from high to low elevations, and from distance east of the Sierra Crest.

Source: ENTRIX, Inc. 2004

W:\REPORTS\Upper Truckee River\Graphics\UTR Middle Reach Boundaries Fig 4.12-1.ai 01/03/08 JJT

Figure 4.12-1

UTR Middle Reach Watershed Boundary and USGS Stream Gage and Weather Station Locations

CDM

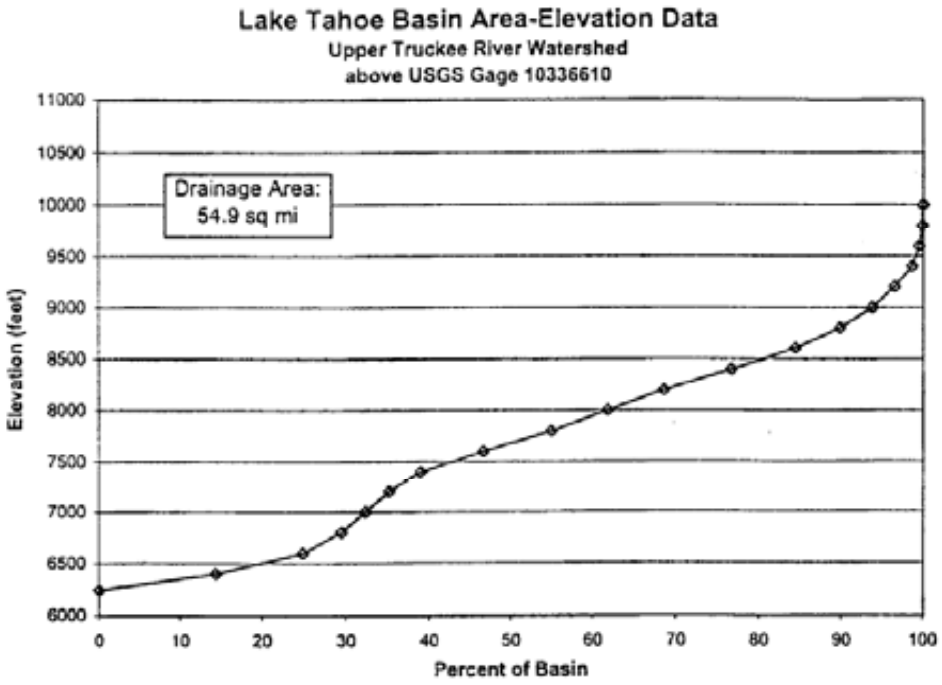


Figure 4.12-2
UTR Watershed Area-Elevation Data (Source: Northwest Hydraulic Consultants, Inc., October 2002

Figure 4.12-3
Representative Soil Horizon of Mosher Meadow and UTR Banks at RS 2000 (View Left Bank, ~30 cfs, 06 July04)

Water available for runoff from snowpack melt is best represented through analysis of the snow water content (i.e. how many equivalent inches of water are produced from the melting of the snowpack). Monthly snow water content data is analyzed using four locations at various elevations within and adjacent to the UTR watershed. Two weather stations near the western crest of the UTR watershed by Echo Summit are used in the following discussions to approximate high elevation snow content.

Station Echo Peak 5: This station is located at elevation 7,800 feet in the Echo Lake drainage of the UTR watershed, just north of Upper Echo Lake. Monthly snow content values were measured at this station from 1974 to 1989 typically during the months of January through April, but sometimes into May and June if the snowpack persisted (Figure 4.12-4). Monthly snow water content varies depending on the month, but peak values range from 50 to 78 inches. The average snow water content for all months measured is 30 inches.

Echo Summit near Highway 50: This station is located southeast of the Echo Peak 5 station and 350 feet lower in elevation. This station is located at an elevation of 7,450 feet in the American River watershed, approximately 600 feet west of the UTR watershed boundary. Similar to the Echo Peak 5 site, data from 1940 to 2004 indicate wide year to year variations. The average snow water content for all months measured at Echo Summit is 25 inches (Figure 4.12-5).

Saxon Creek Station: This station is approximately 3,200 feet east UTR watershed boundary near Saxon Creek at elevation 6,400 feet and represents middle watershed conditions. Data available from 1930 to 2004 indicates that monthly snow water content rarely exceeds 20 inches, and averages 7 inches for all months measured (Figure 4.12-6).

Fallen Leaf Lake Station: Although east of the UTR watershed, the Fallen Leaf Lake station at elevation 6,250 feet is the best available data source for low elevation conditions. This station is located north of Fallen Leaf Lake, and recorded monthly snow water content from 1930 to 1960. In peak years, snow water content often exceeds 40 inches. On average for all months measured, the snow water content was 29 inches (Figure 4.12-7).

It is expected that this value would decrease for a location at the same elevation but in the UTR watershed since orographic influences of the Sierra Crest decrease eastward. Accumulated monthly rain precipitation data averaged by month from 1955 to 2003 is available from the Meyers Fire Station site (elevation 6,400 feet) located in the UTR watershed, approximately 1,000 feet southeast of the Highway 50 and Highway 89 intersection (Figure 4.12-8). The winter months of December through February produce the most rain precipitation (5 to 6 inches per month). June through September precipitation averages less than 1 inch per month.

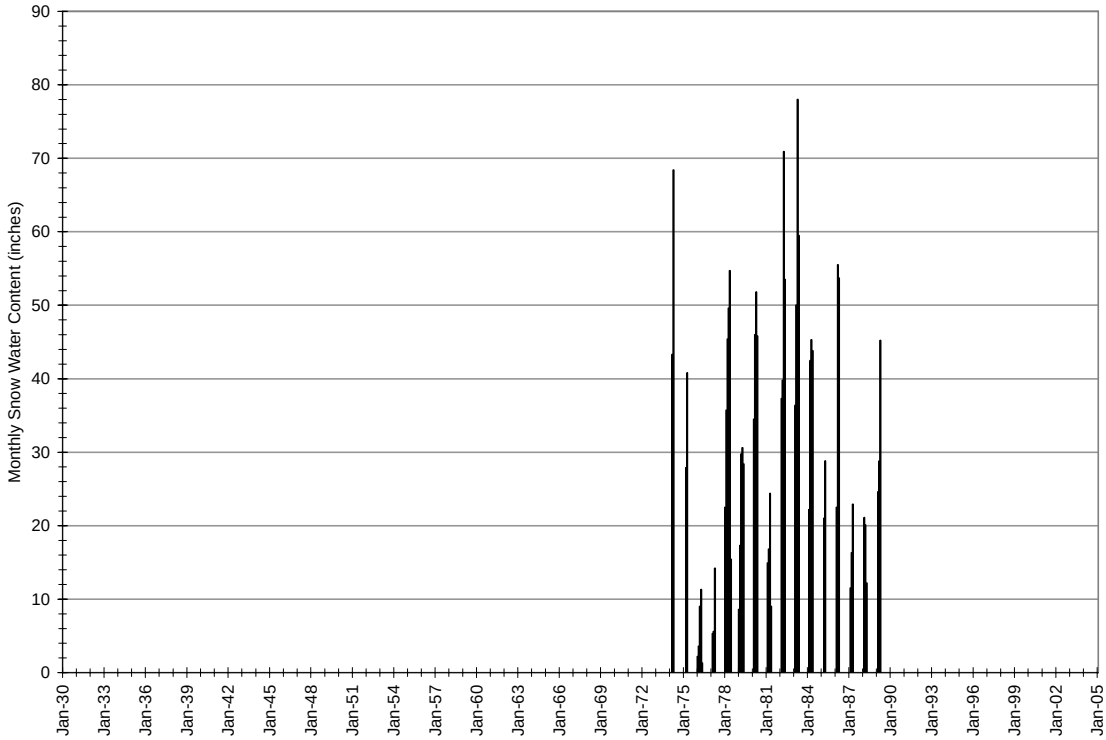


Figure 4.12-4
Echo Peak 5 Weather Station (7,800 ft) Snow Water Content Measured from 1974 to 1989

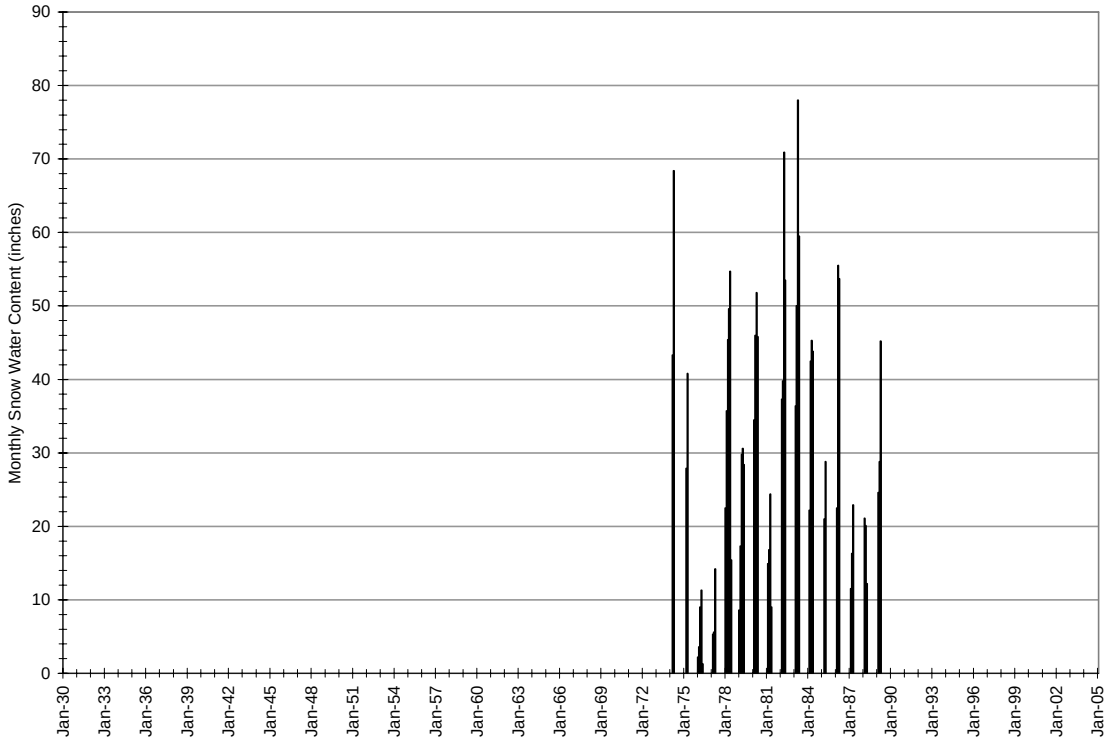


Figure 4.12-5
Echo Summit Weather Station (7,450 ft) Snow Water Content Measured from 1940 to 2004

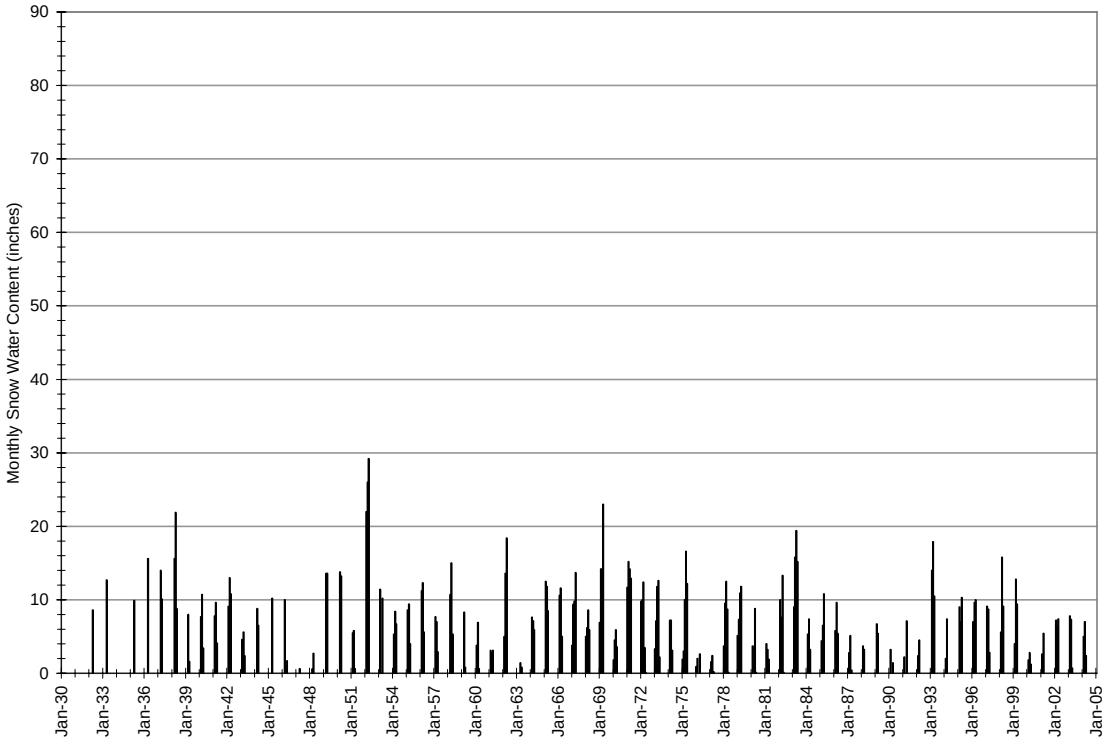


Figure 4.12-6
UTR Weather Station (6,400 ft) Snow Water Content Measured from 1930 to 2004

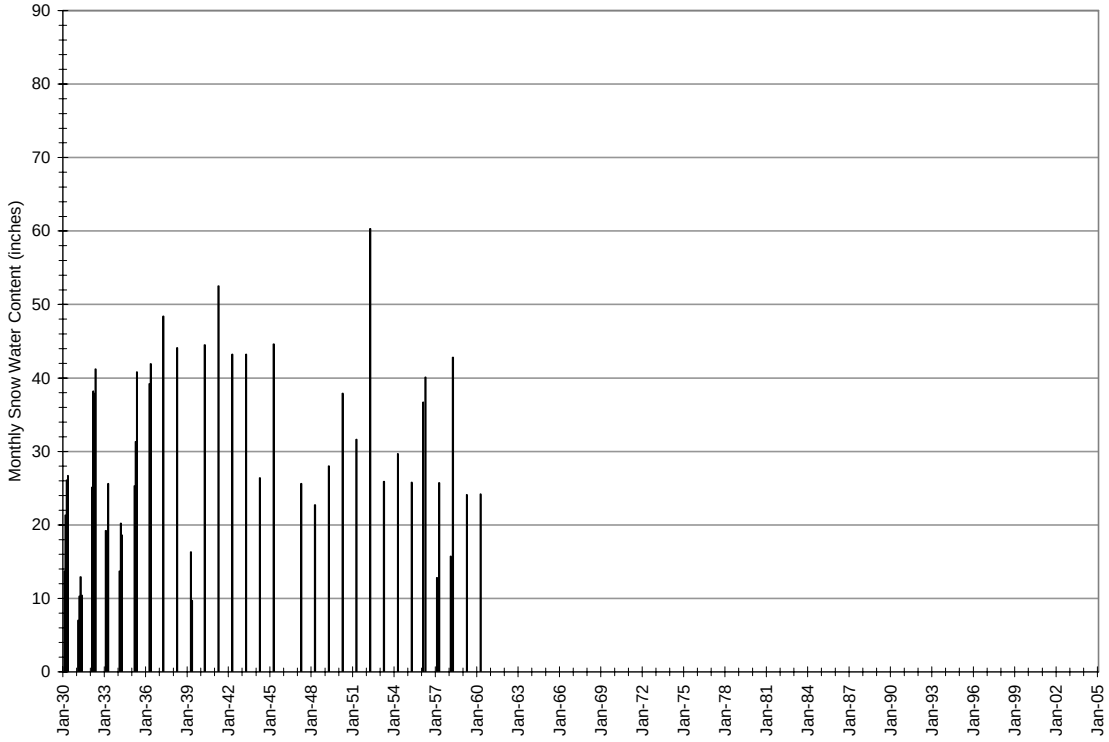


Figure 4.12-7
Fallen Leaf Lake Weather Station (6,250 ft) Snow Water Content Measured from 1930 to 1960

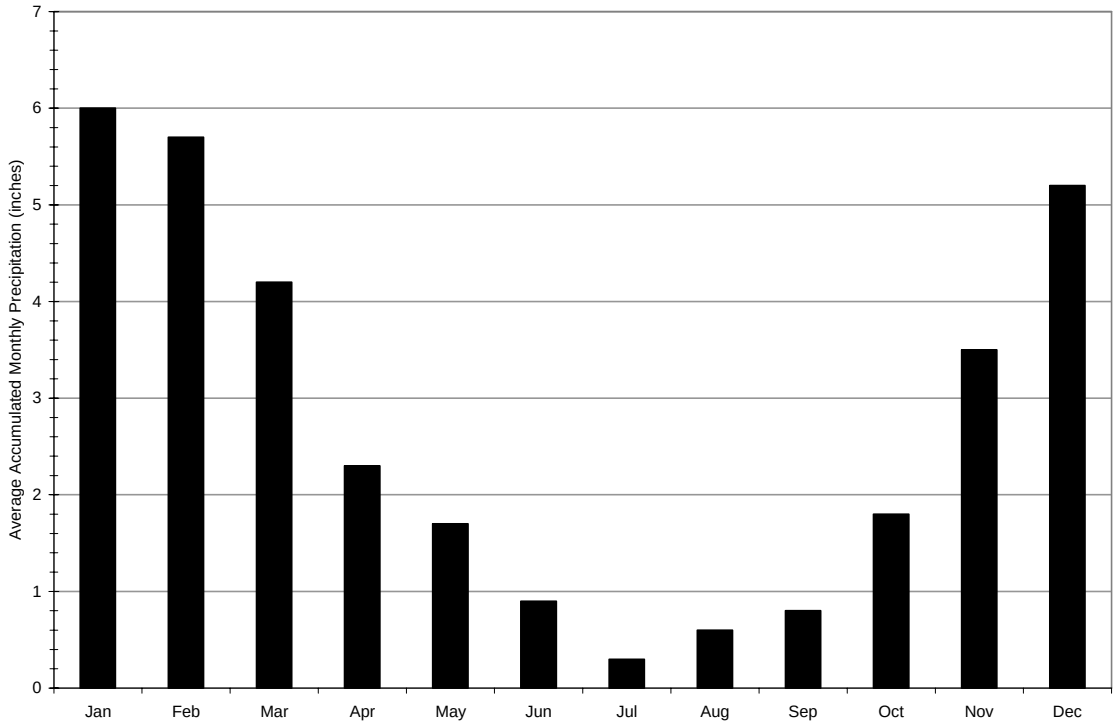


Figure 4.12-8
Meyers Fire Station (6,400 ft) Average Monthly Rain Precipitation Measured from 1955 to 2003

Streamflow

Streamflow (discharge) is gaged by the U.S. Geological Survey (USGS) at four locations on the UTR (Table 4.12-1). The UTR at South Lake Tahoe gage (#10336610) located at the pedestrian bridge near Lake Tahoe Blvd. is the closest gage, located approximately 5,000 river feet downstream of the Airport Reach. Steamflow data from this gage is continuous back to 1972 except for gaps between October 1,1974 to September 30, 1976; July 1,1977 to September 20, 1977; and July 1, 1978 to February 28, 1980.

Table 4.12-1
USGS Streamflow Gaging Stations Within the UTR Watershed

Station Name	*USGS Station ID*	*Period of Record (Water Years)*	*Contributing Drainage Area (Sq. Mi.)*	*Percent of Watershed Gaged*
UTR at South Lake Tahoe	10336610	1972–1974 1977-1978 1980-current	54.0	97.2
UTR at Highway 50 above Meyers	103366092	1990-current	39.2	68.8
UTR near Meyers	10336600	1961-1986	33.2	58.6
UTR So. end of So. Upper Truckee Rd.	10336580	1991-2001	14.1	25.0

Source: Rowe and Allander 2000; Northwest Hydraulic Consultants 2002
Mean Daily Streamflow

The USGS gaging station continuously measures water stage in the UTR at 15-minute intervals. All of the 15-minute measurements taken in one 24-hour period are averaged by the USGS to determine the mean daily streamflow for that day. Published mean daily streamflows for the South Lake Tahoe gage are graphed in time-series since 1972 in Figure 4.12-9. The river displays large annual and seasonal flow variation typical of an unregulated Sierra Nevada snowmelt river. Seasonal snowmelt creates annual maximum mean daily flows generally in May or June. Seasonal low flows occur in the summer and fall, usually between July and November. The typical spring snowmelt streamflow on the UTR ranges from 200 to 500 cfs, with autumn low flows under 25 cfs. Climate-driven cycles can produce extreme highs and lows during a single year and from one year to the next. The extreme high flows are mostly, but not entirely, associated with winter rain-on-snow conditions. Mean daily streamflows associated with major rain-on-snow events (e.g., Feb 1963, Dec 1964, Jan 1997) are often three times greater than snowmelt flows on the UTR. The maximum mean daily streamflow for the period of record was 3,150 cfs on January 2, 1997. In addition to longer duration snowmelt runoff peaks in spring, short duration peak runoff events with lower volumes occur in summer months from thunderstorms. These flow events typically last only a few hours (USACOE 1999).

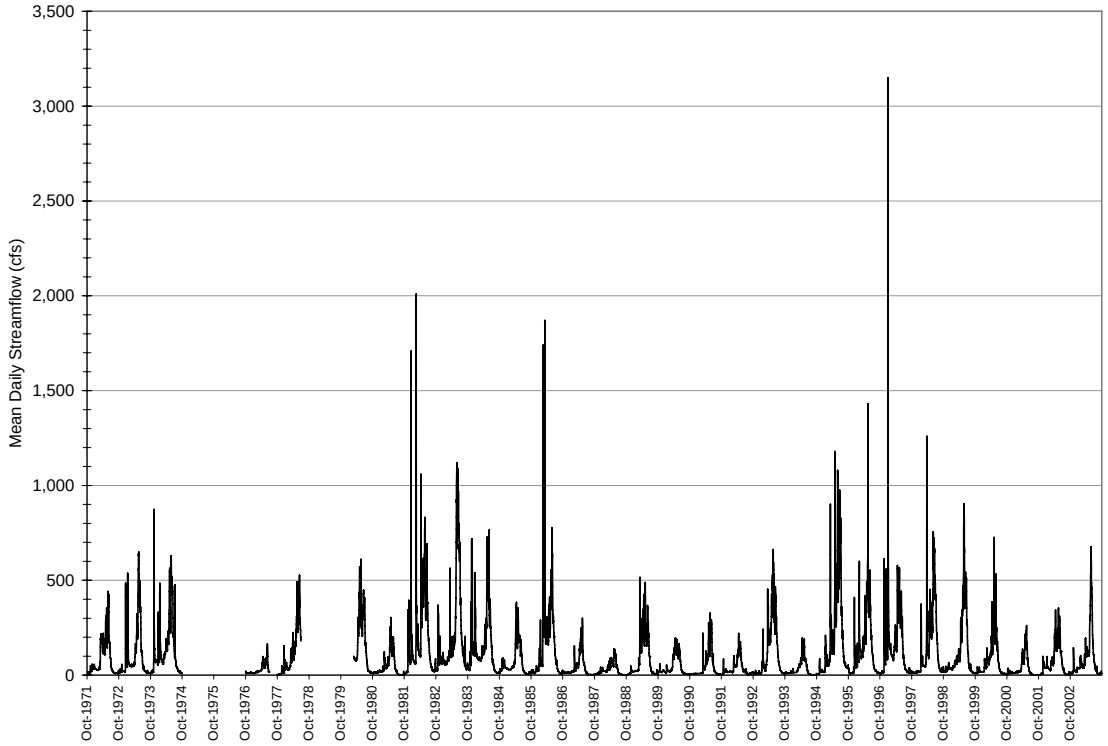
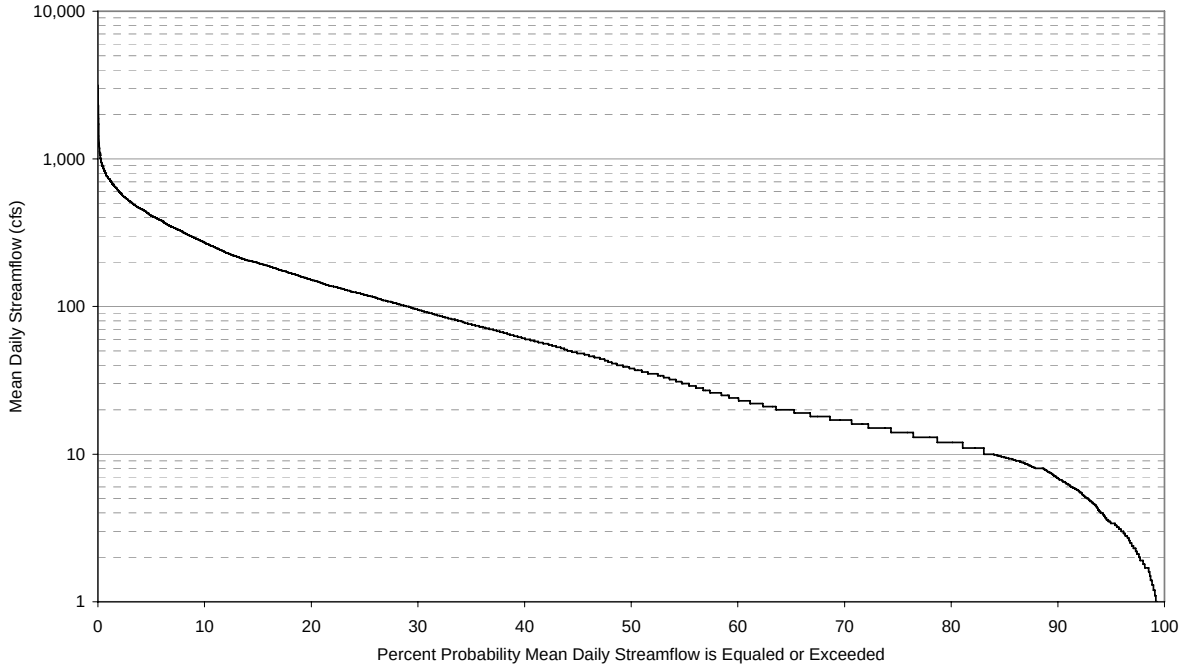


Figure 4.12-9
UTR Mean Daily Streamflow from 1972 to 2003

The UTR flow duration curve (Figure 4.12-10) is a statistical analysis (based on the Weibull plotting position method) of all the mean daily streamflows on record since the 1972 water year. The curve describes the percent probability on any given day of the year that a given streamflow will be equaled or exceeded. For example, on any given day, there was a 50 percent probability the streamflow was equal to or greater than 38 cfs. If expressed in terms of number of days, the flow was equal to or greater than 38 cfs for half the days of the year. Table 4.12-2 displays the number of days per year that UTR flows were equal to or exceeded for selected streamflow values.



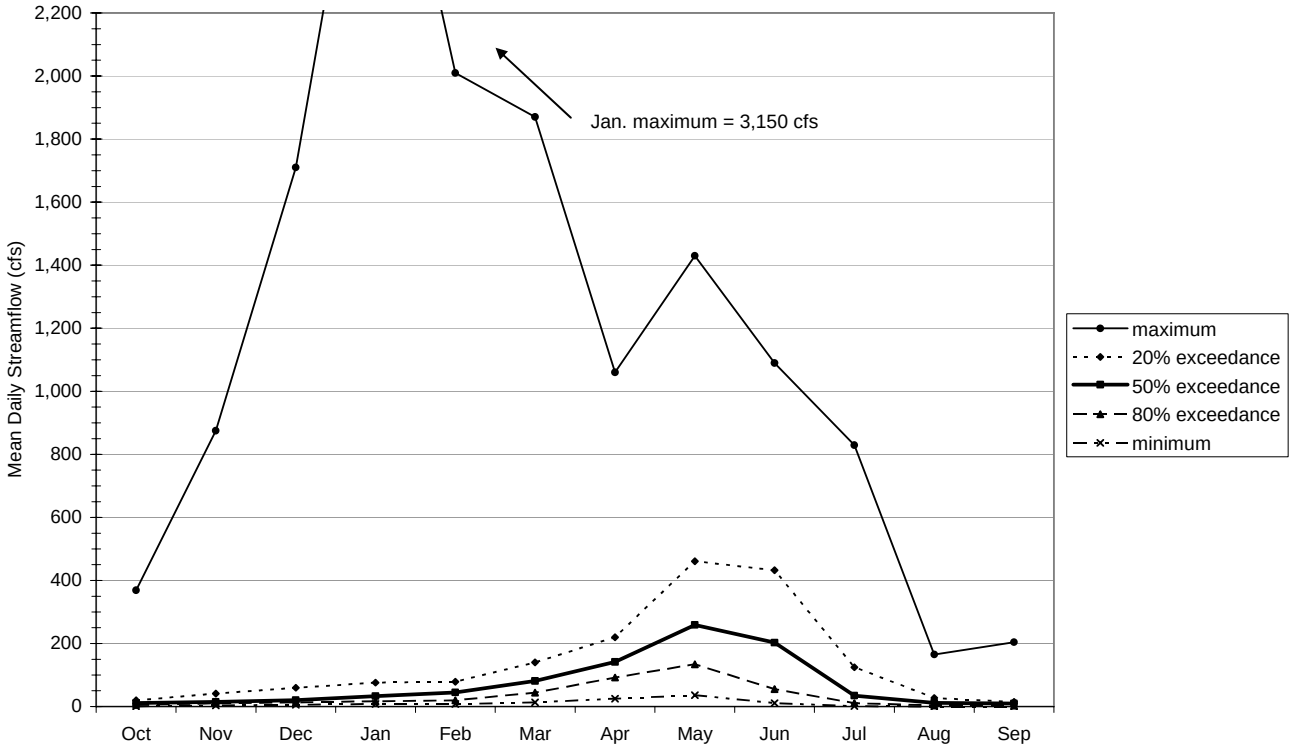
* Water Years 1975 - 1979 excluded from analysis because of incomplete gaging record

Figure 4.12-10
UTR Mean Daily Flow Duration Curve from 1972 to 2003

Table 4.12-2
Mean Daily Streamflow Statistics Generated from UT River Flow Duration Curve (Water Years 1972 – 2003)

Mean Daily Streamflow (cfs)	*% Probability Streamflow was Equaled or Exceeded*	*# Days/Year Streamflow was Equaled or Exceeded*
1,000	.25	0.9
800	.7	2.6
600	2	7.3
500	3	11.0
400	5	18.3
300	9	32.6
100	29	105.9
50	44	160.6
25	59	215.4

While the flow duration curve is useful for statistical analysis to determine how many total days per year a given streamflow can be expected to be equaled or exceeded, it does not describe changes to streamflow exceedance probabilities within a year due to seasonal flow fluctuations. Therefore, monthly exceedences have been calculated for the same mean daily streamflow period of record to describe the probability that a particular streamflow was equaled or exceeded on a monthly basis (Figure 4.12-11). Statistically, half of the days (50% exceeded) in September had mean daily streamflows less than 10 cfs, while in May, half the days had mean daily streamflows less than 259 cfs. For eighty percent of the days, streamflows were less than 3.2 cfs in September and less than 134 cfs in May. Twenty percent of the days, streamflows were less than 15 cfs in September and less than 220 cfs in May. The greatest variation between lower (80% exceedance) and higher (20% exceedance) streamflows occurs in the peak snowmelt months of April, May, and June.



* No gage records available for periods: 10/1/1974 - 9/30/1976, 7/1/1977 - 9/30/1977, and 7/1/1978 - 2/28/1980

Figure 4.12-11
UTR Monthly Flow Exceedences Based on Mean Daily Streamflow Record from 1972 to 2003

Peak Annual Streamflows

Peak instantaneous streamflows measured[1] by the USGS UTR at South Lake Tahoe gage #10336610 from 1972 to 2000 are plotted in Figure 4.12-12.

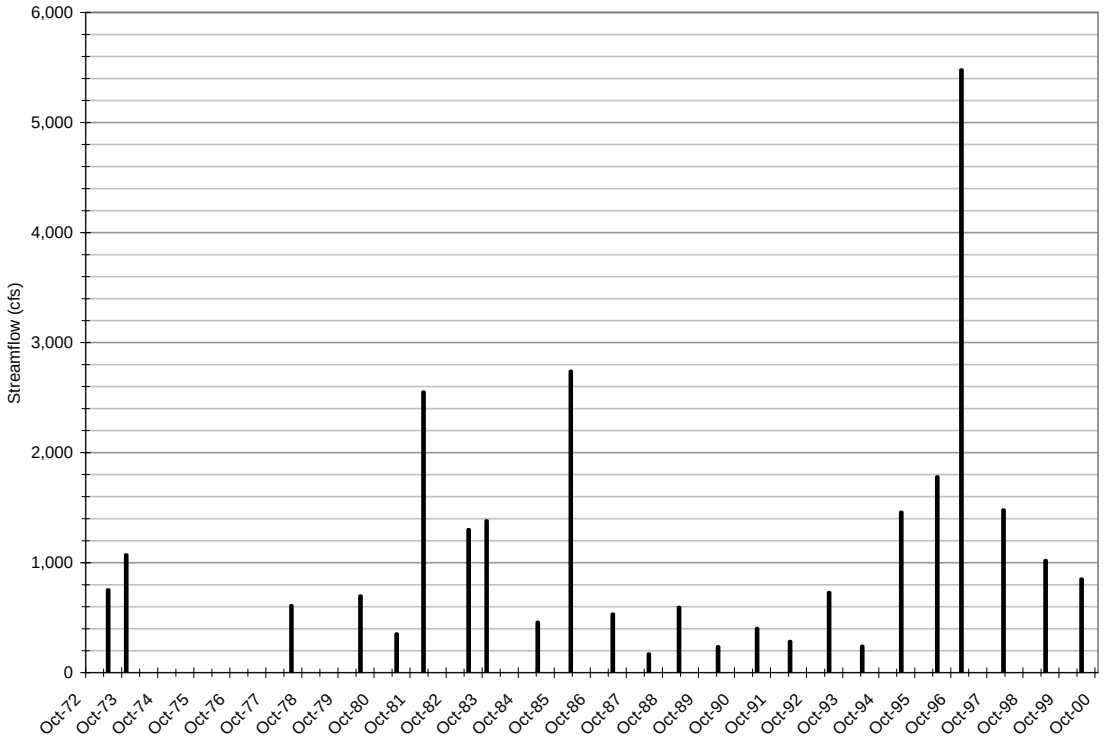


Figure 4.12-12
UTR Peak Instantaneous October Streamflows Measured from 1972 to 2000

The January 2, 1997 rain-on-snow flood event is the largest UTR flood on record. The peak flow was measured at the UTR at Highway 50 above Meyers gage (#103366092) as 5,120 cfs. The gage at Highway 50 in South Lake Tahoe (#10336610) failed during the flood event and was unable to measure the peak instantaneous streamflow.

Because the 1997 flood event was of such large magnitude and peak flows have only been measured at the Highway 50 in South Lake Tahoe gage (#10336610) since 1972, flood recurrence statistical analysis is highly affected by this flow event. Due to the importance of the 1997 event, several estimates have been made of the flood's peak streamflow at Highway 50. The USGS estimated the peak flow at Highway 50 in South Lake Tahoe to be 5,480 cfs. This was based on an extension of the rating curve

[1] USGS flow records indicate that the peak instantaneous flows for years 1988 and 1991 were estimated rather than measured.

up to a high water mark within the shelter of their recording equipment at Highway 50 (Rockwell, pers. comm., 2001). The USACOE (2002) estimated the 1997 peak flow at 8,200 cfs through frequency curve comparison and correlation with Blackwood Creek, and the upper reaches of the UTR and Sagehen Creek flow sites. The large difference between the two peak flows estimates may be a result of flow blockage at the Highway 50 bridge, which may have influenced the lower USGS estimate. Both the USACOE and USGS had noted backwater (damming) and possible constricted flow at the Highway 50 bridge during the 1997 event. Flow was observed to cross over Highway 50 near Longs Drugs suggesting a peak flow potential in excess of the bridge design capacity.

ENTRIX calculated flood recurrence statistics using both the USGS and USACOE estimates of the 1997 flood event. To increase the number of years on record available for the peak flow recurrence analysis, ENTRIX correlated the peak annual streamflow record at gage #10336610 with the upstream UTR near Meyers gage (#10336600) to extend the record back to 1961. ENTRIX applied a log-Pearson Type III analysis to the extended record for both the USGS and USACOE 1997 flood estimates and developed the flood recurrence intervals listed in Table 4.12-3. The analysis resulted in 100-year[2] peak flow estimates of 6,600 cfs and 7,650 cfs for the UTR.

Table 4.12-3
ENTRIX Flood Recurrence Interval Estimates Based on Log-Pearson Type III Analysis with Extended Streamflow Record of USGS Gages #10336610 and #10336600

Return Period (years)	*Upper Truckee Using USGS 1997 Peak of 5,480 cfs (cfs)*	*Upper Truckee Using USACE 1997 Peak of 8,200 cfs (cfs)*
1.5	533	530
2	768	760
5	1,620	1,660
10	2,430	2,550
25	3,790	4,130
50	5,090	5,690
100	6,660	7,650
200	8,560	10,100

Because the previously noted problems of streamflow blockage at the Highway 50 bridge likely affected the USGS 1997 flood estimate of 5,480 cfs, ENTRIX considers the USACOE (2002) estimate of 8,200 cfs more probable. Therefore, it is recommended that flood recurrence statistics based on the 1997 flood estimate of 8,200 cfs be used.

[2] Since less than 40 years of peak streamflows are on record, the 100-year flood estimate is based on an extrapolation of data. Another way to express the 1997 event is to call it the flood-of-record.

Moderate magnitude flooding, like a 10-year to 20-year event, on the UTR results in overbanking (i.e., out-of-channel flow) and inundation of areas adjacent to the river. These types of flows occur during spring snowmelt events, large winter rainstorms or rain-on-snow events. Summer thunderstorms rarely produce overbanking in the Airport Reach because they tend to produce short duration precipitation events with little volume and flashy peaks (USACOE 1999). Major flooding, as in the 1997 event, usually results from large winter rainstorms where antecedent snowpack conditions have produced saturated ground conditions. Flows from spring snowmelt events tend to be less extreme than winter rain events, because the snowpack melts gradually over various elevation zones of the watershed moderating the peak flow.

The stream flow record for the UTR shows distinct differences in peak flow between snowmelt runoff and rain on snow precipitation events. The stream flow record also shows peak runoff events for annual snowmelt and rainfall peaks. The largest peak floods are generated by rainfall events while the greatest volumes of runoff are carried by snowmelt events.

Groundwater Elevations and Gradients

Relevant information on local groundwater conditions was obtained from several South Lake Tahoe groundwater studies: Loeb 1987, Thodal 1997, AGRA Earth & Environmental 1999, and Rowe and Allander 2000.

Groundwater

The South Lake Tahoe groundwater basin is the primary water supply source for domestic and public water supplies (Rowe and Allander 2000). Concerns about groundwater withdrawals, wastewater disposal, and water quality implications of groundwater and surface water interaction have been the focus of various monitoring programs and studies. These studies are discussed below.

The watershed-scale groundwater flow paths are generally from the uplands toward the lake, discharging through seepage to stream channels, springs, small lakes, or directly to the lake (Thodal 1997). The groundwater elevations within the UTR watershed (and most geomorphic settings) generally parallel the topography, with higher groundwater elevations in the headwaters and along ridgelines and lower groundwater elevations in the valleys and along the lake (Rowe and Allander 2000). In the upper watershed reaches, groundwater generally flows towards the center of stream valleys and in the middle of the valleys it flows downvalley, approximately parallel to the direction of stream flow (Rowe and Allander 2000).

The groundwater levels and hydraulic gradients (groundwater surface slopes, which can be interpreted from groundwater level contour maps in the same manner as topographic slopes can be interpreted from ground surface elevation contour maps) vary by location and over time. Rowe and Allander (2000) indicate that hydraulic gradients in the upper UTR watershed are very high, but decrease in the valleys and middle reaches. Nearer the lake, the groundwater elevations and gradients also relate

to topography, but change with lake level, and are affected by groundwater pumping (AGRA Earth & Environmental 1999).

Observed groundwater contours for October 1964 were used (AGRA Earth & Environmental 1999) to represent the likely conditions prior to substantial groundwater pumping (Figure 4.12-13). Overall, the groundwater gradients in 1964 were steep in the high elevation areas of UTR watershed and flattened out in conjunction with the topography several miles upstream of the lake.

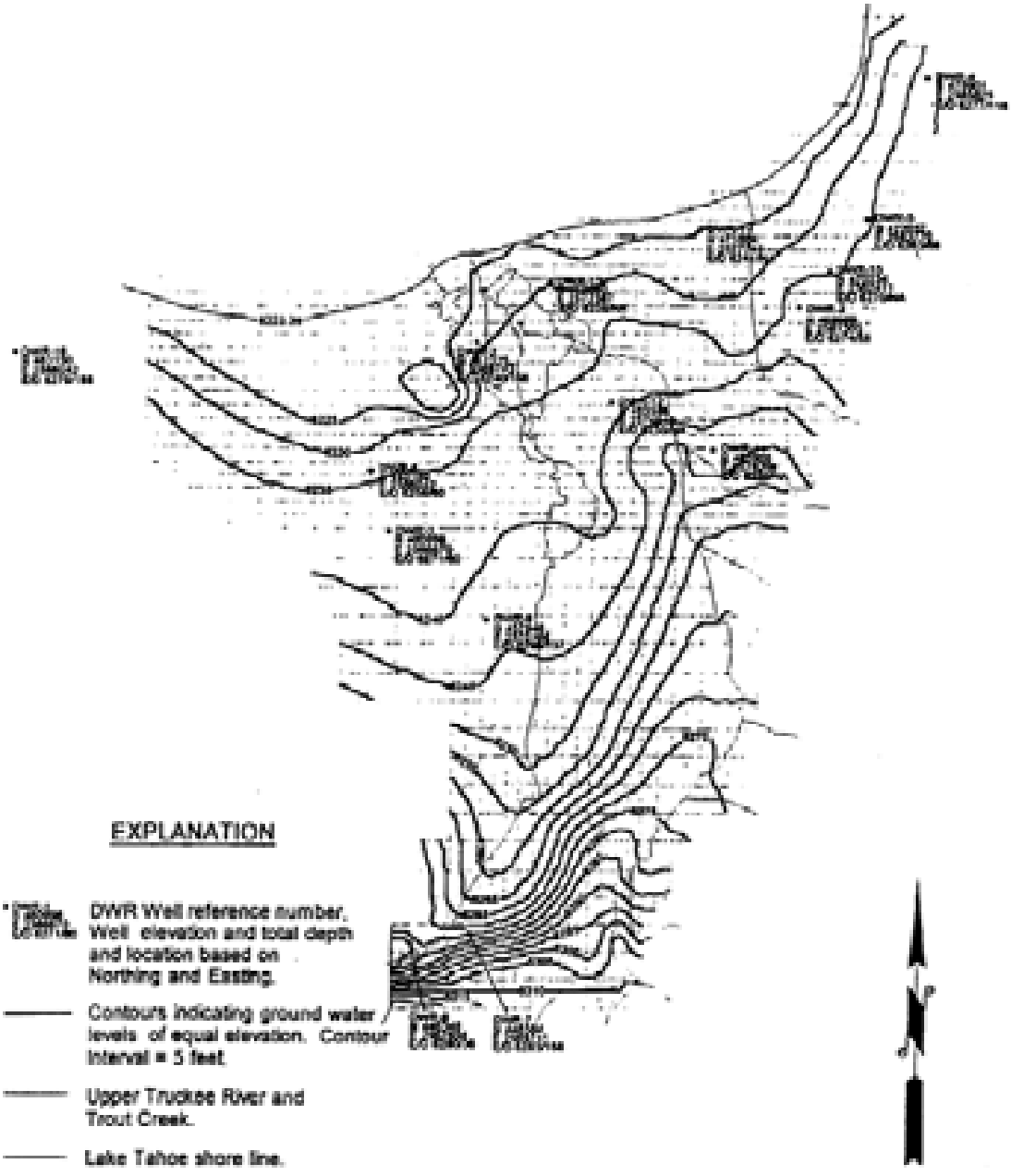


Figure 4.12-13
UTR Valley 1964 Groundwater Elevations
(Source: AGRA Earth & Environmental, Inc. October 1999)

The mean groundwater surface for 1976 to 1986 (Loeb 1987) also generally sloped toward the lake, but included a large cone of depression due to pumping in the Al Tahoe neighborhood east of the UTR within the Trout Creek valley (Figure 4.12-14). Loeb (1987) estimated the average watershed gradient towards the lake for 1976 to 1986 as 15 feet/mile (0.0028 ft/ft). In the downstream reaches of the UTR, a groundwater gradient near the lake occurred on the order of 1 to 2 ft/mile.

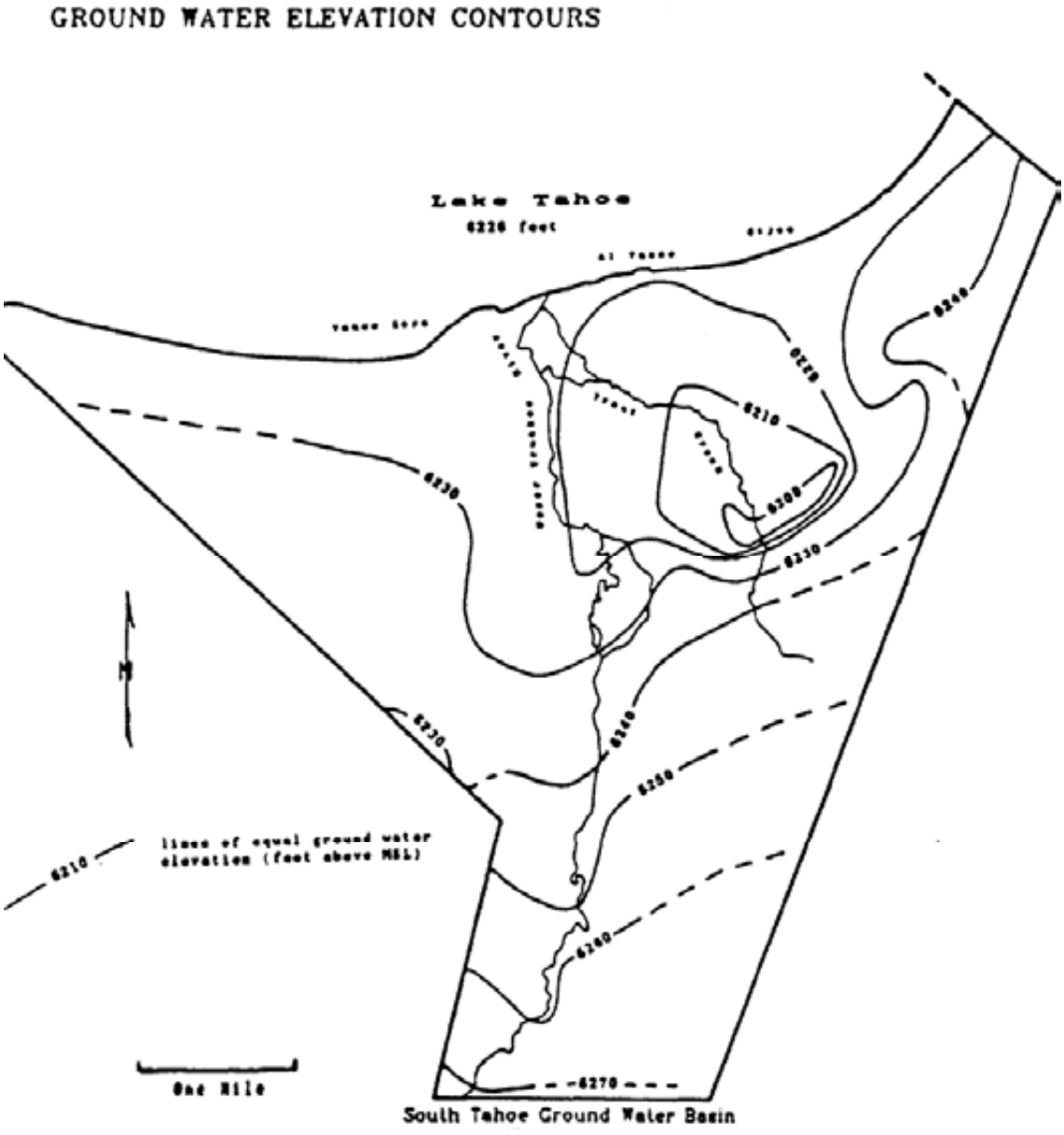


Figure 4.12-14
UTR Valley Groundwater Elevations from Measurements Observed from 1976 to 1986 (Source: Loeb 1987)

The 1996 groundwater data presented by Rowe and Allander (2000) also supports a lakeward (northerly) flow direction through the study area (Figure 4.12-15).

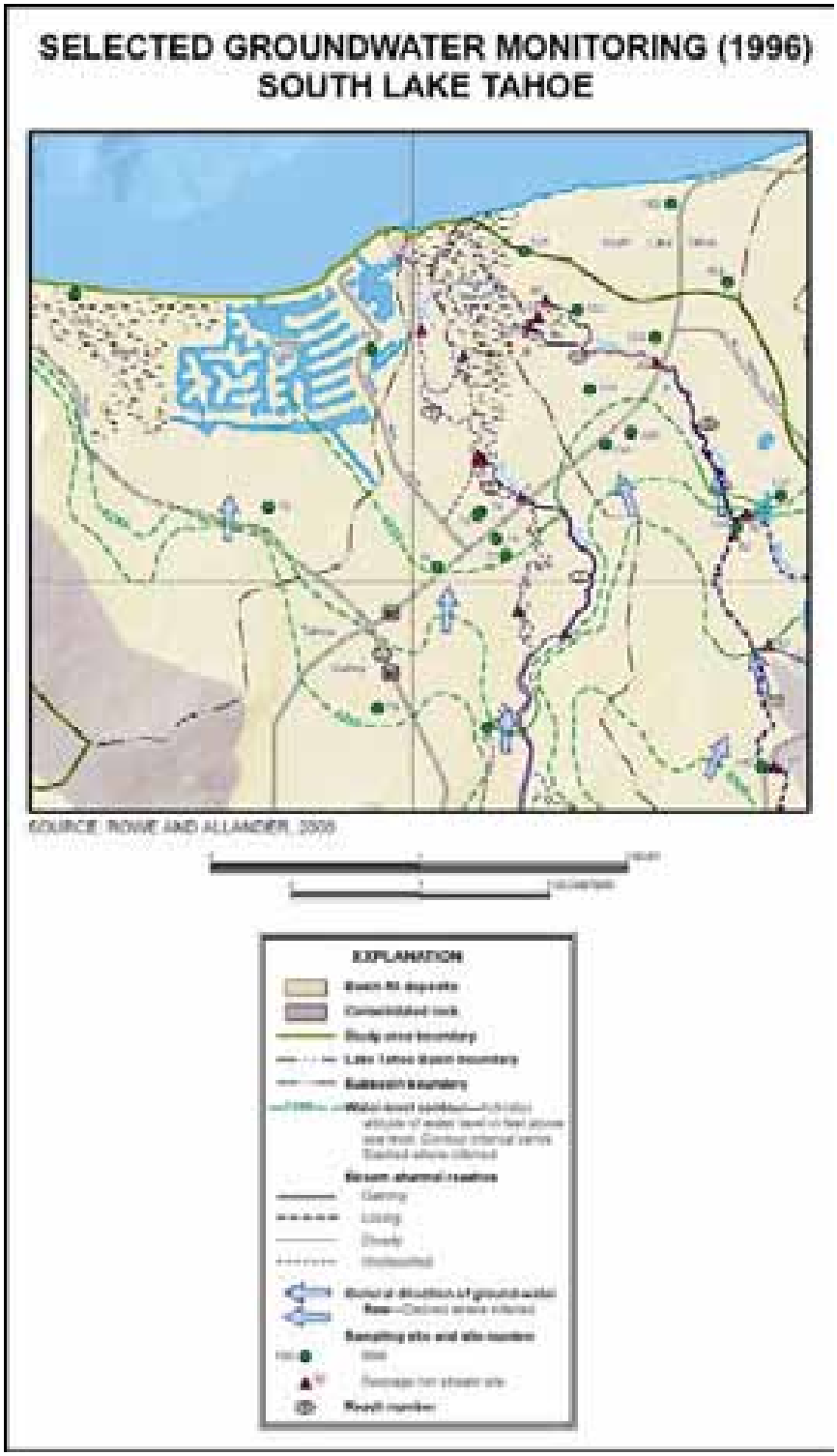


Figure 4.12-15
UTR Valley 1996 Groundwater Elevations
(Source: Rowe and Allander 2000)

River Gains and Losses from Groundwater

Two studies are known to have been undertaken to investigate the relationship between UTR valley groundwater and UTR streamflow. AGRA Earth & Environmental (1999) measured river gain and loss by comparing streamflow entering and exiting two defined reaches in the lower UTR at various dates throughout years 1995 to 1998. Streamflow measurements taken with a current meter at the Highway 50 bridge at Elks Club Drive and just upstream of the head of the gully channel that diverts water from the UTR near RS 4500. These measurement stations defined Reach 1. Reach 2 was from the gully channel at RS 4500 downstream to the USGS gage (#10336610) at Highway 50 in South Lake Tahoe. Streamflow values at the Highway 50 bridge in South Lake Tahoe were based on USGS gaging records. In their report, AGRA states:

"Problems which were encountered during gaging that prohibited the acquisition of data or that may have caused significant error during collection of data include: freezing conditions; construction; backwater effects; and flood irrigating. Of all the gaging events, two (April and July 1996), provided the best data from all of the gaging stations" (AGRA 1999, p.14).

As recommended, only April and July 1996 values are considered. In April 1996, the UT River gained 28 cfs (128 to 156 cfs) from groundwater contributions in Reach 1, and 2 cfs (156 to 158 cfs) in Reach 2. The report does not state the extent to which overland snowmelt runoff may have been responsible for the apparent gains in streamflow from groundwater. In July 1996, the UTR gained 3 cfs (60 to 63 cfs) from groundwater contributions in Reach 1, and lost 3 cfs (63 to 60 cfs) to groundwater in Reach 2.

The second river and groundwater flow interaction study was conducted by the USGS during baseflow conditions in September 1996 (Rowe and Allander 2000). They used streamflow measurements at 4 locations to estimate groundwater related gains and losses to UTR streamflow. The most upstream streamflow measurement site was on the UTR just downstream of Angora Creek. The next two downstream measurement sites were near each other. One was on the main channel UTR just downstream of the gully channel head (RS 4500), and the other was on the gully channel itself just downstream of where it diverts water from the UTR. The fourth and most downstream measurement site was USGS gage #10336610 at Highway 50 in South Lake Tahoe. Reach 1 was defined from the site downstream of Angora Creek to the UTR main channel site downstream of the gully head (RS 4500). Reach 2 was from the same site just downstream of the gully channel head to the site at Highway 50.

If the streamflow measured at the downstream end of the reach was at least 5 percent greater than the streamflow entering the reach, the difference was attributed to groundwater seepage, and the reach was classified as a gaining reach. Conversely, if the streamflow measured at the downstream end of the reach was at least 5 percent less than the streamflow entering the reach, the difference was attributed to

groundwater loss, and the reach was classified as a losing reach. Differences in flow value measured at the up and downstream reach sites within 5 percent were determined to be within the standard measurement of error, and the reach was therefore called a steady reach with no streamflow gains or losses. The USGS stated that their method assumed no overland runoff, negligible river evapotranspiration, negligible evapotranspiration due to riparian vegetation, and no storage changes within the reach.

At the upper Reach 1, measured streamflow decreased from 10.3 to 10.1. Since the 1.9-percent change in streamflow was well within the standard measurement error, Reach 1 was labeled as a steady reach (Figure 4.12-15). At the downstream Reach 2, measured streamflow increased slightly from 10.1 to 11.2, which is an 11 percent increase in streamflow. Therefore, Reach 2 was labeled as a gaining reach. It is worth noting that the USGS measured zero cfs in the gully channel (RS 4500) in September 1996.

Viewed on a watershed scale, the UTR is a gaining river in its upper reaches, steady or losing in the middle reaches, and gaining in the lower reach beginning about 2.5 miles upstream of Lake Tahoe (Rowe and Allander 2000).

4.12.1.2 Geomorphology

The information contained herein is based primarily on a review of three existing studies, described below, and ongoing work performed by ENTRIX geomorphologists in the design component of the Middle Reach restoration project. Data used from prior studies mainly focuses on results that pertain to the Middle Reach, although some data and discussion for reaches of the UTR outside of, but adjacent to, the Middle Reach are included.

The USACOE (2000) conducted a study of geomorphic processes controlling the channel stability of the UTR between the pedestrian bridge downstream of the Highway 50 bridge in South Lake Tahoe and Highway 50 bridge at Elk's Club Drive. They investigated historic and existing processes operating at a watershed and reach scale and described the processes' relationship to the river channel form. The USACOE (2000) evaluated channel stability impacts on sediment delivery to Lake Tahoe, and developed preliminary restoration recommendations.

The TRCD (2003) reported on the geomorphology of the Middle Reach, between the Highway 50 bridge in South Lake Tahoe and the Highway 50 bridge at Elk's Club Drive, as part of a comprehensive environmental assessment aimed at developing restoration alternatives. The report identified six sub-reaches, selected a preferred alternative for each, and provided conceptual plans for a preliminary design (TRCD 2003).

Simon and Others (2003) conducted a study of several watersheds within the Lake Tahoe basin to evaluate the key source areas supplying fine sediment and the rate of delivery to Lake Tahoe. Numerical modeling and field observations were made at the

watershed scale, and on a site-specific basis of over 12 miles of the UTR upstream of its mouth. Simon and Others (2003) combined historical analysis of channel evolution with detailed measurements of geomorphic parameters at specific locations on the UTR to determine which areas are presently contributing the most fine sediment to the channel for transport into the lake. Based on analysis of historic trends and existing conditions, the authors estimated future rates of fine sediment erosion along the UTR.

All three prior reports reference locations on the UTR by RS; however, each report uses different starting points and units. The USACOE (2000) RS zero is at the pedestrian bridge downstream of the Highway 50 bridge in South Lake Tahoe, and extends upstream along the UTR centerline to the Highway 50 bridge at Elk's Club Drive. The TRCD (2003) report does not explicitly describe a RS system, but it appears that locations are referenced by distance in feet upstream of the Highway 50 bridge in South Lake Tahoe. Simon and Others (2003) reference locations by distance in kilometers upstream of the UTR mouth. To facilitate comparison of data collection sites referenced in the prior reports, the three different sets of river stations have been converted to ENTRIX river stations. The adopted RS zero is at the Highway 50 bridge in South Lake Tahoe, and extends upstream along the river centerline, on the 2003 aerial. All references to RS values hereafter are based on these river stations, in feet.

The geomorphic form and lateral controls on the UTR in the study area are influenced by the local geology and past and present land uses. From RS 13600 downstream to RS 8800, the **channelized** (terms in **bold** are defined in the Glossary in Appendix C) and relocated UTR flows in a narrow valley between the South Lake Tahoe Airport and east valley wall. Within this reach, the river is highly **laterally confined** on the left bank (left bank and right bank refer to an observer looking downstream) by imported fill used in the construction of the Airport and by the confining steep valley hillslopes directly right of the channel. Natural valley width in this reach has been substantially altered because of the dramatic changes to valley floor topography resulting from construction of the Airport. If defined as the distance between the runway and the base of the hillslope, the valley width ranges from 200 to 600 feet. Lateral migration of the river is restricted by rip-rapped banks created in the Airport fill east of the runway and very hard to indurated lacustrine deposits exposed on the right bank (Figure 4.12-16). Riparian vegetation on the left bank is generally low density, being mainly composed of small trees and shrubs that have grown in the Airport fill.

Downstream of RS 8800 to RS 5050, the UTR becomes less confined as it enters the broad undeveloped and open meadow (Figure 4.12-17). Valley widths measured between the bases of the western and eastern valley walls range from 800 to 1,300 feet. Sedimentary deposits are largely of alluvial/lucustrine origin, with some colluvial sources where the UTR cuts into the east hillslope. Higher density coniferous vegetation is located on the right bank along the eastern hillslopes.

Figure 4.12-16
UTR rip-rapped banks in channelized airport reach restrict lateral channel movement. Imported airport fill west of the channel functions as a terrace (upstream view, RS 9400, ~310 cfs, 04May2004)

Figure 4.12-17
Alluvial and adjustable reach of the UTR at RS 7200, downstream of the channelized Airport Reach (upstream view, ~270 cfs, 03May2004)

The remainder of this section focuses on a categorical presentation of the existing geomorphic conditions of the UTR. All descriptions apply to the portion of the UTR within the City study area, unless noted otherwise. First, a brief discussion of the historical land uses within the UTR watershed that have affected the UTR geomorphology is presented to provide a contextual link between historic disturbances and the resultant adjustments to channel form. Following the historical section, physical parameters that describe the UTR geomorphology are discussed. These include the river **planform**, riverbed slope, cross-section geometry, bed and bank sediment composition, and bedforms. Second, a discussion of channel dynamics and how the river has been adjusting to prior **degradation** is presented.

Historic Land Use Effects

Prior to the Comstock Era in the late 1800s, the UTR within the Middle Reach was a freely meandering river flowing through a broad meadow that was also a floodplain surface. During annual peak snowmelt in the late spring and also during less frequent rain-on-snow events, high flows would overtop the river's banks and flood portions of the meadow, and in the process recharge groundwater levels, deposit fine sediment onto the floodplain, and rejuvenate vegetation with nutrients. Since the beginning of the Comstock Era, though, a culmination of watershed and site scale land use activities (e.g. logging, mining, urbanization, and grazing) and direct channel disturbances (e.g. channel relocation and channelization) have led to **degradation** of the UTR channel and floodplain by disrupting the hydrology and sediment load that maintains **dynamic channel stability**.

Some of the major watershed land uses that have likely contributed to adverse impacts on the existing river geomorphology include:

- Relocation and straightening (i.e. channelization) of the lower UTR in the past to accommodate grazing, development, and irrigation needs. **Channelization** of the Airport Reach and in reaches downstream reduced the UTR's **sinuosity** and channel length and increased channel slope and sediment transport capacity, which likely contributed to downcutting, **incision** of the bed, and **headcutting**. In addition to changes in channel slope, a primary geomorphological effect of **channelization** is the removal of natural heterogeneity in riverbed morphology, particularly pool-riffle sequences (Keller 1978, Brookes 1988). **Incision** and **over-widening** have also increased the UTR's **flow conveyance capacity**, creating negative effects (e.g. transforming the floodplain to a terrace) on channel and floodplain hydrology and morphology.

- Grazing on the meadow may have contributed to channel **degradation** through both direct impacts to river banks from cattle hooves and alteration of meadow hydrology. Excessive foraging and trampling in the meadow causes a reduction in plant biomass, limits the development of young woody plants, and compacts the soil, all of which contribute to an increased volume and quicker delivery of runoff into the river. Along the riverbank, cattle create paths to enter and exit the water, effectively destabilizing banks and establishing new channels for overland runoff

into the channel. Additionally, the impact of hooves chiseling the banks often promotes the collapse of overhanging banks. Impacts of cattle grazing on channel morphology are generally associated with channel widening, decreased **sinuosity**, decreased heterogeneity of the streambed, and channel **incision** from the increased runoff (Magilligan and McDowell 1997).

- Urbanization in the UTR watershed has altered water and sediment deliveries to the river by creating a more peaked hydrograph with an increased frequency of higher flows that can cause channel widening and **incision**. Urban development is often linked to initial increases in sediment delivery to the stream during construction phases, followed by a decrease in sediment delivery once sediment sources have been reduced by infrastructure (Graf 1975).

- Deforestation of much of the UTR watershed in the past likely increased peak runoff and sediment delivery. The type of geomorphic response to deforestation depends upon the rate and type of sediment supplied to the river (Knighton 1998). In general, an increased supply of bedload from deforested watersheds has been documented to cause channel adjustments of widening, **aggradation**, decreased **sinuosity**, and bar instability (Kondolf and others 2002, Knighton 1998). These adjustments in response to increased sediment supply could have been enhanced by historic UTR watershed logging. Reforestation of the UTR watershed after the end of the Comstock Era likely led to a decrease in runoff and sediment delivery. This may have led to downcutting of the bed, channel **incision**, and channel narrowing (Kondolf and others 2002).

It is very difficult to determine the level of impact and temporal and spatial scales to which the above watershed land uses may have contributed to channel **degradation**. These land uses have occurred at overlapping periods and at varying intensities over the past 150 years, and it is not possible to correlate one single disturbance with a particular channel adjustment. Knowledge of the land uses that have impacted channel morphology in the past provides insight into how the channel might continue to adjust to these disturbances and respond to future land use changes. Specifics on the UTR's change in channel form from disturbances are discussed below.

Channel Planform

The UTR in the Airport Reach is a single thread channel that has been relocated to the base of the east valley wall and straightened to accommodate grazing on Mosher meadow and Airport construction in the early 1960s. The overall UTR channel **sinuosity** in the study area is 1.2. The channel parallel to the Airport has no meanders with a **sinuosity** of approximately 1.0.

Channel Slope

A longitudinal thalweg (deepest part of the channel) profile[3] was surveyed in August 2004 in support of the ENTRIX Middle Reach restoration design (Figure 4.12-18). Thalweg elevation shots were surveyed every 20 feet, on average. The overall bed slope for the study area is 0.001 ft/ft, which is the same as the overall bed slope for the entire Middle Reach. Bed slopes calculated by the USACOE (2000) (Table 4.12-4) are similar to the slope calculated by ENTRIX.

Table 4.12-4
U.S. Army Corps of Engineers (2000) Geomorphic Characteristics Measured within the Middle Reach City Study Area

ENTRIX River Station (ft)	Bed Slope (ft/ft)	Average Bank Height (ft)	Sediment Stored in Bars (ft^3)	Percent of Reach Bank Eroding (%)	Channel Capacity (cfs)
4450 - 6400	0.0021	7.0	~45,000	59	800-1,200
6400 - 8750	0.0003	6.0	125,617	40	1,200
8750 - 9860	0.0037	8.0	<1,000	~0	1,200
9860 - 12800	0.0011	9.3	~22,000	~0	1,200
12800 - 13310	0.0018	8.0	<1,000	~0	800

Two distinct features on the bed function as vertical grade control. The low-water crossing at thalweg distance 10314 (RS 9850) that provides access to the Airport creates a five foot drop in thalweg elevation between the top of the concrete crossing to the scour pool immediately downstream of it (Figure 4.12-19). In terms of overall bed slope, bed elevations are approximately one foot higher upstream of the low-water crossing than they are downstream. The second grade control is the old dam at RS 12800 (thalweg distance 13468). This structure creates a 3-foot drop in the thalweg elevation, and an approximate 1-foot difference in the overall bed slope (Figure 4.12-20).

Channel Cross-section Geometry

The USACOE (2000) report indicates nine cross-section locations within the study area. These cross-sections were used in the development of the USACOE HEC-RAS model. It is not known if the cross-sections were field surveyed or generated from contour data. No plots or dimensions of the cross-sections are reported.

[3] Note that the thalweg distances on Figure 4.12-18 are not directly comparable to river station distances. Unlike the river station distances that are based on the channel centerline, the thalweg profile is longer because the thalweg meanders back and forth across the channel.

The TRCD (2003) report does not make any reference to cross-section surveys, although a longitudinal plot in the TRCD (2003) report that is adopted from the USACOE (2000) HEC-RAS model indicates that the meadow surface is typically 6 to 6.5 feet above the thalweg trend line. A non-incised, low gradient, meandering channel flowing through a meadow environment, such as the UTR, will typically have point bars at grade with the meadow surface (i.e. top of the point bar elevation is the same as the meadow/floodplain elevation). As results from the TRCD profile surveys suggest (Appendix D), the point bars along the UTR are typically 3 feet below grade with the meadow surface.

The USACOE (2000) report bank heights at **channel capacity** ranging from 6 to 9.3 feet (Table 4.12-5). It is not stated if the bank height measurements are limited to the west meadow surface, or include the steep, high banks of the east hillslopes.

Channel Bed and Bank Material

Bed Material

Simon and Others (2003) sampled bed material at two locations in the study area as part of their Rapid Geomorphic Assessments (RGAs) (Appendix D). The report states that bed (and bank) sediment samples "could be a bulk sample, a particle count if the bed is dominated by gravel and coarser fractions, or a combination of the two" (p. 4-5). Results for each sample neither indicate which sampling method was used nor what geomorphic unit was sampled (e.g. pool, riffle submerged at low flow, mid-channel or point bar). At RS 6900, the ($\mathbf{D_{50}}$) median size is 0.11 mm (very fine sand) and at RS 9525, it is 10 mm (medium gravel).

The USACOE (2000) also presented results of six bed material samples (Appendix D). A mid-channel bar at RS 8200 was sampled using the Wolman pebble count method, and the other five samples were sub-surface bulk samples. The median grain sizes of all the samples vary from 1.6 mm (very coarse sand) to 30.9 mm (coarse gravel) on the riffle surface. A berm sampled on the right side of the channel had a $\mathbf{D_{50}}$ of 0.59 mm.

ENTRIX conducted an extensive sediment sampling campaign in early July 2004 throughout the entire study area. Because the median grain diameter at most locations is less than 8 mm with a high percentage of sand content, bulk samples were used to sample sediment. Two exceptions include RS 8240 and RS 13130, where the coarse surface material enabled Wolman counts. Most samples were collected at locations in the low flow channel that best represented average sediment conditions, except for samples collected on point bars that were selected for use in river **competence** calculations.

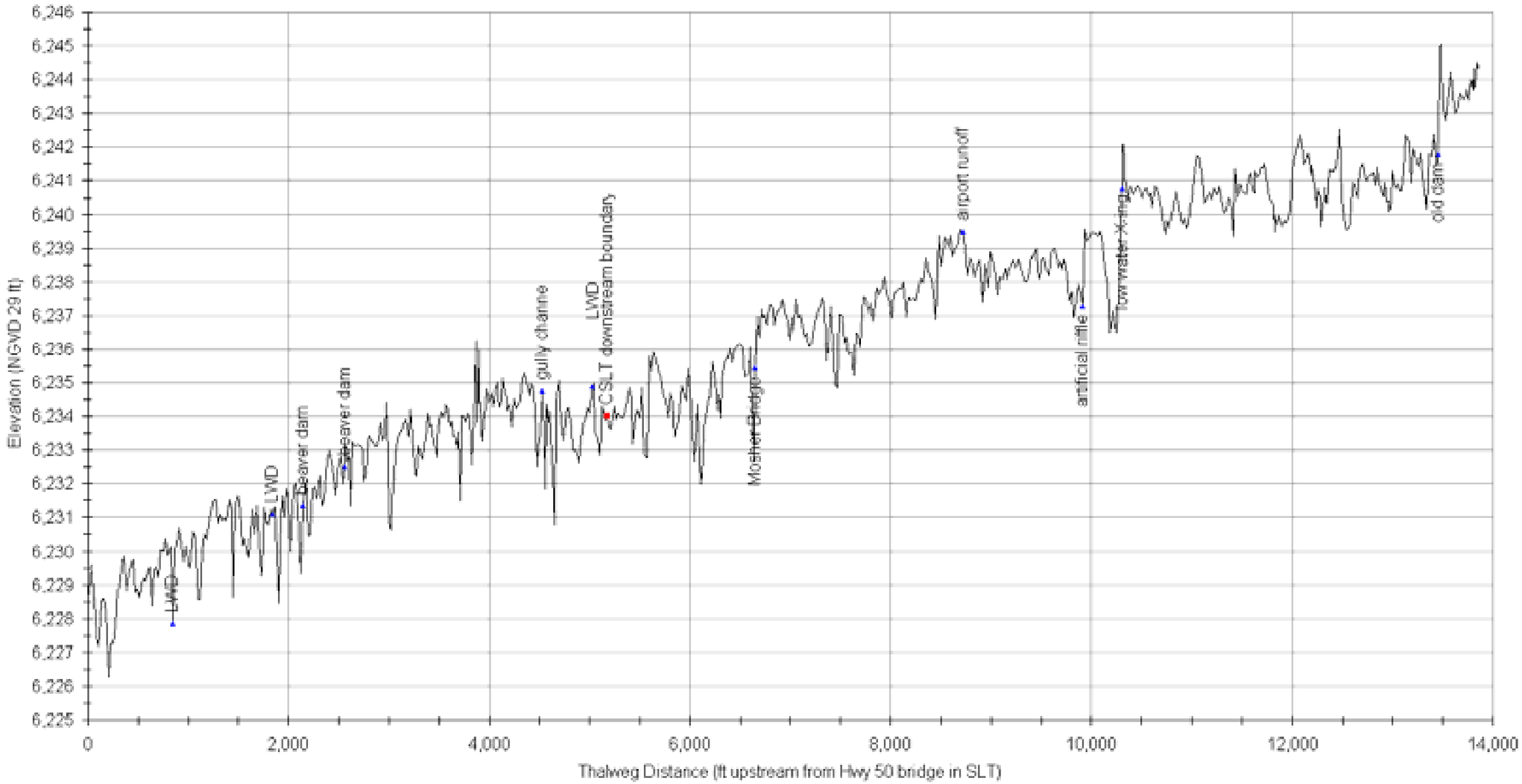


Figure 4.12-18
Longitudinal Thalweg Survey of the Entire Middle Reach, August 2004

Figure 4.12-19
Channel Bed Grade Control Created by Low-water Crossing at RS 9850 (View Left Bank, ~340 cfs, 06May04)

Figure 4.12-20
Channel Bed Grade Control Created by Old Hydraulic Structure at RS 12800 (View Right Bank, ~5 cfs, 23Oct2003)

Table 4.12-5
ENTRIX UTR Middle Reach Sediment Sampling – Airport Reach Results, July 6 & 7, 2004

River Station (ft)	Sub-Surface Sample Locations	Sampling Unit	Bulk Sediment Gradations (mm)				% <2 mm	Wolman Counts (mm)		
			D_{16}	D_{50}	D_{65}	D_{84}		D_{16}	D_{50}	D_{84}
5180	MR XS-9 SUB-SURFACE	Low flow channel	0.47	1.79	3.00	6.00	53.00			
5750	MR XS-10 SUB-SURFACE CHANNEL	Low flow channel	0.65	4.60	6.50	9.00	28.40			
7230	MR XS-11 SUB-SURFACE CHANNEL	Low flow channel	1.40	5.62	7.70	18.00	19.70			
8240	MR XS-12 SUB-SURFACE	Low flow channel	1.90	10.40	25.00	64.00	16.30			
10050	MR XS-13 SUB-SURFACE	Low flow channel	0.58	2.26	3.10	5.00	45.20			
13035	MR XS-14 SUB-SURFACE	Low flow channel	0.85	2.26	3.00	4.30	43.80			
13130	MR XS-15 (STAFF 4) SUB-SURFACE	Low flow channel	1.08	11.20	30.00	50.00	23.70			
5775	MR XS-10 SUB-SURFACE PT BAR	Head of point bar	1.60	3.40	4.60	6.80	24.20			
7230	MR XS-11 SUB-SURFACE PT BAR	Point bar	0.50	4.16	7.00	15.00	37.50			
River Station (ft)	**Surface Sample Locations**	**Sampling Unit**	**Bulk Sediment Gradations (mm)**				**% <2 mm**	**Wolman Counts (mm)**		
			D_{16}	D_{50}	D_{65}	D_{84}		D_{16}	D_{50}	D_{84}
5180	MR XS-9 SURFACE	Low flow channel	0.80	4.17	5.80	8.60	26.30			
5750	MR XS-10 SURFACE CHANNEL	Low flow channel	5.30	12.60	16.00	20.30	9.80			
7230	MR XS-11 SURFACE CHANNEL	Low flow channel	4.60	6.96	8.00	10.10	2.00			
8240	MR XS-12 SURFACE	Low flow channel	17.30	53.90	60.00	69.30	1.10	3.6	23.5	48.8
10050	MR XS-13 SURFACE	Low flow channel	2.20	4.63	6.00	8.50	13.90			
13035	MR XS-14 HARD CLAY L. SIDE CHANNEL	Low flow channel	<.0012	0.0056	0.013	0.05	99.90			
13035	MR XS-14 SURFACE	Low flow channel	1.04	3.72	5.10	7.30	27.20			
13130	MR XS-15 (STAFF 4) SURFACE	Low flow channel	32.00	86.00	90.00	95.00	0.40	2.8	16.5	55.0
5775	MR XS-10 SURFACE PT BAR	Head of point bar	2.80	4.96	6.10	8.30	1.80			
7230	MR XS-11 SURFACE PT BAR	Point bar	4.00	19.40	24.00	31.00	10.50			

At each bulk sample location, the surface and sub-surface portions were sampled and analyzed separately. The surface depth was considered to be the depth of the maximum surface particle diameter. In all of the samples, the median grain diameters for the subsurface portion of the sample are always finer than the surface portion (Table 4.12-5). The $\mathbf{D_{50}}$ for all sub-surface samples is typically between 2 and 6 mm (very fine to fine gravel) (Figure 4.12-21). Two sites have sub-surface median diameters of approximately 11 mm. The average percent of the sub-surface portion of the bulk sample finer than sand size (diameter less than 2 mm) is 32 percent.

Figure 4.12-21
Representative point bar grain size distribution (D_{50} of 5 mm) at RS 5775. For scale, sampling can diameter is 155 mm (07July04)

Surface particle diameter gradations exhibit much more variability than their sub-surface counterparts. Median particle sizes range from 0.0056 to 86 mm. Wolman surface counts collected at RS 8240 (23.5 mm) and RS 13130 (16.5) have median particle sizes substantially less than the bulk surface sample representation. The average percent of the surface portion of the bulk sample finer than sand size (diameter less than 2 mm) is 10 percent.

The bulk sample collected at RS 13035 is composed of 54.3 percent silt and 33.5 percent clay. This material that is found throughout portions of the study area and is very compacted, difficult to break, and likely very erosion resistant. The USACOE (2000) also make reference to this material, referring to it as erosion-resistant Holocene-age lacustrine sediment (Figure 4.12-22).

Figure 4.12-22
Erosion resistant lacustrine deposits (D_{50} of 0.0056 mm) in channel at RS 13035 (07July2004)

Bank Material

Simon and Others (2003) sampled bank toe, bank face, and internal bank material at two locations in the study area. Results of these samples are shown in Appendix D. Sampled bank toe and bank face material at RS 6900 primarily consists of fine sand intermixed with 20 to 25 percent silt/clay. A rip-rapped bank was also sampled at RS 9525. The median diameter of the rip-rap is 110 mm (small cobble), and the maximum diameter is approximately 250 mm (large cobble). Grain size testing results of internal bank material are quite similar to the bank face and bank toe results. At sample depths of 0.5 and 0.9 meters, fine sand is the median particle size. Approximately 85 percent of the internal bank samples are composed of sand, with the remainder silt/clay.

The USACOE (2000) reported collecting bulk samples of the left bank material at three locations in the study area (RS 20700) (Appendix D). The median particle diameters of the banks are 0.06 mm (very fine sand) at RS 7275, less than 0.06 mm (silt/clay) at RS 8675, and 0.21mm (fine sand) at RS 13000. Fifteen to 65 percent of the bank samples are composed of silt/clay.

The USACOE (2000) mapped the location and type of bank protection. These values are displayed in Table 4.12-6. Both the right and left banks have extensive rip-rap protection in the channelized Airport reach, extending continuously from RS 8750 to RS 12580.

Table 4.12-6
UTR Middle Reach Bank Protection Locations (USACE 2000)

Bank	*DS RS*	*US RS*	*Type*
LB	5300	5400	willow staking
LB	8200	8325	riprap
LB	8000	8200	biotech
LB	8750	12600	riprap
RB	8775	12580	riprap

Geomorphic Bedforms

Pools and riffles in the UTR within the City study area are often poorly developed. The greatest heterogeneity in bed topography is associated with large woody debris jams and in-channel structures that alter hydraulics. **Channelization** of the river reduced channel **sinuosity**, which resulted in the loss of pool and riffle sequences associated with the meandering channel form. Furthermore, **incision** and widening of the channel decreased water depths for a given discharge and led to a more planar bed with a high sand content (Figure 4.12-23). Deviations from the average thalweg elevation in Figure 4.12-18 are typically less than 1 to 1.5 feet, indicating relatively minor elevation changes in the bed profile. Most of the deviation is related to shifting sand bed forms in the wide channel. Gravel riffles that extend for at least 20 to 30 feet are very infrequent.

Figure 4.12-23
Uniform Bed Topography, Low Flow Depths, and Fine Sediment Substrate (D_{50} Of 2 mm) In Channelized Airport Reach at RS 10050
(Upstream View, ~30 cfs, 07July2004)

Channel Dynamics

Channel dynamics in this case refers to how the morphology of the UTR is adjusting to over a hundred years of watershed scale and direct channel disturbances. The evolution of the UTR into its current form and subsequent impacts on bank erosion, **channel capacity**, and bedform diversity are discussed.

Channel Evolution

Simon and Others (2003) state that channel **incision** led to much of the channel widening observed in the UTR. Three different locations were evaluated in terms of the Simon and Hupp (1986) six-stage channel evolution model (Figure 4.12-24). River station 5000 was reported as Stage VI, which is the final stage defined for channels that have previously incised, widened because of mass bank failure, aggraded, and have reached a new quasi-equilibrium form. At RS 6700, the channel is described as Stage V, which is defined for channels that continue to exhibit active widening from bank failure and **aggradation**. Finally, RS 9500 in the rip-rapped Airport Reach is classified as Stage II, which is defined as a constructed channel. According to the model, previous or concurrent deepening of the channel through **incision** promotes the widening experienced in Stage V. Heightening and over-steepening the UTR banks beyond a critical height for stability in conjunction with toe scour and undercutting causes gravitational forces to exceed the shear strength of the bank material, which can result in mass failure of bank material.

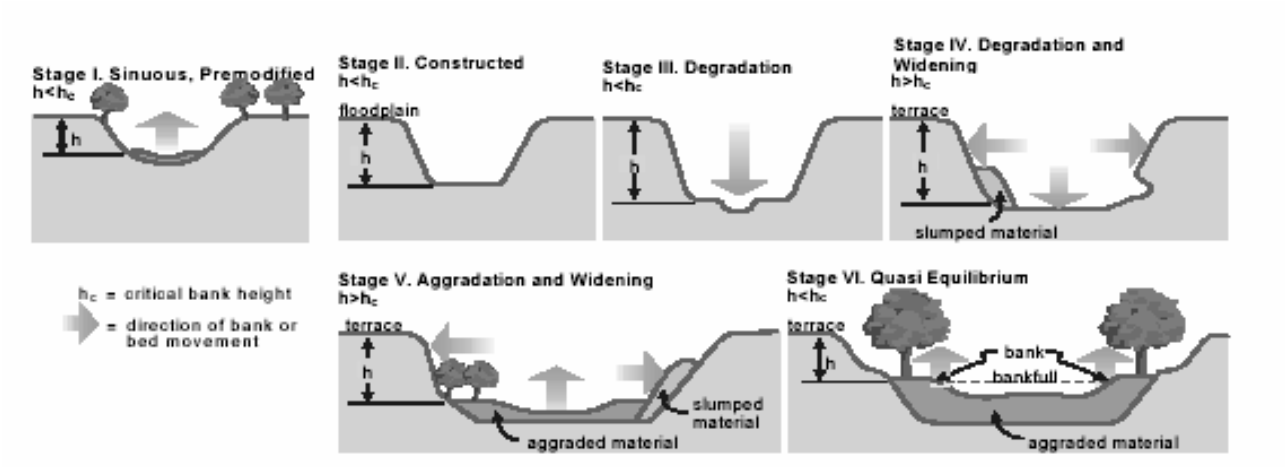


Figure 4.12-24
The Simon and Hupp (1986) Six-Stage Channel Evolution Model
(Taken from Simon and Others 2003)

The USACOE (2000) state that they do not believe that models of incised channel evolution that predict channel **incision** followed by channel widening and eventual **aggradation** (such as Simon and Hupp's) are appropriate for the UTR. They report that the presence of the erosion resistant, consolidated sediment in the bed of the UTR has prevented substantial bed **degradation**, and therefore, critical bank heights for mass failure would not have been exceeded.

Bank Erosion

As is expected, bank erosion is most evident at the outsides of meander bends in the alluvial reach downstream of RS 8750 where the channel becomes more sinuous. Since eroding cut banks are natural features of alluvial meandering streams, it can be difficult to interpret whether rates of bank erosion are natural or unnatural based on field observations alone, especially considering the relatively short period since the tremendous channel altering 1997 flood event. The flood event is estimated to approximate the 100-year event. The amount of bank erosion as a result of the 1997 flood has not been determined. When the volume of sediment eroded at the cut bank is balanced by sediment deposition on the point bar, eroding cut banks should not be interpreted as a sign of channel instability and in need of restoration intervention, but rather as a natural and healthy process of lateral channel migration (Figure 4.12-25). Repeat cross-section surveys within Mosher meadow would be useful to verify if cut bank erosion is greater than expected for the meandering UTR. If repeat cross-section surveys were to be conducted and the results indicated increases to channel width from cut-bank erosion, then the channel is continuing to widen. However, if cross-section surveys indicate channel width is maintained during cut-bank erosion because of point bar development, then rates of bank erosion may not be accelerated. This should be viewed as a positive process if natural channel processes are desired.

Figure 4.12-25
Cut-bank erosion on outer meander bend and point bar deposition on inner bend at RS 5775. Rate of bank erosion possibly accelerated by channel over-widening and increased flow capacity (downstream view, ~30 cfs, 06July04)

Although not directly in the City study area, Simon and Others (2003) compared time-series cross- sections upstream in Washoe Meadows for the periods 1992-1994 and 1997-2002. They reported that bank erosion rates between the two periods increased 2 to 3 times, and attributed the increase to bank toe scour and lateral retreat during the 1997 rain on snow event. They documented channel widening between 1992 and 2001/2002 at the Washoe Meadows State Park cross-sections. The authors state that the geotechnical bank instabilities created by the 1997 flood event continued to affect channel processes for at least the next five years while the channel continues to adjust to flood-induced instabilities. Furthermore, Simon and Others (2003) point out that channel widening on the UTR is enhanced by the lack of root penetration to provide cohesive strength for bank material, and a lack of coarse material to protect bank toes. The USACOE (2000) reports that approximately 50 percent of the banks are eroding in the alluvial reaches downstream of RS 8775 (Table 4.12-4).

The sloughed vegetated blocks of bank material located at the base of many cut banks in the City study area may be a product of the 1997 flow event induced erosion. This eroded bank material appears to be a stable feature at the base of the banks, and may provide short-term protection from further erosion, or even promote sediment deposition and some channel narrowing.

Bank instabilities are also very pronounced on the steep east hillslopes near RS 5500 and RS 6100 (Figure 4.12-26). Since the channel was relocated east to make space for the Airport, it has been become impinged against the steep east hillslopes. Unless the channel becomes more dynamic and begins to laterally migrate west from this location, the hillslopes will continue to be a source of eroding colluvial material. This area is located on private property outside of our project area and would not be stabilized as part of the Airport Reach project.

Figure 4.12-26
Steep and unvegetated hillslope at RS 5400 serves as a major source of fine colluvial sediment to the UTR. (upstream view, ~270 cfs, 03May2004)

Channel Capacity

Despite the USACOE (2000) doubts regarding whether the Simon and Hupp (1986) model of channel evolution is directly applicable to the UTR, all three reports referenced in this report conclude that the UTR has incised and widened in response to past disturbances. Because of this **degradation** to form, the channel has a larger in-channel flow capacity. Under the current hydrologic and sediment regimes, the recommended maximum in-**channel capacity** (i.e. bankfull flow) is estimated to be about 370 to 450 cfs (TRCD 2003; CTC 2003). Flows exceeding this level should begin to overtop the channel banks and inundate the marsh surface (i.e., floodplain). Based on statistical analysis of UTR peak annual discharge, overbank flows (~400 cfs) in the MPA should occur about every 1.5 to 2 years (California Tahoe Conservancy 2003) to promote restoration of the meadow conditions. Statistical analysis of mean daily discharge indicates that overbank flows should occur about 15 to 20 days per year. Under its existing incised condition, however, it requires flows over approximately 800 to 1,200 cfs to overbank and flood the meadow (Table 4.12-4) (USACOE 2000; TRCD 2003). Mean daily flows of this magnitude statistically occur approximately 3 days per year. The increased capacity of the river has transformed the meadow floodplain surface into a river terrace feature that is infrequently inundated with floodwaters. As a result, upland vegetation is encroaching on the meadow vegetation community due to channel **incision** and lowering of the groundwater table. In addition, replenishment of the meadow soil through fresh deposition of fine alluvial sediment during flood flows occurs less often. Instead of being stored on the floodplain, most of this sediment remains in the channel in lower flow events and is delivered into Lake Tahoe (Simon and Others 2003).

The increased capacity of the UTR can lead to further adverse affects of channel stability. Overbanking onto the floodplain typically limits in-channel flow depth and the magnitude of erosive hydraulic forces acting on the channel's bed and banks. Yet, since the channel holds more flow at capacity than it should, the bed and banks experience the erosive hydraulic force of 800 cfs rather than a 370 to 450 cfs flow.

Over-widening of the channel has created shallower flow depths that reduce the hydraulic efficiency to transport bed sediment. As a result of the decreased transport capacity, the over-widened channel exhibits extensive sediment deposition and **aggradation** (Figure 4.12-27). The USACOE (2000) quantified the volume of in-channel sediment in the UTR within the study area (Table 4.12-4). The average length of bank-attached and mid-channel bars was determined from aerial photograph base maps, and the average height of the bars was estimated to develop approximate volumes of sediment stored in the bars. As may be expected, the sediment bar storage in the rip-rapped channelized reach beginning at RS 8750 and extending upstream is minimal compared to the volumes downstream. Because the rip-rapped banks have prevented lateral channel migration, there is little opportunity for bars to form. The relatively uniform flow within the channelized reach likely prevents the flow diversity required for substantial bar development, resulting in a relatively uniform bed topography.

Figure 4.12-27
Sediment Deposition of Mid-Channel Bar in Over-Widened Channel at RS 8240
(Downstream View, ~30 cfs, 07July04)

Most sediment storage is located downstream of RS 8750 in the reach that still has mostly alluvial banks and can make adjustments to channel form. The presence of mid-channel and bank-attached sediment bars in this reach is evidence that river is responding its over-widened form (Figure 4.12-28). Through point bar development (lateral sediment accretion) the channel at several places may be narrowing and becoming more sinuous. The channel narrowing is often accompanied by incipient floodplain formation in the form of small benches. This newly forming floodplain is typically less than 25 feet wide, and is located at the back end of point bars away from the low-flow channel, one to three feet below the meadow/terrace surface (Figure 4.12-28). The incipient floodplain is now the active floodplain (i.e. floods approximately every 1 to 2 years). The amount of future active floodplain growth depends on the future rate the incised channel laterally migrates across the meadow and deposits sediment on inside bends to form new floodplain surface.

Figure 4.12-28
Lateral Sediment Accretion and Creation of Incipient Floodplain within the Incised Meander Belt at RS 13150 (Downstream View, ~320 cfs, 04 May 2004)

Although the UTR is working to reduce its **channel capacity** through channel narrowing, it is likely that the river will remain incised and hydrologically disconnected with the meadow surface without direct intervention or an unanticipated increase to incoming sediment loads that could cause the channel to aggrade. Since the UTR is also incised in the Middle Reach downstream of the study area, the base level for the Airport Reach will continue to be lower than it should. Therefore, incipient floodplain formation through sediment deposition may narrow the channel, but is not expected to lead to an overall rise in bed elevation and reestablishment of a floodplain connection with the meadow surface.

4.12.1.3 Water Quality and Pollutant Sources

The City monitored water quality at four locations within the study area for nitrate as nitrogen (NO_3-N), nitrite as nitrogen (NO_2-N), total Kjeldahl nitrogen (TKN), total nitrogen (TN), organic phosphorous (OP), total phosphorous (TP), TDP, total suspended solids (TSS), iron (Fe), ammonia as nitrogen (NH_4-N), and turbidity. Monitoring occurred during March, May, July, and November in 2004. Monitoring sites above and below the gully channel (RS 4500) have shown an increase in total

suspended sediment below the gully channel (RS 4500); these results indicate the gully channel is likely a source of sediment to the UTR.

A key concern within the Lake Tahoe Basin and the subject of considerable effort and expenditure by numerous agencies and organizations is the quality of runoff discharged into Lake Tahoe. This has been prompted by the well-documented and rapid decline in the optical clarity since measurements began in the mid-1960s. It is generally agreed that excessive nutrients and fine sediments, especially in urban runoff from streams, surrounding the Lake are a primary cause of clarity decline.

The main water quality issues to be addressed by the efforts to restore the UTR involve reducing fine sediment and bio-available nutrients including forms of soluble nitrogen and phosphorous. Other issues include reducing urban runoff pollutants (metals, oils grease hydrocarbons, etc.) This assessment analyzes potential changes in the supply and discharge of sediment and nutrients with the project as compared with current conditions and the potential for their release during construction and postconstruction conditions.

Review of past water quality data taken at the USGS stream gage below the project site indicates high levels of nitrogen during the winter months (TRCD, 2003) during non-precipitation periods; this suggests exfiltration of sanitary sewer lines that are located in and along the channel. Other nutrient sources in the watershed include urban landscapes and golf courses, grazing and wildlife feces and organic debris (vegetation, algae, etc.).

The UTR watershed includes several land uses that may be sources of fine sediment sources including roads and urban development. These sources are often situated within or adjacent to urban drainage systems that efficiently collect and transport pollutants to the UTR. De-icing abrasives applied during winter snow storms are a very obvious potential source of fine sediment. These include sediment (primarily sands) and, in some cases, cinders that are applied when road surfaces are frozen. During snowmelt conditions the sediments are transported in street runoff and gutter systems before being discharged into the UTR and in some cases Lake Tahoe. Some volcanic derived road abrasive materials may be ground up by vehicle tire and chains into "dispersive clays" and become colloidal in fresh water and never settle out of water column.

Another significant source of fine sediments results from streambank erosion along portions of the UTR. A survey of bank erosion sediment sources conducted in 1995 found that the bulk volume of bank erosion was approximately 10% of the sediment load runoff that had occurred in the spring of 1995 (a greater than 10-year peak snowmelt flood) (TRCD 2003). However, the fine sediment constituents detached annually are likely sufficient to impact optical clarity to the lake. Much of the bank erosion occurs as a result of channel **incision** where the rooting depth of bank vegetation does not extend into the lower portion of the exposed banks. Without **incision**, bank depth is 2-3 feet above low water.

As noted above, stream flow in the UTR has been measured at two USGS stream gage stations since 1970s: one is located at Meyers, above ¼ mile downstream of the upper U.S. Hwy 50 crossing; the second is located just downstream of the lower Highway 50 crossing at a Pedestrian/Bicycle bridge. The stream flow regime consists of five distinct types depending upon the hydrology of the runoff source. Base flow, which occurs between precipitation events, is generated from the emergence of subsurface flow in the watershed and from surface water spilled from lakes in the watershed. Snowmelt runoff occurs seasonally in the spring and early summer months when the bulk of the runoff from the watershed occurs. Rain on snow events occur during winter months during periods of warm precipitation and El Nino periods, or late in the winter season and early spring. Thunderstorm events occur occasionally in the late summer months. Winter rainfall events occur late fall and/or early winter during the onset of early storms.

4.12.1.4 Land Capability Verification

TRPA has determined 7 land classes within their Land Capability system. These land classes indicate the development sensitivity of land within the Tahoe Basin. The land capability class is based on soil type, slope and environmental sensitivity including hydrology and vegetation types located in the area. The Land Capability for the project area has been verified by TRPA. The area along the river channel extending into the floodplain is Class 1b Stream Environment Zone (SEZ). The staging, parking and stockpiling areas are located in Land Capability Districts 1C, 3, and 5. Figure 4.12-29 shows the TRPA Land Capability map for the project area.

4.12.1.5 Regulatory Framework

Federal Regulations

The Clean Water Act (CWA) establishes the basic structure for regulating discharges of pollutants into the waters of the U.S. and gives the U.S. Environmental Protection Agency (EPA) the authority to implement pollution control programs such as setting wastewater standards for industries (EPA 2002). In certain states such as California, the EPA has delegated authority to state agencies.

Water quality of waters of the United States subjected to a discharge of dredged or fill material is regulated under Section 401 of the CWA. These actions must not violate federal or state water quality standards. Specifically in the State of California, the applicable Regional Water Quality Control Board (RWQCB) administers Section 401 and either issues or denies water quality certifications depending upon whether the proposed discharge or fill material complies with applicable State and Federal laws. In addition, policies and regulations governing the protection of the beneficial uses of the State's water resources must also be followed.

In addition to complying with state and federal water quality standards, all point sources that discharge into waters of the United States must obtain a NPDES permit under provisions of Section 402 of the CWA. In California, the State Water Resources

Control Board (SWRCB) and RWQCBs are responsible for the implementation of the NPDES permitting process at the state and regional levels, respectively.

The NPDES permit process also provides a regulatory mechanism for the control of non-point source pollution created by runoff from construction and industrial activities, and general and urban land use, including runoff from streets. Projects involving construction activities (e.g., clearing, grading, or excavation) involving land disturbance greater than one acre must file a NOI with the Lahontan RWQCB to indicate their intent to comply with the State General Permit for Stormwater Discharges Associated with Construction Activity (General Permit). The General Permit establishes conditions to minimize sediment and pollutant loadings and requires preparation and implementation of a Stormwater Pollution Prevention Plan (SWPPP) prior to construction. The SWPPP is intended to help identify the sources of sediment and other pollutants, and to establish Best Management Practices (BMPs) for stormwater and non-stormwater source control and pollutant control.

The CWA also requires that a permit be obtained from the EPA and the USACOE when discharge of dredged or fill material into wetlands and waters of the United States occurs. Section 404 of the CWA requires the EPA and USACOE to issue individual and general permits for these activities. General Permit 16 applies to Minimal Impact Activities in the Lake Tahoe Basin.

The federal Safe Drinking Water Act (SDWA) was established to protect the quality of drinking water in the United States. This law focuses on all waters actually or potentially designated for drinking use, whether from above ground or underground sources. The SDWA authorized the EPA to establish water quality standards and required all owners or operators of public water systems to comply with primary (health-related) standards. State governments, which assume this power from the EPA, also encourage attainment of secondary standards (nuisance-related). Contaminants of concern in a domestic water supply are those that either pose a health threat or in some way alter the aesthetic acceptability of the water. These types of contaminants are currently regulated by the EPA as primary and secondary maximum contaminant levels (MCLs). As directed by the SDWA amendments of 1986, the EPA has been expanding its list of primary MCLs. MCLs have been proposed or established for approximately 100 contaminants.

Tahoe Regional Planning Agency

The TRPA was established in 1969 by U.S. Congress as a bi-state agency (California and Nevada) to adopt threshold environmental quality standards and enforce ordinances created to support threshold standards. The TRPA adopted seven water quality thresholds to help to protect and maintain Tahoe basin water quality.

A Code of Ordinances was adopted as part of the 1987 Regional Plan for the Tahoe Basin. The Code regulates many things including land use and site development projects and includes threshold standards established for water quality, including

N

0 300 600
Feet

U.S. HWY. 50

PROJECT BOUNDARY

ACCESS ROAD
(HEAVY EQUIPMENT)

STAGING, STORAGE,
& STOCKPILE AREA

SOUTH LAKE TAHOE
MUNICIPAL AIRPORT

STAGING AND WATER
TREATMENT AREA

PROPOSED NEW CHANNEL ALIGNMENT

UPPER TRUCKEE RIVER

LOW WATER CROSSING

PROPOSED TEMPORARY
RAILCAR BRIDGE

HAUL ROAD (TYP.)

CONSTRUCTION TRAILER
AND PARKING

STAGING, STORAGE,
& STOCKPILE AREA

ACCESS ROAD
(SMALL EQUIPMENT)

BARBARA AVE.

PARCEL BOUNDARY (TYP.)

PRELIMINARY PLANS
NOT FOR CONSTRUCTION

Source: Entrix

W:\REPORTS\Upper Truckee River\Graphics\TRPA Verified Land Capability Fig 4.12-29.ai 01/04/08 JJT

CDM

Figure 4.12-29
TRPA Verified Land Capability

specific pollutant concentrations for surface runoff and waters infiltrated into soils. Tributaries to Lake Tahoe must attain and maintain the strictest applicable federal or state water quality standard.

TRPA has established Stream Environment Zones (SEZs) within the Tahoe Basin under authority granted to the agency in the CWA's 208 Plan. TRPA has developed and implemented an annual tracking system for SEZ restoration. The criteria for SEZ identification is outlined in the *TRPA Code of Ordinances* Section 37.3 Procedures for Establishing SEZ Boundaries and Setbacks. SEZs provide natural treatment and conveyance of runoff and are key habitat for riparian plans and wildlife. All of the area adjacent to the UTR is classified as SEZ.

The project proponent must obtain a permit from TRPA prior to construction. The applicant will apply for an exemption from SEZ restrictions as outlined in Chapter 20 of the TRPA Code of Ordinances.

State Regulations

The Porter-Cologne Water Quality Control Act of 1970 established the SWRCB and nine RWQCBs within the State of California. These groups are the primary state agencies responsible for protecting California water quality to meet present and future beneficial uses and regulating appropriative surface rights allocations. The preparation and adoption of water quality control plans, or Basin Plans, and statewide plans, is the responsibility of the SWRCB. State law requires that Basin Plans conform to the policies set forth in the California Water Code beginning with Section 13000 and any State policy for water quality control. These plans are required by the California Water Code (Section 13240) and supported by the Federal CWA. Section 303 of the CWA requires states to adopt water quality standards which "*consist of the designated uses of the navigable waters involved and the water quality criteria for such waters based upon such uses.*" According to Section 13050 of the California Water Code, Basin Plans consist of a designation or establishment for the waters within a specified area of beneficial uses to be protected and water quality objectives to protect those uses. Adherence to Basin Plan water quality objectives protects continued beneficial uses of waterbodies.

Because beneficial uses, together with their corresponding water quality objectives, can be defined per Federal regulations as water quality standards, the Basin Plans are regulatory references for meeting the State and Federal requirements for water quality control (40 CFR 131.20).

One significant difference between the State and Federal programs is that California's Basin Plans establish standards for groundwater in addition to surface water. The Basin Plans include provisions to prevent **degradation** and require clean up of groundwater quality problems. These provisions address local problems such as underground storage tanks and associated issues. Basin Plans also address groundwater **degradation** due to elevated nitrate and salt concentrations caused by

leaching from nearby urban developments, agricultural fields, confined animal feeding operations, and municipal sources.

Basin Plans are adopted and amended by regional water boards under a structured process involving full public participation and State environmental review. Basin Plans and amendments thereto, do not become effective until approved by the SWRCB and regulatory provisions must be approved by the Office of Administrative Law (OAL). Adoption or revision of surface water standards is subject to the approval of the EPA. It is the intent of the SWRCB and the RWQCBs to maintain Basin Plans in an updated and readily available edition that reflects the current water quality control program. This is accomplished by reviewing water quality standards for each Basin Plan every three years.

The Lahontan RWQCB Water Quality Control Plan for the North and South Lahontan Basins regulates waters of the state located within the study area. The Lahontan RWQCB Basin Plan covers a region approximately 570 miles long with a total area of 33,131 square miles east of the crest of the Sierra Nevada and Warner Mountains. The study area falls within the North Lahontan Basin that extends from the southern boundary of the East Walker River watershed north to the Oregon border. The current Basin Plan took effect in 1995 and reflects multiple amendments adopted since the plan was completed (Lahontan RWQCB 1995). The Lahontan Basin Plan includes specific water quality objectives for the Upper Truckee River and the Lake Tahoe basin which must be adhered to during construction and after the project is completed.

A State of California General Permit for Discharges of Stormwater runoff Associated with Construction Activity will be required prior to any ground disturbance. A SWPPP will be submitted to the Lahontan for review and approval. An erosion control, BMP plan, and dewatering plan will be included within this document. The contractor will be required to implement the BMPs and erosion control plan described in the approved SWPPP. These measures may include but would not be limited to: revegetation, silt fences, waddles, water filled berms, mulching of unstabilized areas, settling basins, pumps for dewatering, gravel sand bags, stormwater drainage system and construction fencing. The SWPPP will also present a detailed water quality monitoring plan which describes the locations and protocols for water quality testing (including sampling methods and equipment, sampling frequency, and testing methods) and data analysis methods (including statistical testing). The SWPPP will also provide protocols for corrective action implementation (if required)

Local Regulations

The El Dorado County General Plan establishes a county-wide water resources program to conserve, enhance, manage, and protect water resources and their quality from **degradation**. These objectives consist of the following: ensuring an adequate quantity and quality of water is available; protection of critical watersheds, riparian zones, and aquifers; improvement and subsequent maintenance of the quality of both surface water and groundwater; wetland area protection; utilization of natural

drainage patterns; and encouraging water conservation practices including re-use programs for applicable areas such as agricultural fields (El Dorado County 2004).

The City of South Lake Tahoe General Plan establishes in its Goals, Objectives and Action Plans for the Land Use, Housing and Conservation Elements establishes policies that seek to improve water quality conditions in Lake Tahoe and in rivers, streams and other water bodies within the City's sphere of influence. These policies include guidance on identifying land suitability for supporting new development, supporting TRPA programs, and implementing forest management practices that support water quality protection and wildlife habitat enhancement (City of South Lake Tahoe, 1999).

4.12.2 Significance Criteria and Assumptions

4.12.2.1 CEQA

The CEQA checklist identifies hydrologic and water quality impacts for the project as those that would:

- Violate any water quality standards or waste discharge requirements;
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level;
- Substantially alter the existing drainage pattern in a manner which would result in substantial erosion or siltation, and/or flooding on- or off-site.
- Create or contribute runoff water which would exceed the capacity of existing or planned stormwater systems or provide substantial additional sources of polluted runoff;
- Expose people or structures to a significant risk of loss, injury or death involving flooding, including as a result of the failure of a levee or dam; or,
- Increase risk of inundation by seiche, tsunami, or mudflow.

4.12.2.2 TRPA

The thresholds of significance for the project were developed using guidelines from the TRPA established in the TRPA Initial Environmental Checklist. For the proposed project, a hydrologic or water quality impact would occur if:

- Currents or the course or direction of water movements are changed.
- Absorption rates, drainage patterns, or the rate and amount of surface water runoff are altered so that runoff from a 20 year, 1 hour storm could not be contained.

- The course or flow of 100-year flood waters are altered;
- Any substances are discharged into surface waters or any surface water quality characteristics are altered;
- There is a potential that contaminants could be discharged into groundwater or that groundwater quality could be altered.

In August 1982, TRPA adopted resolution No 82-11, adopting environmental threshold carrying capacities for the region. TRPA defines environmental thresholds as an environmental standard necessary to maintain the significant resources in the region. TRPA has established seven water quality thresholds as described below.

- Decrease sediment load as required to attain turbidity values not to exceed 3 Nephelometric Turbidity Units (NTU) in littoral Lake Tahoe. In addition, turbidity shall not exceed 1 NTU in shallow waters of Lake Tahoe not directly influenced by stream discharges.
- The average Secchi depth, December-March, shall not be less than 33.4 meters. California: Secchi disk transparency shall not be decreased below levels recorded in 1967-71 based on a comparison of seasonal and annual mean values.
- The annual mean phytoplankton primary productivity shall not exceed 52 gC/m2/yr. California: algal productivity shall not be increased beyond levels recorded in 1967- 1971, based on a statistical comparison of seasonal and annual mean values.
- The phosphorus (0.010-0.030 mg/l), and total iron (0.015-0.03 mg/l), (annual average.). Nevada: Lake Tahoe standards for soluble phosphorus not to exceed 0.007 mg/l (annual average.); soluble inorganic nitrogen not to exceed 0.025 mg/l (annual average.). TRPA: attain a 90th percentile value for suspended sediment of 60 mg/l.
- TRPA threshold--discharges to surface water (90th percentile):
    - Dissolved inorganic nitrogen: 0.5 mg/l
    - Dissolved phosphorus: 0.1 mg/l
    - Dissolved iron: 0.5 mg/l
    - Grease and oil: 2.0 mg/l
    - Suspended sediment: 250 mg/l
    - 1981 208 Plan/SWRCB Water Quality Control Plan--discharges to surface water:
    - Total nitrogen as N. 0.5 mg/l
    - Total phosphate as P: 0.1 mg/l
    - Total iron: 0.5 mg/l

- Turbidity: 20 NTU
- Grease and oil: 2.0 mg/l

- Surface water infiltration into the groundwater shall comply with the Uniform Regional Runoff Guidelines, below. Where there is a direct and immediate hydraulic connection between ground and surface waters, discharges to groundwater shall meet the guidelines for surface discharges--see WQ-5, Uniform Regional Guidelines for discharges to groundwater:

  - Total nitrogen as N: 5 mg/l
  - Total phosphate as P: 1 mg/l
  - Total iron: 4 mg/
  - Turbidity: 200 NTU
  - Grease/Oil: 40 mg/l

4.12.2.3 Assumptions

The analysis of potential hydrology and water quality effects generated by the UTR Restoration Project, Reaches 2, 3 and 4 was completed under the assumption that conditions in the project area are contributing to the degraded condition of the UTR and Lake Tahoe as a result of the historical changes in land use within the project area and the larger UTR watershed that began approximately 150 years ago. The UTR is currently listed as impaired for iron and phosphorus and Lake Tahoe is listed for sediment under Section 303(d) of the Clean Water Act. The analysis presented in this section assumes that this impaired condition in the project area, the UTR watershed and to an extent Lake Tahoe will persist into the future absent any restoration activities on the UTR and could potentially worsen over time.

4.12.3 Methodology

The evaluation of potential project related hydrology and water quality impacts generated by the No Action/No Project Alternative and Alternative 2 focused on both short term construction related effects as well as potential long term effects after alternative implementation.

4.12.3.1 Short Term Impact Evaluation

Short term construction related impact evaluation focused on the proposed construction schedule and the planned implementation of BMPs that would ensure discharge from the project site during construction that would not exceed reporting limits.

4.12.3.2 Long Term Impact Evaluation

Long term project related impacts were evaluated using the results of HEC-RAS modeling of the alternatives completed in 2005 as a part of the FAM for the UTR Restoration Project (City 2006a). To support the design of channel bed slope, channel length and **sinuosity**, and channel depth for each alternative UTR bedload rates

within the project area were measured during sampling efforts completed in 1995, 2002, and 2003. The observed bedload rates collected during these three sampling efforts exhibited a level of variability that necessitated the modeling of bedload rates. Results from the modeling effort fell within the range of observed values measured in 1995 and 2003 and were used to develop project alternatives.

The HEC-RAS modeling completed in 2005 for the FAM used the surface-based transport equation for mixed sized sediment in the development of project alternatives. This modeling effort produced out-of-bank shear stress estimates for the project alternatives in a 1,600 cfs event that were presented in the Appendix B of the 2006 AEM (City 2006b). Shear stress represents the force exerted on particles in the channel bed and is presented in pounds per square foot. Lower shear stress values are representative of a lower likelihood of the initiation of particle movement in the channel bed. This long term impact evaluation is relying on the varying shear stress values for the No Action/No Project Alternative and Alternative 2 to indicate the potential for long term sediment erosion and transport effects.

4.12.4 Environmental Consequences/Environmental Impacts of the No Action/No Project Alternative

The No Action/No Project Alternative is the future condition without the project. Under this alternative, no stream restoration work would be performed in the study area, however there could be projects upstream implemented or constructed in the future.

Under the No Action/No Project Alternative, it is assumed that the hydrology and water quality in the project area will be similar to the existing conditions described in Section 4.12.1 or potentially degrade as the existing incised streambank conditions continue to worsen. The existing conditions within the project area include the heightening and over-steepening of the UTR banks beyond a critical height for bank stability, and a lowering seasonal groundwater table. This change in bank morphology in conjunction with toe scour and undercutting causes gravitational forces to exceed the bank's shear strength, increasing the risk for the mass failure of bank material and the corresponding affect on water quality. The lowering seasonal groundwater table is resulting from the deepening and widening of the river bed. The deeper and wider river channel has a larger carrying capacity and the occurrence of groundwater percolation in the floodplain from river flow events that overtop the existing river banks become less frequent because larger flows are required to overtop the banks. The lowered groundwater table creates drier meadow conditions and encourages establishment of upland plant community into the meadows in and around the project area.

Additional river restoration projects implemented in the future that would occur outside of the project area could reduce channel erosion and the related sediment contributions to the UTR. This would be potentially beneficial. Known past, present, and reasonably foreseeable future projects with the potential to affect hydrology and

water quality on the UTR are described in Section 4.1 and are evaluated in the Cumulative Impacts Section 4.12.5.

The majority of the land included in the study area is publicly owned by the City and some properties are currently used for cattle grazing under a long term lease agreement. A small parcel of land is owned by the California Tahoe Conservancy as well. Areas in and around the Airport property is restricted. The City has no plans to change this current land use and is limited from increasing development intensity in the study area because of the proximity to the Airport and the flight path that crosses much of the Airport Reach. The remaining future projects would not occur in the Airport Reach and would therefore be unlikely to affect the hydrology and water quality within the project area.

The No Action/No Project Alternative would be consistent with the TRPA standards that govern land use in the region since no restoration construction would occur at the site and no hydrology and water quality impacts would occur from restoration activities. The No Action/No Project Alternative would not result in any restoration construction activities and would not generate any short term hydrologic or water quality impacts.

The No Action/No Project Alternative would have a less-than-significant impact on hydrology and water quality. However, the No Action/No Project Alternative would not benefit water quality through restoration efforts either.

Although the impact associated with the No Action Alternative would exceed the significance threshold presented in Section 4.12.2.2, it is not necessary or appropriate to formulate mitigation measure(s) and ascribe mitigation responsibility for that impact. In accordance with the intent and requirements of CEQA (Guidelines Section 15126.6), delineating the nature and significance of impacts associated with the No Action Alternative serves to provide a basis for comparing the impacts of approving the proposed project with the impacts of not approving the proposed project. In particular, the evaluation of alternatives, including the "no project" alternative, serves to determine whether the significant impacts of the proposed project can be avoided or substantially lessened. The analysis presented above for the No Action Alternative determined that the unstable soil conditions and the modified channel would be significant for reasons not attributable to the proposed project, which provides information to be considered by decision-makers in evaluating the impacts that are attributable to the project.

4.12.5 Environmental Consequences/Environmental Impacts of Alternative 2 – New Channel East of the Airport (Recommended Alternative)

4.12.5.1 Short Term Impact Evaluation

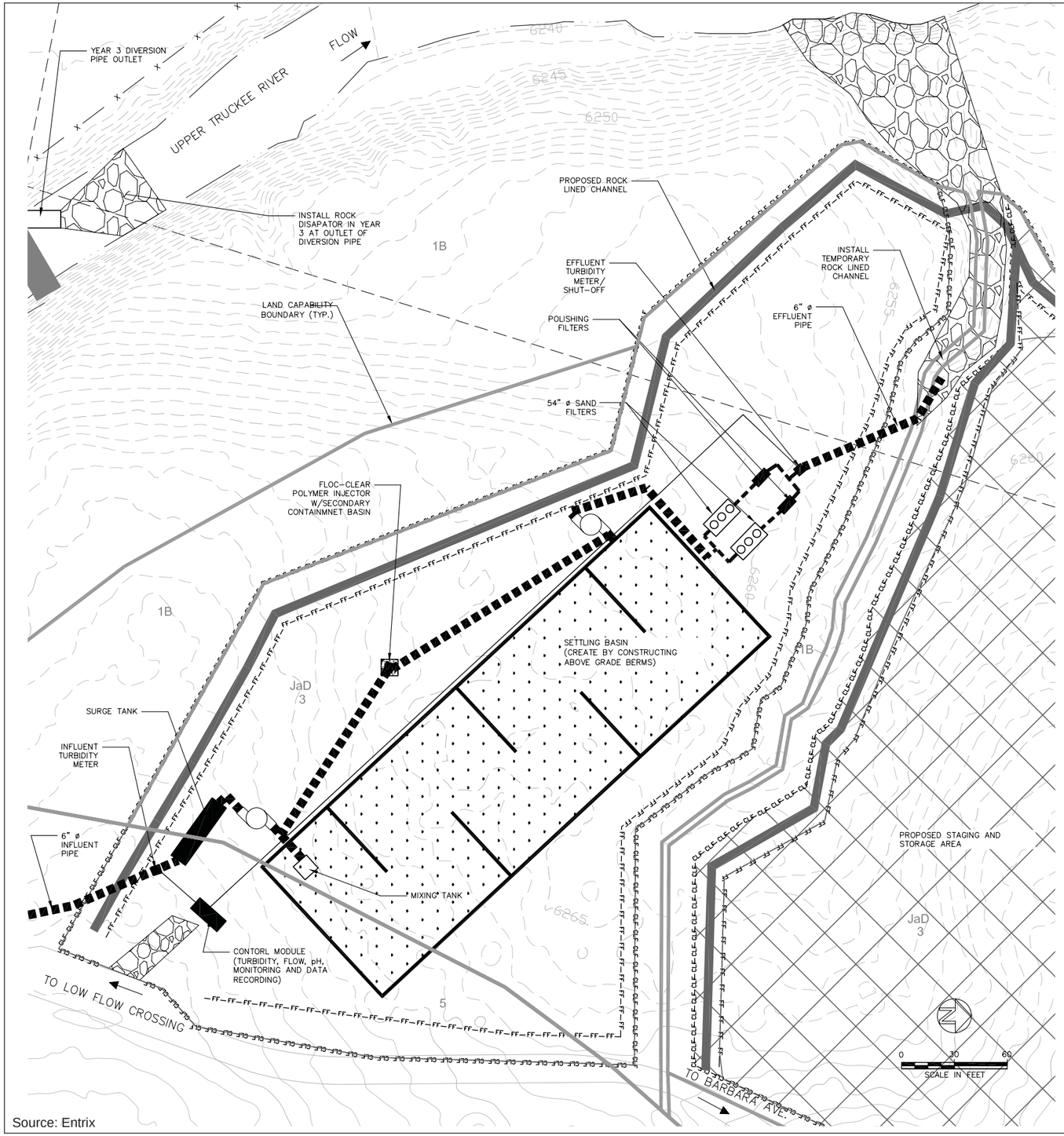
Construction of the new river channel east of the Airport would be completed over a three year period with active construction only conducted during the summer and fall

months of July through mid-October. Each year, construction would commence only after soil within the project area was no longer saturated with spring runoff. The preliminary dewatering plan is described for each year of construction below. Figures 4.12-30 and 4.12-31 show the proposed dewatering area and the plan for each construction year. Winterization of the project site would be completed each year prior to October 15th and is described in Section 4.12.7. The construction plan is described in Section 3.3.6 and is further described below with a focus on the construction activities that are designed to ensure discharge less than reporting limits from the project area during construction.

Year 1

Construction activities during the first year include: project mobilization, initial site preparation work, and construction of the new river alignment. The site mobilization work would include development of the access road to connect the new river alignment project area to the stockpile locations north of the construction area. A railcar crossing/bridge would be constructed to transport materials across the river to prevent interaction with the channel. The bridge would be designed with BMPs to prevent sediment discharges to the UTR. Clean gravel would be placed at the bridge approaches. A silt fence that would be placed along the east and west river banks would be tied into the railcar crossing abutments with a secondary silt fence running under the railcar crossing. Coir logs would be placed on paved surfaces under the railcar crossing. Silt curtains would be placed in the river as an additional protection along the channel from upstream to downstream of the low-water crossing. Access routes would be continuously cleaned with water trucks and brooms trucks. Silt fences and cut off channels connected to small settling basins would be placed along the sides of the access routes.

Construction of the new river alignment would be preceded by installation of an isolation berm along the western bank of the UTR for the full length of the project area. The purpose of this berm is to isolate the new river channel from the existing river (see the 75% plan sheets in Appendix B). The isolation berm would be constructed using multiple approximately 6′ x 16′ water filled bladders that would be connected and would provide sufficient elevation to protect the construction site from an estimated 1500 cfs river flow event (Figure 4.12-32). The western river bank silt fence would further supplement the isolation effect created by the water filled berm for the project area. This silt fence would be installed prior to placement of the water filled berm to prevent any construction disturbance related sediment discharge to the UTR. The water filled berm and silt fence would prevent river water from entering the new river alignment while it is being developed, and eliminate the potential for any discharge from the project area into the UTR during the three year construction period. Approximately 52,000 cubic yards of soil would be excavated from the floodplain and transported to the stockpile locations as part of construction of the new channel between the Airport fence and the river. The final phase of the first year of project construction involves revegetation along the new river alignment to minimize erosion from the disturbed soils, and winterization of the entire project site.



NOTES:

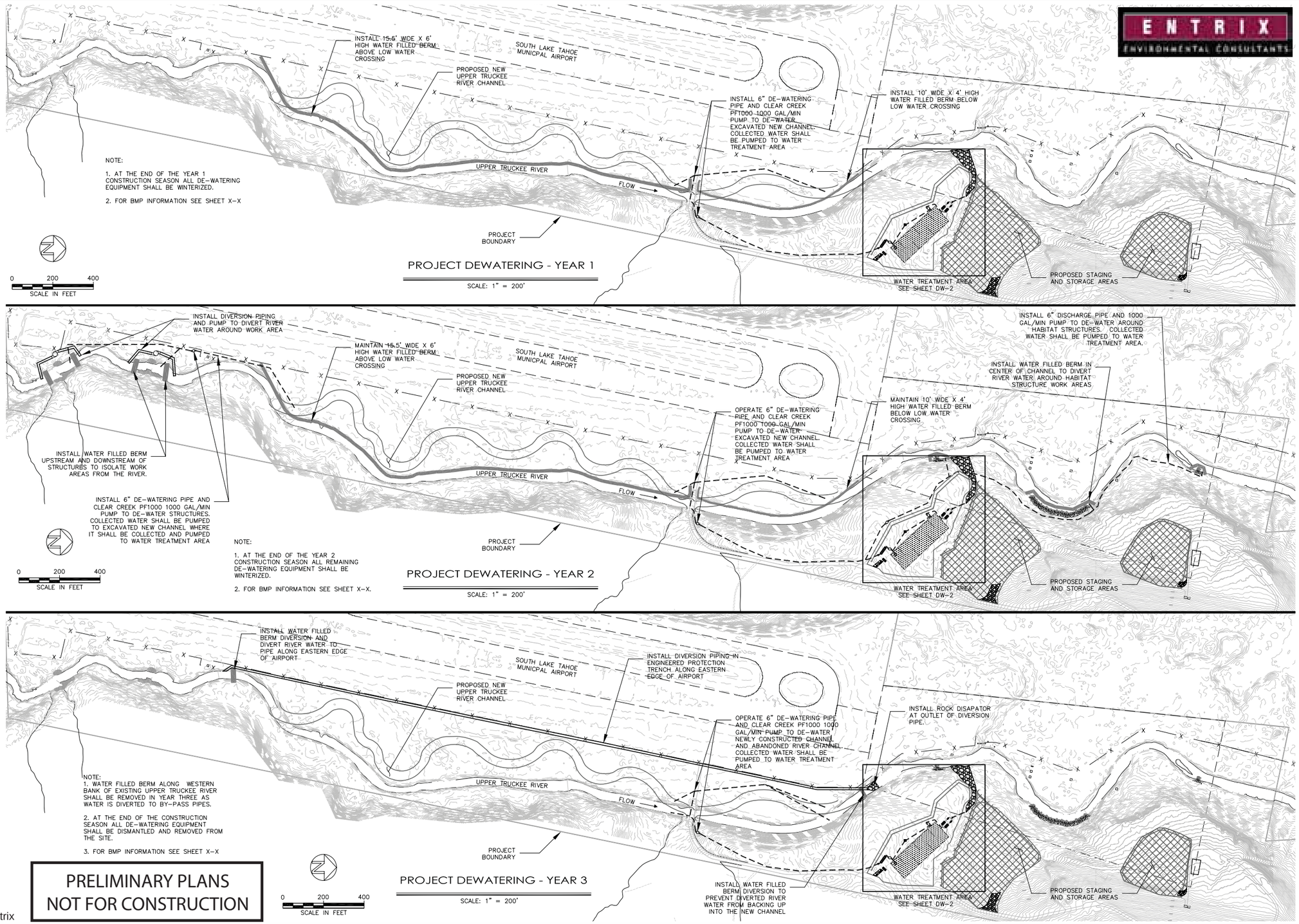
1) FOR EROSION CONTROL BMP INFORMATION SEE SHEET X-X
2) ALL PIPE TO BE PLACED ON GRADE

Source: Entrix

W:\REPORTS\Upper Truckee River\Graphics\Proposed Dewatering Area Fig 4.12-30.ai 01/07/08 JJT

CDM

Figure 4.12-30
Proposed Dewatering Area



PRELIMINARY PLANS
NOT FOR CONSTRUCTION

Source: Entrix

W:\REPORTS\Upper Truckee River\Graphics\Preliminary Dewatering Plan Construction Years 1 2 and 3 Fig 4.12-31.ai 01/07/08 JJT

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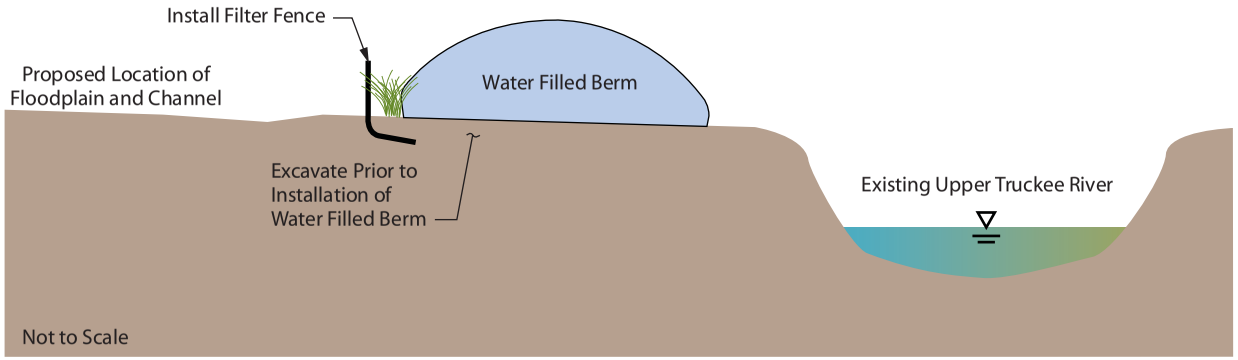
Figure 4.12-31
Preliminary Dewatering Plan Construction Years 1, 2 and 3



W:\REPORTS\Upper Truckee River\Graphics\Water Filled Berm Placement Fig 4.12-30.ai 11/12/07 JJT

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Figure 4.12-32
Water Filled Berm Placement

Dewatering

The first year of construction would include excavation of the new channel and floodplain. When ground water is encountered the water would be pumped to the settling basin, which would be part of the dewatering site. The dewatering site would be comprised of a settling basin or a series of Baker tanks, followed by a sand filter and finally a polishing filter prior to discharge. A bi-polymer, such as Floc-clear Chitosan, would be injected into the influent water, as needed, prior to entering the settling basin. Depending on the NTU level in the settling basin a small dose of bi-polymer would be injected prior to the sand filter. Following the polishing filter the water would either be re-introduced downstream of the project site or piped back to the project site and used for irrigation, or dust control. See Figure 4.12-31.

Year 2

During the second year of construction, establishment of vegetation and riverbed seasoning would continue along the new river alignment. The site would be monitored to determine if BMPs are properly installed, or if other problems have developed. Problem areas would be identified and maintenance issues addressed. An irrigation system would be installed in the flood plain early on, to promote vegetation establishment. All BMPs would remain in place and would be inspected on a monthly basis to ensure that discharges from the site are less than reporting limits. This work would prepare the site for water flows when the UTR is diverted into the new alignment in the third year, and help prevent erosion impacts.

The second year would also include construction of root wad and log habitat structures at several sites downstream of the new river alignment in Reach 2 of the UTR. Construction of these structures would help reduce water quality impacts by stabilizing currently eroding slopes by reducing the potential for failure of unconsolidated bank sediments and revegetation of exposed bank sediments. Additional bank stabilization efforts would also be undertaken upstream of the new river alignment. Eroding banks in the vicinity of two old river crossings would be repaired to reduce water quality impacts. Construction of these sites would be accomplished by isolating the area, bypassing the base flow, completing the improvements, and then flushing the areas. In late September, wetting flows would be sent down the new river channels, habitat structures, and bank stabilization areas to prepare them to carry actual UTR flows. A water treatment system consisting settling tanks, and filters would be onsite to treat water as needed. At the downstream terminus of the new alignment all water would be captured and treated prior to diversion back into the existing UTR to meet discharge standards.

Dewatering

In year two there would be two separate bank stabilization operations and three fish habitat structures constructed. The bank stabilizations would be constructed upstream of the new channel alignment. Each of these sites would be isolated both upstream and downstream by water filled berms with the main flow of the river

pumped around the work areas. Water that infiltrates into the isolated project site would be pumped into the new channel alignment downstream and allowed to flow the length of the channel for infiltration. At the end of the new channel alignment remaining water would be pumped to the dewatering site and go through the settling and filtration systems as describe above. Following completion of the first bank stabilization the same procedure would be used on the second bank stabilization.

The three fish habitat structures located downstream of the new channel alignment would be dewatered by laying a water filled berm along the existing channel bed to isolate the work area. The main flow would be slightly confined but will remain in the existing channel alignment. While the work is being completed the water that infiltrates into the work area would be pumped to the dewatering site and go through the settling and filtration systems as describe above. Each fish habitat structure would be completed one after another. See Figure 4.12-31.

Year 3

The final construction year focuses on the establishment of river flow in the new river alignment. The irrigation system in the revegetated area would be reestablished and revegetation inspections would be completed to evaluate percent coverage and growth. The site would be monitored again to determine if BMPs are in need of maintenance or if other problems have developed. Problem areas would be identified and maintenance issues addressed. In order to construct the connections between the new river alignment and the existing river alignment, water filled bladders would be placed in the existing river bed after spring runoff flows recede. These bladders or berms would temporarily divert the river baseflow into a lined trench or pipe that would be constructed along the eastern boundary of the Airport. The channel would extend just upstream and downstream of the project area. During the time that the river flow is diverted, the two zones where the new river alignment and existing alignment converge would be armored with rock and large wood elements to prevent erosion impacts when river flows are no longer diverted around the project area. Clean washed gravel would be added to the new river channel to minimize erosion when river flow is diverted into the new alignment. The existing river channel would be backfilled to match the grade of the Sunset Stables reach of the UTR and an embankment would be built downstream of the access road crossing. The bladders diverting water to the lined trench or pipe would be removed during a low flows in the river, and river flows would be diverted into the new alignment.

Water quality sampling and testing would be performed to determine if there is elevated turbidity. The water quality monitoring would consist of sampling and testing of river water upstream and downstream ends of the new river channel. The sampling would be performed using automated turbidity meters temporarily installed within the low flow channel. Turbidity measurements would be made at 15-minute intervals. The digital readings would be downloaded daily and converted to spreadsheet format. The data would be analyzed to determine if statistically significant increases in downstream turbidity readings are indicated by the testing results. When the new river channel demonstrates no water quality impacts, the lined

trench would be removed and replaced with boulders for Airport flood protection. Construction would conclude with the revegetation of the old river channel that was backfilled earlier during year 3.

Dewatering

Year three would entail moving the Upper Truckee River into the new channel alignment. To do this the river would be diverted upstream of the new channel alignment with a water filled berm around the project area in two 36-inch diameter pipes. These pipes would run along the west side of the project area next to the existing airport fence. The flow would be placed back in the existing channel downstream of the project area. During this time the connections between the new channel and old channel alignments would be constructed with rock, gravel, willows and transplanted sod. In addition to constructing the connections the old channel alignment would be backfilled with the excavated material. Following the construction of the connections and backfilling of the old channel, the diversion would be removed and the UTR would flow in the new channel alignment. See Figure 4.12-31.

Impacts
The construction plan for the New Channel East of the Airport Alternative (Alternative 2) has been designed to include numerous construction controls that would result in discharge that would be less than Lahontan Basin Plan reporting levels from the project area and ensure that the alternative would have a less-than-significant short term impact on water quality.

4.12.5.2 Long Term Impact Evaluation

The potential for long term water quality impacts was evaluated using the results of HEC-RAS modeling efforts completed in 2005 as a part of project alternative development and in support of the 2006 AEM. The HEC-RAS model produced estimates of average out of bank shear stress for 1,600 cfs river flow events that are presented in Table 4.12-7. The lower shear stress levels during a 1,600 cfs river flow event on the UTR in comparison to existing conditions and future conditions as described in the No Action/No Project Alternative. The shear stress values indicate a lower likelihood of floodplain erosion during out of bank river flow events because of lower stress levels on particles in the floodplain.

Table 4.12-7
Average out-of-bank shear stress for the 1,600 cfs event (lbs/sq ft)

Existing Conditions	*Alternative 2*
0.10	0.04

Source: City 2006 – *Alternatives Evaluation Memorandum*

The new UTR alignment is designed to overtop its banks and inundate the new floodplain on a more regular basis. Flows that exit the river banks are expected every 1.5 years and flows that inundate the floodplain are expected to occur every two years. The length of bank overtopped along the new river alignment is predicted to be 3,818 feet or 45 percent of the total 7,968 foot channel. These two year stream flow events would inundate an estimated 17.3 acres of the new floodplain area. This increased frequency of floodplain inundation, lower flow velocities and much lower out-of-bank shear stress would minimize the potential for bank erosion during high flow events and increase the opportunity for sediment deposition during storm events and potentially improve water quality in the UTR.

The new UTR alignment within the project area is being designed to overtop its banks and inundate the new floodplain on a more regular basis within the confines of the new floodplain. The wider floodplain would allow the river to convey large storm event flows at a lower velocity and allow for sediment deposition in the new floodplain and river channel. Any potential reduction in river channel size resulting from this sediment deposition would be offset by the added capacity of the new floodplain area whenever flow in the river channel exceeds its banks. This added floodplain capacity would prevent any increase and could potentially improve effective flood elevation for the UTR in the project area. Engineered flood control protection would be developed along the project areas boundary with the airport to prevent bank erosion and potential impacts to the airport. Therefore, the project would not expose people or structures to significant risk of loss, injury or death involving a flood.

The increase in river bank overtopping and floodplain inundation regularity allow for shallow groundwater table percolation in the floodplain and would not contribute to the lowering shallow groundwater levels in the meadows observed in and around the project area.

Impacts

The New Channel East of the Airport Alternative (Alternative 2) would have a less-than-significant long term impact on hydrology and water quality and would likely be a benefit to area hydrology and water quality. Alternative 2 would change the erosion and deposition potential of the river (TRPA IEC Question 1f). The alternative proposes to restore the natural floodplain and create a shallow channel that would overflow its banks more frequently. Increased overbanking frequency would cause increased sediment deposition on the floodplain thereby reducing sediment transport to Lake Tahoe. These changes would restore the natural processes of the river and would reduce sedimentation. Alternative 2 would have a less-than-significant impact associated with TRPA goals and soil standards.

4.12.6 Cumulative Impacts

Cumulative projects that may impact the project are discussed in Section 4.1. The cumulative projects potentially affect hydrology or water quality in the area if they result in increases in runoff volume or pollutant loadings that would enter the study area.

Many of the cumulative projects involve construction activities that could increase the potential for sediment loads in the UTR. When considered in conjunction with the proposed project, a cumulative impact could potentially occur if the UTR Restoration Project was unable to achieve discharge below reporting requirements from the project site during construction. The project design features described in the short term impact analysis for Alternative 2 have been structured to make sure that this discharge goal is achieved. The project discharge plan, in addition to the requirement that all the cumulative projects, including the proposed project, would implement erosion and runoff measures required by the TRPA, Lahontan, California DFG, and the NPDES permit and SWPPP, support the expectation that the implementation of these measures would result in a less than cumulatively considerable impact associated with hydrology and water quality. It is assumed that the BMPs designed for the 50 year water flow event proposed for the UTR Restoration Project would be similar to precautions required for all of the cumulative projects and that the discharge level below reporting requirements from the project area planned for the UTR Restoration Project would apply to all of the cumulative projects. These BMPs for all of the cumulative projects would make sure that projects have a less than significant short term cumulative impact on water quality.

The cumulative projects that involve river restoration upstream of the study area (Sunset Stables Reach, and Golf Course River Restoration) could have long-term cumulative benefits because they would stabilize the stream banks and restore the river to its previous natural function. It is assumed that these projects, which are still in the planning stages, will be subject to similar water quality requirements and will, as a result, utilize many of the same BMPs to prevent discharge to the river in a 50-year storm event, and erosion and sediment control during construction. These measures and the project's overarching goal to improve river conditions by restoring natural fluvial processes and hydraulic conditions should improve existing conditions which adversely affect water quality (e.g., channel instability, bank failure, reduced overbank flow, and reduced flood plain inundation). This return to more natural fluvial processes would improve water quality conditions by reducing erosion and sediment transport. Increased overbanking frequency should cause increased sediment deposition on the floodplain thereby reducing sediment transport to Lake Tahoe. When considered together, these projects, including the proposed project, could reduce the potential for bank failure and sediment loading to Lake Tahoe. This would be a cumulatively beneficial effect.

The timing of construction of the various projects proposed along the UTR is to be considered when analyzing the cumulative impacts associated with the Airport Reach project. It is infeasible to determine what the overall effects to the Upper Truckee

River would be once all the various projects are under construction and after construction completion in a reasonable amount of time for the Airport Reach environmental document process and proposed construction schedules. Most of the other projects proposed along the UTR have not yet developed alternatives or determined the proposed project alternative. The California Tahoe Conservancy is currently in the early stages of studying the overall cumulative effects of all the proposed projects along the UTR and other projects that could affect UTR. Preparation of this report has begun but will not be completed until late 2008 or early 2009.

However, it can be determined that a construction start in 2008 for the Airport Reach project could have less risk of potentially significant cumulative effects to water quality than a construction start in 2009. A construction start in 2008 for the Airport Reach project would allow for plant/revegetation establishment for over 1 year and bank stabilization work prior to the start of the next scheduled project, the Sunset Stables project directly upstream of the Airport Reach. This is better than having two projects with open channels and no benefit of some plant establishment or bank stabilization along a larger stretch of the largest sediment contributor to Lake Tahoe during a major flood event. The next scheduled project would begin in 2010 directly upstream of the Sunset Stables project which would be the scheduled Year 3 of construction for the Airport Reach project. Again, by 2010, the Airport Reach project would have two years of plant establishment and additional bank stabilization along this portion of UTR which lessens the potential for a significant impact to water quality resulting from a major flood event in 2010 than if only one year of work along the Airport Reach was completed.

4.12.7 Environmental Commitments and Mitigation Measures

The hydrology and water quality environmental commitments and mitigation measures developed for the UTR Restoration Project, Airport Reach described in this section were developed during project design and are described in Sections 3.3.5 as components of the project. These components were identified to reduce potential hydrologic and water impacts and some have been included in the project description already. The environmental commitments and mitigation measures have been developed to work within the guidance of applicable regulatory requirements to reduce potential hydrologic and water quality impacts to a less than significant level. The measures are listed below:

- Earthwork shall be confined to areas of construction activities according to the construction phasing plan and Figure 3-3. This information will be included in the contractor specifications. Filter fencing will be installed around all of the stockpile locations and equipment storage areas.

- An internal drainage system shall be constructed and maintained within the project site during all construction activities to contain any runoff within the project boundary and prevent it from exiting the site. Localized pumping will be used to hydraulically contain turbid groundwater or standing water as a result of

excavation of saturated soil. The turbid water will be treated at an upland area at the project site in a temporary settling basin to levels below TRPA and Lahontan thresholds prior to discharge as described in Section 4.12.5.1. Once water has had time to settle, clean water will be released into a the UTR downstream of RS 8900.

- Stockpiled and transported material will be covered to control stormwater runoff.

- Construction vehicles will be serviced in specific upland areas or stabilized areas to prevent accidental spills of fluids, oils and lubricants into surface water. This area will consist of a clean gravel pad with an impervious liner underneath.

- Construction equipment shall be cleaned to remove any loose dirt or sediment prior to exiting the site. Washing will take place in an area stabilized with crushed stone and drain to an approved sediment trap or basin.

- The excess fill disposal locations will be regraded to the natural contours of the surrounding area and revegetated with native upland species.

- All spills shall be reported to Lahontan and procedures and response protocols for immediate cleanup outlined in the SWPPP shall be implemented. These procedures shall include placement of sandbags, gravel, boards or other TRPA approved methods to prevent spilled material from entering any drainage facilities or areas.

- Construct temporary 4 to 6 foot high water filled berms in Year 1 to isolate the construction site, and protect the river from spring runoff prior to implementation of the new channel. These water filled berms will be placed at the two tie in ends between the old and new channel and run the entire length of the existing channel from the two tie in points. The water filled berm will be wrapped around the low-water crossing at both sides to allow for access across the low-water crossing during construction. Filter fencing will also be constructed between the excavation area and the water filled berm for extra protection.

- A railcar crossing/bridge will be constructed to transport materials across the river to prevent interaction with the channel. The bridge will be designed with BMPs to prevent sediment discharges to the UTR. Clean gravel will be placed at the bridge approaches. A silt fence that will be placed along the east and west river banks will be tied into the railcar crossing abutments with a secondary silt fence running under the railcar crossing. Coir logs will be placed on paved surfaces under the railcar crossing. Silt curtains will be placed in the river as an additional protection along the channel from upstream to downstream of the low-water crossing. Access routes will be continuously cleaned with water trucks and brooms trucks. Silt fences and cut off channel connected to small settling basins would be placed along the sides of the access routes.

- In channel work sites will be isolated both upstream and downstream by water filled berms with the main flow of the river pumped around the work areas.

Water that infiltrates into the isolated project site will be pumped into the new channel alignment downstream and allowed to flow the length of the channel for infiltration. At the end of the new channel alignment remaining water will be pumped to the dewatering site and go through the settling and filtration systems as describe above. Following completion of the first bank stabilization the same procedure will be used on the second bank stabilization.

The three fish habitat structures located downstream of the new channel alignment will be dewatered by laying a water filled berm along the existing channel bed to isolate the work area. The main flow will be slightly confined but will remain in the existing channel alignment. While the work is being completed the water that infiltrates into the work area will be pumped to the dewatering site and go through the settling and filtration systems as describe above. Each fish habitat structure will be completed one after another.

- The project site will be winterized according to TRPA and Lahontan RWQCB requirements at the end of each construction season. These measures will include: wrapping water filled berm to secure all isolated areas for winter and spring flows around the length of the western approach to the low-water crossing and a small portion along the existing airport fence, wrap water filled berm around the downstream end of the new channel and along a portion of the airport fence, winterize temporary irrigation system installed for plant establishment. Other proposed winterization measures are listed below.

- Maintain all temporary erosion control including filter fencing and coir logs.

  - Stabilize all disturbed areas with a heavy mulch.

  - Clean up and remove all construction site waste including trash, debris and spoil piles.

  - Cover all soil stockpiles with a natural fiber blanket and secure stockpile locations with filter fencing.

- Prior to diversion of UTR flows into the new river alignment, the new river channel will be wetted in September of the second construction year, and potentially in the third construction year as well, to prepare the river channel. These wetting flows will either be allowed to infiltrate or be pumped from the downstream end of the new river alignment and treated to ensure compliance with discharge standards prior to their diversion back into to the UTR. This is described in the dewatering discussions in Section 4.12.5.1. During the third construction year clean washed gravel will be placed in the new river channel before the UTR is diverted into the new alignment.

- Implement the dewatering plan for each construction year as described in Section 4.12.5.1.

- During Year 3, the locations where the new alignment and the existing alignment converge will be graded and armored with a combination of rock and large wood elements. Willow stakes will be incorporated into these engineered areas. Propagated sod will be placed as needed on top of the armored banks.

- Revegetate all disturbed areas and old channel with native riparian or upland vegetation where applicable. Salvaged sod, willows and other riparian vegetation will be propagated and used where possible. Additional seed or vegetation will be added where needed for stabilization measures.

4.13 Land Use

This section analyzes the effects of the No Action/No Project Alternative and Alternative 2 to existing land uses within the project area and surrounding uses.

The information included in this Land Use section is based on site visits to the study area and Land Use information downloaded from the TRPA FTP site. The *Final Report Upper Truckee River Reclamation Project, Environmental Assessment, Feasibility Report and Conceptual Plans* by the TRCD, January 2003; the *Upper Truckee River Middle Reaches 3 and 4 Restoration Project Existing Conditions Memorandum*, CDM, 2005; and other documents referenced in this study were used to prepare this analysis. TRPA Plan Area Statements (PASs) were also reviewed for Land Use information.

4.13.1 Existing Conditions

The project area is located within Plan Areas 095-Trout/Cold Creek, 100-Truckee Marsh and 116-Airport. The individual PASs are included in Appendix H. Figure 4.13-1 shows the land uses within the surrounding area. Below are descriptions of the various land uses within and surrounding the project area. The project area is entirely within land owned by the City.

4.13.1.1 Airport Property

The Lake Tahoe Airport is within the project area and adjacent to the UTR. The Airport was constructed in 1958 and expanded in the 1960's. During the Airport expansion, the UTR channel was straightened and moved and portions of the floodplain were filled to make room for the lengthened runway. The Airport recently converted from a C3 rating to a B3 rating which allows small planes and jets to land at the Airport. No formal commercial service is currently operating at the Airport beyond a helicopter tour operation since 2000. Airport facilities include the Terminal Building which houses the Airport Terminal, Airport and City offices, helicopter tour operator office, a full service Bar and Restaurant, Rental Car counter and the City Council Chambers. An adjacent maintenance facility houses various airport snow removal and other equipment. The airport has 53 hangars for airport tenants to store their aircraft. A Fixed Base Operator (FBO) is located in the newly renovated facility adjacent to the aircraft ramp. The FBO provides refueling and other services to transient aircraft. The FBO also operates three hangars to store aircraft. A large hangar has recently been converted to a City Fire Station. A squadron of the Civil Air Patrol is located on the airport and provides services to locate downed aircraft. A one way road enters the Airport property from Highway 50 and exits to the north onto Highway 50. A large parking area is located to the west of the Terminal Building.

4.13.1.2 Highway 50

Highway 50 is located approximately one-half mile west of the UTR and a portion of the Highway crosses the river via a bridge. Most of the highway is four lanes with the exception of the portion fronting along the Airport where it is only two lanes.

4.13.1.3 Residential

The project area does not contain any residential land uses. However, there are numerous residential developments to the west, east and north of the UTR corridor and project area. Local residents have been known to access the river via existing dirt trails that travel through public property, restricted Airport property and private property and along STPUD maintenance roads. These residential developments are primarily single family residences with some multi-family developments west and northwest of the Airport. The Sierra Tract subdivision is located approximately 1 mile northeast from the excavation area and less than ½ mile to the staging area. This area is a densely populated subdivision comprised of both single family and multi-family residences. The Golden Bear subdivision located approximately 1,600 feet from the excavation area is primarily single family residences. The Tahoe Paradise Washoan subdivision is located approximately 1,600 feet southeast of the excavation area and is comprised of single family residences. All of these subdivisions are located in upland area to the river corridor with forested areas providing buffer for the river from the residences. The Bonanza subdivision is located directly west of the north half of the Airport and includes single family and multi-family residences. The Evergreen Apartments on Melba, a multi-family housing development includes the closest housing cluster to the project area. The South "Y" area is located approximately 3,000 feet from the excavation area and is comprised of both single family and multi-family residences.

4.13.1.4 Sewer Lines

The STPUD operates the wastewater treatment facilities in the City and parts of El Dorado County. Sanitary sewer lines run between the Airport runway and the existing UTR Channel within the project area. On the west side of the river is a secondary sewer force main that is currently not in service. However, the STPUD wishes to maintain this line if needed in an emergency. A gravity line is also located on the west side of the river servicing the Meyers area. An STPUD export line is located on the east side of the river outside of proposed construction areas.

4.13.1.5 Grazing Land/Ledbetter Grazing Unit

Private land encompasses much of Reach 2. This land is existing meadow and is used primarily for cattle grazing. Most of the property is owned by Mosher and some is publicly owned with an easement attached to the property to allow for grazing. These areas have been continuously grazed on a seasonal basis for more than 100 years. Controls were implemented in 1997 to limit access for livestock to the historic river channel and overflow channel for watering during the grazing season. A grazing plan has been developed in accordance with Section 73 of the TRPA Code of Ordinances. Information contained in the grazing plan is proprietary to the parties involved. (TRCD 2003)

4.13.1.6 Open Space

Open space borders the study area to the east. The open space is primarily USFS lands. This property has the potential of being used for water quality improvement

US 50

Reach 1
Reach 2

Reach 2
Reach 3

Tahoe Airport

Reach 3
Reach 4

Upper Truckee River
River Reaches
Parcels
Project Area

Land Use

- Vacant (Private)
- Residential
- Tourist Accomodation
- Commercial
- Public Service
- Recreation
- Open Space

N

400 0 400 Feet

Source: Land use data obtained from TRPA FTP site, ftp://ftp.trpa.org

W:\REPORTS\Upper Truckee River\Graphics\Land Use Surrounding the Project Area Fig 4.13-1.ai 01/02/08 JJT

CDM

Figure 4.13-1
Land Uses Surrounding the Project Area

purposes and recreation uses. A project requiring construction on these lands will require a Special Use Permit from the USFS.

4.13.1.7 Tourist Accommodation

Tourist accommodation properties are located to the north and west of the UTR Airport Reach. The tourist accommodation properties consist of small to medium sized hotels, motels and lodges. These businesses are located approximately 1.5 miles from the project area on Highway 50.

4.13.1.8 Commercial

Commercial properties are located to the north and west of the UTR Airport Reach. The commercial properties consist of all mixes of retail, service and food establishments. These businesses are located approximately 1.5 miles from the project area along Highway 50.

4.13.1.9 Vacant Private Land

This land consists primarily of undeveloped residential and commercial properties located to the north, east and west of the UTR Airport Reach. Vacant private land also encompasses vacant lots located in the residential subdivisions and commercial areas. It is assumed that some of the vacant private land is not suitable for development according to TRPA standards. Some of the vacant land is assumed to be buildable according to TRPA requirements and may be developed in the future. We do not have enough information about all of the properties to prepare a more definitive description of buildable versus non buildable property. It is assumed that the allowable uses correspond with allowable uses based on TRPA land use types and PASs for each plan area.

4.13.1.10 Regulatory Framework

Land Use within and surrounding the project area is regulated by the TRPA, the City, and El Dorado County. All agencies use the TRPA PASs or Community Plans as guidelines for determining appropriate land uses and zoning within the Tahoe Basin. The City uses the PASs for their zoning restrictions in addition to their Zoning Ordinance. The PAS discusses land use classification, management strategy, permissible uses, planning considerations, density levels and other special policies for land use in a defined area. The project is located within three different PAS areas. All projects must comply with standards and guidelines established within the PAS. (Appendix H)

The City General Plan also provides guidelines surrounding land use issues. This document speaks to land use, circulation, housing, conservation, open space, noise and safety issues. The General Plan lists guidelines for development within the City limits to help to protect South Lake Tahoe's quality of life, scenic beauty, water quality and environmental resources. (City 1999) The City will issue a Design Review Permit for construction of the project based on compliance with the General Plan.

The City of South Lake Tahoe Airport Land Use Commission (ALUC) includes members from Planning Commission, when augmented with two Airport Commission members under provisions of article 3.5 of the California Public Utilities Code. This Article of the code mandates the establishment of ALUCs and details their various duties. The ALUC is required to establish planning boundaries around each public use airport within its jurisdiction and to formulate a comprehensive land use plan (CLUP) to provide for the sensible growth of the airport and the airport environs. The Lake Tahoe Airport CLUP provides guidelines for land use compatibility and is included as part of the general plan and land use regulations by cities and counties with jurisdiction over any geographic area subject to the CLUP.

4.13.2 Significance Criteria and Assumptions

4.13.2.1 NEPA and CEQA

Implementation of the proposed project would result in a significant land use or recreation impact if it would:

- Conflict with an applicable land use plan, policy or regulation of an agency with jurisdiction over the project adopted for the purpose of avoiding or mitigating an environmental effect.

- Create land use incompatibility.

4.13.2.2 TRPA

TRPA maintains several environmental criteria for establishing the significance of impacts of a project on land use. For the purposes of this analysis, a significant impact would result if the project would result in one or more of the IEC questions answered Yes. The TRPA IEC was completed considering the Recommended Alternative, Alternative 2. The results of the checklist questions are discussed in the analysis. A copy of the TRPA IEC is included in Section 5

4.13.2.3 Assumptions

There would be no change to existing land use designations as a result of the project.

4.13.3 Environmental Consequences/Environmental Impacts of the No Action/No Project Alternative

The No Action/No Project Alternative would have no effect on existing land uses within the project area or surrounding the project area. Without a project, there would be no potential of conflicting with any existing land use plans or guidelines. No changes to existing land uses or incompatibilities with existing land uses would result.

However, the No Action/No Project Alternative also includes the most likely future conditions in the absence of the project, including other UTR Restoration projects proposed upstream and downstream of the project area. Recommended alternatives and project descriptions have not been developed for these projects. Given that these

actions are restoration projects it is unlikely that they would have any significant impact on existing land uses and are all compatible with the guidelines established in the PASs for each, the City General Plan and the Lake Tahoe Airport CLUP. Therefore, there would be no effects to land use from the No Action/No Project Alternative.

4.13.4 Environmental Consequences/Environmental Impacts of Alternative 2 – New Channel East of the Airport (Recommended Alternative)

Construction of the UTR Airport Reach project would not conflict with the TRPA PASs for the three Plan Areas within the project area or the City General Plan. Restoration activities are a permissible use within all three PASs. The project design considers and does not conflict with any Planning Considerations and/or Special Policies discussed in any of the PASs. In many cases the project would help to improve some of the environmental conditions discussed in the special policies and planning considerations. The project complies with and does not conflict with any other land use plans for the project area including the City General Plan and the Lake Tahoe Airport CLUP provided that safety environmental commitments and mitigation measures described in Section 4.11.6 are implemented.

The project would restore and increase the amount of wetlands and riparian area to improve the wildlife habitat. The aquatic habitat and fishery would also benefit from the project. The project would restore SEZ and help to improve the water quality of the river by stabilizing the banks along the river. A secondary benefit to water quality is provided by increased overbanking frequency onto the floodplain which could help to reduce the amount of sediment reaching Lake Tahoe. The project's restoration activities are consistent with the goals of TRPA and the City to preserve environmental resources as discussed in their planning guidelines.

The project would not require any change or modification to an existing land use. There would be no adverse impacts to land use from Alternative 2. Construction of Alternative 2 would help to meet goals discussed in some of the special policies and planning considerations of the PASs which are consistent with the TRPA's Goals and Policies. All TRPA IEC Land Use questions were answered "No" (Section 5).

4.13.5 Cumulative Impacts

The project would have no impact to land use and would, therefore, not contribute to any cumulative impacts to land use.

4.13.6 Environmental Commitments and Mitigation Measures

The project will not have any impacts to land use and therefore no environmental commitments or mitigation measures are required.

4.13.7 Comparative Analysis of Alternatives

The No Action/No Project Alternative would not have any impacts to land use. Alternative 2 would not have any impacts to land use and would also help to achieve goals for restoration discussed in PAS planning considerations and special policies. The project would ultimately benefit wetlands, riparian and aquatic habitat and SEZ restoration goals. Alternative 2 would provide the most benefit for meeting environmental goals in the Tahoe Basin.

4.14 Noise

The project would not result in a permanent source of noise. Therefore, no permanent noise impacts would occur. However, construction noise would be generated and related potential impacts have been evaluated in this section.

The affected area with respect to construction noise is the Airport Reach construction area and the area beyond the project area where construction noise may be audible. This includes the Airport and adjacent TRPA special areas and planning areas in South Lake Tahoe and El Dorado County discussed in the PASs.

4.14.1 Existing Conditions

There are many factors that affect one's perception of noise. These factors include pitch, loudness and the character of the noise. The standard unit of sound amplitude measurement is the decibel (dB). Since the human ear cannot hear all frequencies, a special scale has been devised to relate noise to human sensitivity. The A-weighted decibel scale (dBA) de-emphasizes the low and high end frequencies and emphasizes those frequencies the human ear is able to hear. The following terms are typically used in analyzing noise:

- L_{eq}: Equivalent energy level. The A-weighted sound level corresponding to a steady state sound level containing the same total energy as a time varying signal over a given sample period. L_{eq} is typically computed over 1, 8, and 24 hour measurement periods.

- L_{max}: The maximum A-weighted sound level during the measurement period.

- L_{dn}: Day-night average level. A 24-hour average L_{eq}, with the addition of 10 dBA to the sound level during the hours of 10:00 p.m. to 7:00 a.m. to account for greater noise sensitivity of people at night.

- CNEL: Community Noise Equivalent Level. A 24-hour average L_{eq}, with the addition of five dBA to sound levels from 7:00 p.m. to 10:00 p.m. and the addition of 10 dBA to sound levels from 10:00 p.m. to 7:00 a.m.

It is widely accepted that most human sound perception can barely detect a change in sound level of 3 dBA.

The major sources of noise in the project area are aircraft and motor vehicle traffic on U.S. Highway 50. Additional noise sources include construction activities and residential noise such as barking dogs and loud music.

4.14.1.1 Regulatory Framework

Tahoe Regional Planning Agency (TRPA)

Construction noise between the hours of 8 AM and 6:30 PM is exempt from TRPA noise standards. Outside of those hours, construction noise would be subject to the following TRPA community noise level standards in Table 4.14-1.

Table 4.14-1
Noise Level Standards

Land Use Category	Average Noise Level or CNEL Range (dBA)
High Density Residential Areas	55
Low Density Residential Areas	50
Hotel Areas	60
Commercial Areas	60
Industrial Areas	65
Urban Outdoor Recreation Areas	55
Rural Outdoor Recreation Areas	50
Wilderness and Roadless Areas	45
Critical Wildlife Habitat Areas	45

Source: TRPA 2001 Threshold Evaluation

TRPA has also established the following average noise level standards for transportation corridors:

Highway 50 (65 dBA)
Highways 89, 207, 28, 267, and 431 (55 dBA)
Lake Tahoe Airport (60 dBA)

The highway CNEL values override the land use-based CNEL thresholds listed above for a distance of 300 feet from the road's edge. The Airport CNEL value applies to areas affected by approved flight paths.

City of South Lake Tahoe

Part of the project study area for noise is within the City limits of South Lake Tahoe. The City does not have numerical limits for construction noise. The City does have a nuisance ordinance for protection against excessive sources of noise, which could include construction noise.

El Dorado County

Part of the project study area for noise is within unincorporated El Dorado County. El Dorado County has established non-transportation noise standards based on time of day and land use sensitivity. Residential areas are considered the most noise–sensitive land use and have the strictest noise standards. The County has established maximum allowable exterior one-hour noise limits for both daytime and nighttime hours. Only the daytime hour limits apply to the subject project since no nighttime construction is proposed. The non-transportation noise standards are shown in Table 4.14-2.

Table 4.14-2 El Dorado County Non-Transportation Noise Standards (dBA)						
	Maximum Allowable Exterior Noise Levels					
Noise Element Jurisdiction/Land Use Category	Daytime 7a.m. – 7p.m.		Evening 7p.m. – 10p.m.		Nighttime 10p.m. – 7a.m.	
	Hourly		Hourly		Hourly	
El Dorado County[(1)]	L_{eq}	L_{max}	L_{eq}	L_{max}	L_{eq}	L_{max}
Residential Areas (Community Areas)	55	75	50	65	45	60
Residential Areas (Rural Regions)	50	60	45	55	40	50
Commercial Areas (Community Areas)	70	90	65	75	65	75
Commercial Areas (Rural Regions)	65	75	60	70	60	70
Open Space, Natural Resource (Rural Regions)	65	75	60	70	60	70

Notes:
[(1)]Non-transportation construction noise standards.
Source: El Dorado County General Plan, Public Health, Safety and Noise Element (July 2004)

El Dorado County also has noise standards for transportation sources as shown in Table 4.14-3. Since no offsite truck hauling is proposed, the only transportation-related noise sources associated with the project would be construction worker vehicles, visitors and deliveries.

Table 4.14-3 El Dorado County Transportation Noise Standards (dBA)		
	Maximum Allowable Noise Levels	
Land Use Category	Exterior L_{dn}/CNEL	Interior L_{dn}/CNEL
El Dorado County[(1)]		
Residential Areas	60	45
Commercial Areas	--	--
Other Sensitive Areas - Parks	70	--
Other Sensitive Areas: hospitals, nursing homes, churches, transient lodging	60	45

Notes:
[(1)] Interior spaces worst-case one hour L_{eq} noise standards of 35-45 dBA have been adopted for theaters, auditoriums, music halls, churches, meeting halls, office buildings, schools, libraries and museums.
Source: El Dorado County General Plan, Public Health, Safety and Noise Element (July 2004)

4.14.2 Significance Criteria and Assumptions

4.14.2.1 NEPA and CEQA

Noise impacts would be significant if the project results in:

- Exposure of people to noise levels in excess of established standards;
- Exposure of people to excessive groundborne vibration or noise levels; or
- A substantial temporary, periodic, or permanent increase in ambient noise levels.

4.14.2.2 TRPA

TRPA maintains several environmental criteria for establishing the significance impacts of a project from noise. For the purposes of this analysis, a significant impact would result if one or more the IEC questions was answered Yes. The TRPA IEC was completed considering the Recommended Alternative, Alternative 2. The results of

the checklist questions are discussed in the analysis. A copy of the TRPA IEC is included in Section 5.

4.14.2.3 Assumptions

The project would have no permanent or ongoing noise impacts after construction.

4.14.3 Environmental Consequences/Environmental Impacts of the No Action/No Project Alternative

Under the No Action /No Project Alternative, no construction would take place and therefore, no construction noise impacts would occur.

4.14.4 Environmental Consequences/Environmental Impacts of Alternative 2 – New Channel East of the Airport (Recommended Alternative)

Potential sources of noise impacts from the proposed construction include both onsite construction noise sources and transportation-related noise sources from construction workers, visitors and deliveries.

Because the proposed construction would take place between 8:00 AM and 6:30 PM, the project would comply with TRPA regulatory standards. All of the TRPA IEC questions related to noise were answered "No". (Section 5)

Construction of the project would require the use of heavy equipment such as bulldozers, payloaders and trucks. Construction worker, delivery and visitor traffic would be another source of noise, though less noisy than construction equipment. Noise produced by construction equipment would vary throughout the day. During the busiest periods of construction, sound levels between 80 and 100 dBA at 50 feet could be generated, although the incidence of the highest sound levels would be occasional in any one day. Table 4.14-4 shows typical maximum noise levels for construction equipment. Average construction noise levels over a full construction work day would be considerably lower than the maximum levels in the table.

Based on these equipment noise levels and the equipment anticipated to be used, construction noise levels at the nearest noise-sensitive land uses were calculated to assess compliance with El Dorado County noise standards for non-transportation noise sources (at land uses in unincorporated El Dorado County) and to estimate whether substantial increases in average noise levels during construction would occur at nearby noise-sensitive land uses in El Dorado County or South Lake Tahoe. The nearest noise-sensitive land uses to the construction area are the residences on Lodgepole Trail and Muskwaki Drive east of the Airport in El Dorado County and Barton Memorial Hospital and the residences on Melba Drive and Kyburz Avenue west of the Airport in South Lake Tahoe.

Table 4.14-4 ***Construction Operations, Equipment Types and Their Noise Levels***	
Equipment Type	***L_{max} @ 50'***
Scrapers	81
Dozers	82
Vibratory Compactors	83
Haul Trucks	76
Excavator	81
Small Crane	81
Drill Rigs	84
Loaders	79
Blasting	94
Rock/Screening Crushing Operations	94
Concrete Batch Plant	83

Sources:
U.S. Bureau of Reclamation, September 2006.
U.S. Army Corps of Engineers, Folsom Dam Raise and Auxiliary Spillway Alternative PASSII Draft Report, February 2006a.
U.S. DOT, FHWA, Roadway Construction Noise Model, January 2006.
P. Yastrow, Laku Landing Sound Level Analysis, April 1990.

The predicted maximum daytime construction noise levels at the nearest land uses are shown in Table 4.14-5 along with the applicable standard, if any. The locations of these land uses is identified in Figure 4.14-1. Also shown is the predicted average daytime construction noise level and estimated ambient daytime noise levels. From the table it can be seen that the maximum construction noise levels would comply with the applicable standards and the average construction noise levels would be lower than current average daytime noise levels. Therefore, no significant noise impact would occur.

Table 4.14-5 ***Predicted Construction Noise Levels***					
Noise-Sensitive Land Receptors	***Predicted Maximum Construction Noise Level (dBA)***	***Noise Level Standard (dBA)***	***Predicted Average Daytime Construction Noise Level (Leq in dBA)***	***Estimated Ambient Noise Level (Daytime L_{eq} in dBA)***	***Impact***
1) Lodgepole Trail	52	55	49	50	Negligible
2) Muskwaki Drive	50	55	47	50	Negligible
3) Barton Memorial Hospital	51	N/A	48	55	Negligible
4) Melba Dr./Kyburz Av.	52	N/A	49	55	Negligible

Because no offsite hauling of materials is proposed, transportation-related noise sources would be limited to construction worker vehicles, visitor vehicles and occasional deliveries. According to the traffic analysis, the volume of traffic generated by these sources would be very low in relation to existing traffic volumes. Because it takes a doubling of traffic to increase noise levels by 3 dBA, the noise generated by this short-term, low volume of traffic would increase noise levels by less than 1 dBA and, therefore, would have imperceptible noise impacts.

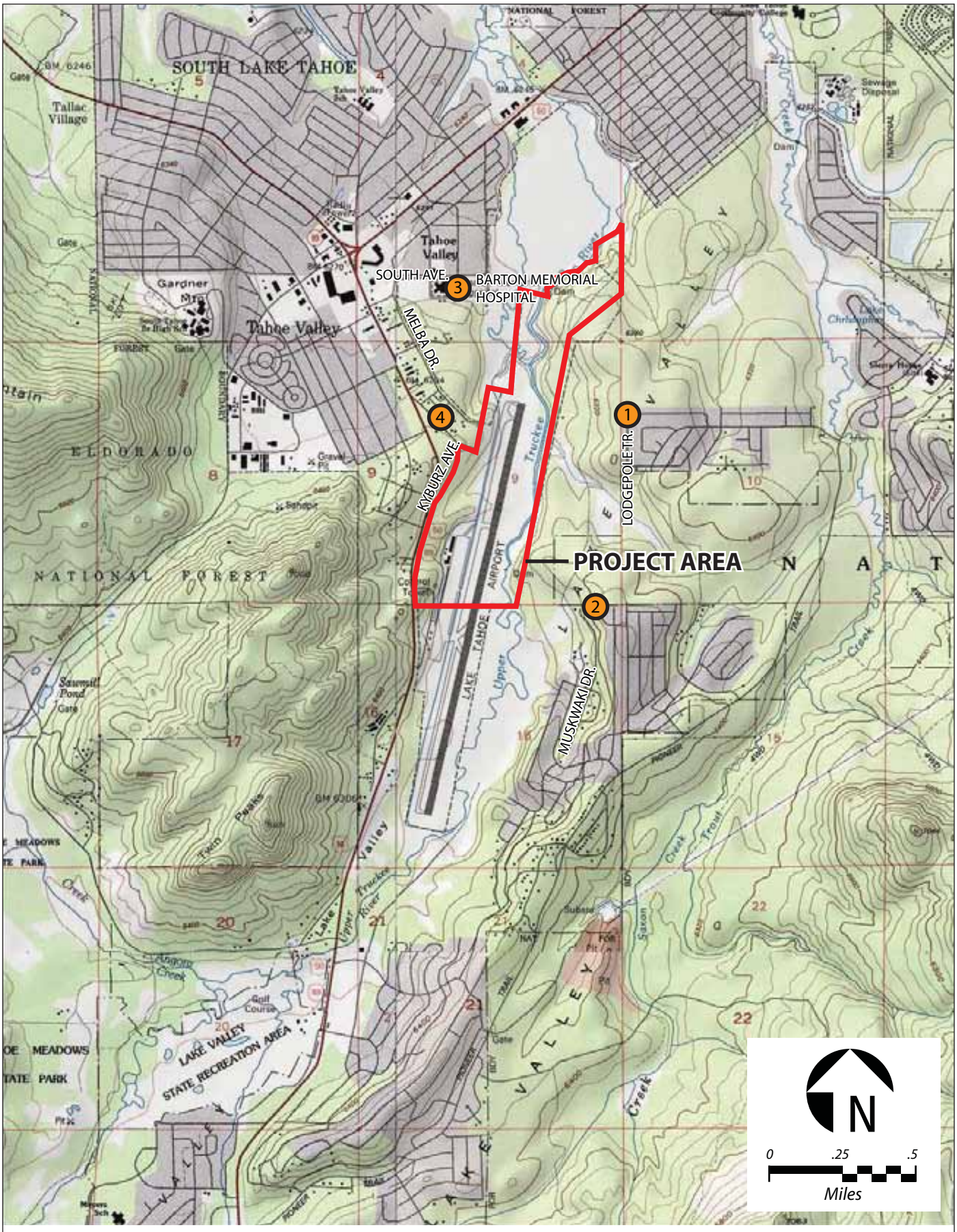

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Figure 4.14-1
Sensitive Noise Receptors

CDM

4.14.5 Cumulative Impacts

The projects identified in Section 4.1 that may be under construction at the same time as the proposed project have been considered and evaluated for potential combined construction noise. The conclusion is that these projects, with the exception of the Airport runway reconstruction project, are all at distances from the Airport such that the combined construction noise levels at the proposed project's noise-sensitive land uses would be imperceptibly higher than from the proposed project alone. Regarding the Airport runway reconstruction project, scheduled to occur in 2008, the combined construction noise from the two concurrent Airport construction projects would be a barely-perceptible, 1 to 3-dBA higher at the noise-sensitive land uses than the proposed project alone. This would still comply with applicable noise standards and would not be significant in terms of the noise impact significance criteria.

4.14.6 Environmental Commitments and Mitigation Measures

Because no significant noise impacts would occur from this alternative, no environmental commitments or mitigation measures are required. However, the following measures are recommended during construction to minimize construction noise impacts.

- Equip all construction equipment with operating mufflers.
- Limit construction hours to 8 AM to 6:30 PM.

4.14.7 Comparative Analysis of Alternatives

No significant construction noise impacts would occur from any of the alternatives. The No Action/No Project Alternative would have no noise impacts. Alternative 2 would have insignificant, short-term construction noise impacts and no long-term noise impacts. While Alternative 2 has the potential to cause impacts to noise and the No Action/No Project Alternative would have no impacts to noise, the project should proceed because the project would provide many significant environmental benefits.

4.15 Recreation

The Lake Tahoe Region is a significant resource for recreational users. These users primarily originate within the state of California (67% according to a TRPA survey) and look to participate in a wide variety of activities from beach activities, hiking, boating, rafting/kayaking, camping, and winter activities such as skiing to shopping and gaming.

Recreation activities within the Lake Tahoe Region provide a significant source of revenue. Examples of recreation facilities within the Tahoe Basin include Lake Tahoe itself and other smaller lakes, numerous rivers and streams, national forests, designated wilderness areas, public and private campgrounds, ski resorts, and casinos.

Several ongoing programs, such as TRPA's EIP and USFS Trail Access and Travel Management Plan (ATM) are being implemented to improve recreation facilities and the overall quality of recreation. The TRPA EIP is an integrated improvement program intended to accelerate achievement of environmental threshold carrying capacities established for the Lake Tahoe Region. The EIP program identifies increased recreational facilities and an increase in quality at various recreational facilities throughout the Lake Tahoe Basin. One such trail is the South Tahoe Greenway Project where one alternative is proposed near the project area for the UTR Airport Reach restoration project.

The USFS Trail ATM is aimed at upgrading existing trails, reducing impacts to resources, and improving the overall recreational experience on USFS trails. This plan is currently in the development stage. Also, the California Tahoe Conservancy is conducting work on recreation facilities at the Sunset Ranch property located directly south of the Airport Reach project area. River and habitat restoration are also components of a project at Sunset Ranch along the UTR corridor. This work includes remedial project activities such as closing trails and trail realignment. Currently there is no recreation plan design for conducting work on the Sunset Ranch. No direct improvements are proposed at any formal recreation facilities for the Airport Reach project.

4.15.1 Existing Conditions

CDM conducted informal field surveys to estimate recreational access, current recreational quality, and recreational usage within the project area. These surveys were performed on Wednesday June 26 and Saturday July 20, 2002.

Recreation facilities along the Airport Reach consist of well established trails emerging from the nearby residential neighborhoods and paralleling the river. These trails receive moderate use by locals during both the weekdays and weekends. Typical recreation activities include hiking, dog walking, and mountain biking. There is also rafting and/or swimming activities along several sand bars and the potential for fishing within the river. Winter activities include snowmobiling and cross-country skiing. Land directly around UTR in the Airport Reach is restricted access property

and is owned by the Airport. Public access is restricted within this area. A fence exists around the Airport property with signs to discourage trespassers; however the fences and signs are often vandalized and/or ignored and the public often uses the trails.

The Mosher property (a.k.a. Ledbetter Meadow), located in Reach 2, is fenced private property. Hiking and biking trails have not been established on this property. Past observations have shown that local residents use the meadow for picnicking.

The UTR is used for boating recreation during periods of high flow. During spring runoff and during the early part of the summer, rafters and kayakers will float down the river. Boaters primarily put in upstream of the project area near the Elks Club at the Highway 50 bridge. During periods of low flow the river is used less for boating.

4.15.2 Significance Criteria

4.15.2.1 NEPA and CEQA

Implementation of the proposed project would result in a significant recreation impact if it would:

- Result in the physical deterioration of a recreational facility or major loss of recreational use.
- Require construction or expansion of recreational facilities that could have adverse physical effects on the environment.

4.15.2.2 TRPA

TRPA maintains several environmental criteria for establishing the significance of impacts of a project on recreation. For the purposes of this analysis, a significant impact would result if one or more of the IEC questions was answered Yes. The TRPA IEC was completed for the Recommended Alternative, Alternative 2. The results of the checklist questions are discussed in the analysis. A copy of the TRPA IEC is included in Section 5.

4.15.2.3 Assumptions

- No new recreation facilities will be created during restoration activities.
- Through information gathered during informal recreation field surveys, it is assumed that most recreation usage is by local residents. The absence of public recreational facilities supports this assumption.

4.15.3 Environmental Consequences/Environmental Impacts of the No Action/No Project Alternative

The No Action/No Project Alternative would not involve any construction actions and therefore no recreation impacts would occur. The recreation opportunities in the study area are expected to remain similar to existing conditions. The South Tahoe Greenway Project is planning to construct a 9.6 mile Class 1 multi-use continuous trail

from Meyers, California to Stateline, Nevada. If the Highway 50 Bypass Alternative is completed, it would offer a convenient transportation alternative and high quality recreation experience. This could increase recreation potential in the study area. There may be short-term construction-related recreation impacts as this new trail is being constructed. Overall, the No Action/No Project Alternative is expected to have a less-than-significant impact on recreation in the study area.

4.15.4 Environmental Consequences/Environmental Impacts of Alternative 2 – New Channel East of the Airport (Recommended Alternative)

Alternative 2 would not increase demand for recreation facilities or create additional recreation capacity. No new or expanded recreation facilities or trails are proposed under this alternative. All TRPA IEC questions were answered "No" or "No with mitigation". (Section 5)

Several existing trails along the Airport Reach would be fenced off during construction. These trails are on Airport property and are not open to the public. Because members of the public often use the trails on the Airport property, signs would be posted to warn them of the construction activities and restricted areas. All trail-related impacts would occur on private or restricted property and therefore there would be no impact to public recreation.

Boating on the river through the project area would be restricted periodically during times of low flow when in-channel work is being performed in Years 1, 2 and 3. This is unlikely to affect recreation as boaters are generally not interested in using the river during times of low flow. Signs would be posted upstream at the Elks Club where boaters access the river stating that construction work is being implemented along the river and list restricted time periods. Other areas upstream and downstream of the proposed project site would still be open for boating. The river would be restored at the close of construction and water-related recreation would be allowed to resume. Overall, Alternative 2 would have a less-than-significant impact to recreation.

4.15.5 Cumulative Impacts

The South Tahoe Greenway Project is planning to construct a 9.6 mile Class 1 multi-use continuous trail from Meyers, California to Stateline, Nevada. One alternative is to be constructed along the former Highway 50 Bypass corridor. The earliest expected construction start date is summer of 2009. This project is not expected to affect water-related recreation and would therefore be unlikely to contribute to a cumulative impact with the proposed project. Some of the future river restoration projects described in Section 4.1 could require closure of certain river portions during construction. Because the proposed project and future restoration projects would take place when the river is low, this is not expected to have a cumulative impact to water recreation. The closures would be temporary and would be re-opened to recreation at the close of construction. Cumulative recreation impacts are expected to be less than significant.

4.15.6 Environmental Commitments and Mitigation Measures

The following environmental commitment and mitigation measures will be implemented as part of the project to reduce all potential significant impacts to less than significant.

- Post signs upstream of the project site to notify boaters of access restrictions during construction.
- Restore river access at the close of construction.

4.15.7 Comparative Analysis of Alternatives

The No Action/No Project Alternative would not affect recreation because no changes to the study area would occur. Although Alternative 2 could temporarily restrict access to the river, this would only occur when in-channel work is being performed and the river is low. Boaters would be unlikely to use the river at this time because of the low flow. This impact would be temporary and full river access would be restored at the close of construction. Use of existing trails would be physically restricted in some locations during construction, however, these trails are not considered designated public use trails since they are located on restricted airport property.

4.16 Traffic and Circulation

This section describes the existing traffic conditions in the study area. The study area encompasses all roads and highway that would be used to access the project site as well as the Lake Tahoe Airport. The main corridor to the project site is U.S. Highway 50/State Route 89. In addition to the airport entrance and exit, residential streets to the north of the project site would be used for construction worker access and are included in the study area. The residential streets analyzed are Sierra Boulevard and Barbara Avenue. This section also analyzes potential impacts to traffic in the study area during construction of the project. No long-term traffic impacts would result once construction is completed.

4.16.1 Existing Conditions

4.16.1.1 Roadway Characteristics

US Highway 50/State Route 89

U.S. Highway 50 East joins State Route 89 North (CA 89) in Meyers; the highway is also designated as Emerald Bay Road. North of the Lake Tahoe Airport, State Route 89 splits to the west, and Highway 50 continues to the East as Lake Tahoe Boulevard. Highway 50 is the main corridor traveling along the south shore of Lake Tahoe, and continues to the Stateline Corridor. From the Airport entrance to Pioneer Trail to the south, U.S. 50/CA 89 is a two-lane highway with a posted speed limit ranging between 45 to 55 miles per hour (mph). At F Street in South Lake Tahoe, approximately 0.6 miles north of the Airport entrance, the highway continues north as a four-lane highway with a center turn lane and a speed limit of 40 mph. At the intersection of Sierra Boulevard., approximately 2.6 miles north along Highway 50 from the Airport entrance, Highway 50 has a speed limit of 35 mph. On Highway 50, in the westbound direction, there is a left turn lane to Sierra Boulevard.

Airport Road

Airport Road is a loop road off of Highway 50/SR 89 that is used to access the Airport. It is a one way road with two travel lanes. The southern intersection with Highway 50/SR 89 is the entrance to the Airport and the northern intersection is the exit. The speed limit at the entrance to the Airport and within the loading area is 15 miles per hour, and the speed limit at the exit is 25 miles per hour. (LSC Transportation Consultants, Inc. 2005)

Sierra Boulevard

Sierra Boulevard is a two-lane residential street that intersects Highway 50/Lake Tahoe Boulevard to the north and Barbara Avenue the south. The intersection with Highway 50 is signalized, and there are right and left turn lanes from Sierra Boulevard to Highway 50. The road is approximately 80 feet wide at the intersection with Highway 50 and then narrows to approximately 40-50 feet wide once it reaches the intersection of William Avenue. There are bike lanes on both sides of Sierra Boulevard, and sidewalks along the first block south of Highway 50. The speed limit is 35 mph, and the only stop sign is at the intersection with Barbara Avenue. At this intersection, there is a four-way stop as Sierra Boulevard is met by the gated driveway

to the Caltrans property, which is controlled by a stop sign. Sierra Boulevard is within the City's jurisdiction.

Barbara Avenue

Barbara Avenue is a residential street that runs perpendicular to the southern end of Sierra Boulevard. There are only the backyards of houses on the northern side of Barbara Avenue (the houses face Fountain Avenue) and there is no marked speed limit. The visible houses are set back approximately 100 feet from Barbara Avenue. The width of the street is approximately 20 feet . At the southwestern end of Barbara Avenue, it dead-ends at Lodi Avenue where there is a stop sign, and jogs up approximately 125 feet to the north from where it continues in the southwest direction. Immediately after, Barbara is intersected by Beecher Street from the north, and then dead ends at the gated entrance to the paved maintenance road which construction workers will use to access the site. Barbara Avenue is primarily within the County of El Dorado's jurisdiction as it is just outside the border of the City.

Lodi Avenue

Lodi Avenue is a residential street similar to Barbara Avenue. The road is approximately 20 feet wide. It runs perpendicular from the end of Barbara Avenue in the northwest direction to Palmira Avenue.

4.16.1.2 Existing Traffic Volumes

U.S. Highway 50

Table 4.16-1 presents the average annual daily traffic volume and the peak hour volume on Highway 50 surrounding the project area.

Table 4.16-1
Traffic Volumes on U.S. Highway 50

Roadway Segment	***Average Annual Daily Traffic Volume (AADT)***		***Peak Hour Volume[(1)] 11:00 a.m. - 12:00 p.m. 4:00 p.m. - 5:00 p.m.***	
U.S. 50	North/East of location	South/West of location	North/East of location	South/West of location
At Upper Truckee River Bridge	33000	33000	3150	3850
At Northern Junction of SR 89	33000	19500	3850	2450
At Rufus Allen Boulevard	32500	32000	3050	3200

(Caltrans online traffic counts, 2006.)

(1) The time of the peak hour volume is based on traffic counts taken at the Rufus Allen Boulevard. segment, as the peak-hour times were not available for the other segments of Highway 50; however, the ADT volumes are reasonably similar (Caltrans, 2007).

Sierra Boulevard and Barbara Avenue

El Dorado County conducted traffic counts along Barbara Avenue in 2006 (El Dorado County, Department of Transportation, 2006). TRPA most recently conducted traffic counts along Sierra Boulevard in 2000 (All Traffic Data, 2000). The data for both roadways is presented in Table 4.16-2.

Table 4.16-2
Traffic Volumes on Sierra Boulevard and Barbara Avenue

Roadway	*Total ADT*	*AM Peak Hour*	*AM Peak Hour Traffic Volume*	*PM Peak Hour*	*PM Peak Hour Traffic Volume*
Sierra Boulevard. (2000)	2,932	(southbound only) [1] 11:00 AM	72	(northbound only)[1] 5:00-6:00 P.M	144
Barbara Avenue. (2006)	3,070	7:00-8:00 A.M.	203	4:00-5:00 P.M.	273

[1] The separate eastbound a.m. and the westbound p.m. traffic volumes are provided rather than the combined volume of traffic because this data is specific to the direction in which construction traffic will be added. The traffic volumes on Barbara Avenue are only available for the combined directions.

It is likely that the current traffic volumes on Sierra Boulevard are slightly higher than those recorded in 2000. This is based on the assumption that development in the area since 2000 has increased local traffic volumes.

4.16.1.3 Level of Service

A measure called "Level of Service" (LOS) is used to measure traffic conditions. Progressively worsening traffic conditions are given letter grades "A" through "F". While most motorists consider an "A", "B", or "C" LOS satisfactory, LOS "D" is considered marginally acceptable. Congestion and delay are considered unacceptable to most motorists and given an LOS "E" or "F" ratings. The LOS of an intersection is determined by the methodology set forth in the *Highway Capacity Manual* (Transportation Research Board, 2000).

4.16.1.4 Existing Intersection Level of Service

Airport Entrance and Exit

As part of a Traffic and Air Quality Study conducted for the 2005 Lake Tahoe Airport Offices Project, a traffic analysis was performed for the Airport entrance and exit onto Highway 50/SR 89. The study data for the Airport entrance and exit are shown in Table 4.16-3.

Table 4.16-3
Level of Service at Airport Entrance and Exit[1]

Intersection	*Movement*	*Type of Control*	*LOS*	*Delay (sec)*
US 50/SR 89/Airport Entrance	**Southbound Left** -AM peak-hour -Noon peak hour -PM peak-hour	Unsignalized	 A A B	 8.1 9.2 10.5
US 50/SR/89 Airport Exit	**Westbound Left** -Noon Peak Hour -PM Peak Hour	Unsignalized	 D E	 28.7 48.8
	Westbound Right -Noon Peak Hour -PM Peak Hour		 B C	 13.9 17.5

LSC Transportation Consultants Inc., 2005

[1] The a.m. peak hour LOS at the Airport exit was not analyzed in this study as the traffic volumes are low during this period.

4.16.1.5 Lake Tahoe Airport Operations

The Lake Tahoe Airport operates as a Class B3 Airport and serves general aviation (private, corporate, business jets, etc.), military, and emergency aircraft. There is one helicopter tour that operates out of the Airport. There are no scheduled commercial flights, and therefore the air traffic control tower has not been in operation since 2004. The aircrafts that operate at Stage 3 aircrafts (single event noise standards) are only permitted to operate from 8:00 a.m. to 8:00 p.m. Only aircrafts that produce noise levels under 77.1 dBA Lmax are permitted during the night time (between 8:00 pm and 8:00 a.m.). The Airport serves approximately 25,000 operations per year (takeoffs and landings counted separately). The single runway 18-36 is 8,544 feet long by 150 feet wide, (Lake Tahoe Airport website); the upcoming Airport runway reconstruction project would repave a portion of the runway and reduce the width to 104 feet. (City, Airport Runway Project Categorical Exclusion, 2007)

4.16.1.6 Regulatory Framework

TRPA

The TRPA Lake Tahoe Regional Transportation Plan (2004) sets forth Level of Service (LOS) standards for the region. The LOS criteria for the Region's highway system and signalized intersections during peak periods are:

- Level of service "C" on rural recreational/scenic roads.
- Level of service "D" on rural developed area roads.
- Level of service "D" on urban developed area roads.
- Level of service "D" for signalized intersections.

Level of service "E" may be acceptable during peak periods in urban areas, not to exceed four hours per day. (TRPA, Lake Tahoe Basin Regional Transportation Plan 2004)

In addition to LOS standards, TRPA also has a traffic volume threshold standard and a vehicle miles traveled (VMT) standard dated 2001. The traffic volume threshold standard entails a 7 percent reduction in traffic volume on the U.S. Highway 50 corridor from 1981 values, winter, 4 p.m. to 12 a.m. The VMT goal is to reduce VMTs 10 percent from the 1981 value (TRPA 2001 Threshold Evaluation). (Note that this standard applies to winter traffic volumes because winter is the season during which carbon monoxide standards are most frequently exceeded.)

The TRPA *Code of Ordinances Traffic and Air Quality Mitigation Program* states that increases of 100 or fewer daily vehicle trips are considered insignificant, and increases between 100 and 200 vehicle trips per day are considered minor.

Local Jurisdictions
The study area includes roadways within El Dorado County and the City. El Dorado County has adopted LOS thresholds for existing and proposed roadway segments as illustrated in their General Plan. Although the City does not have specific LOS standards, the established TRPA criteria listed above for the City's road system and signalized intersections during peak periods are applicable. The El Dorado County standards are intended for long-term conditions rather than short-term construction (El Dorado County Confirmation Letter, November 29th, 2007). Nevertheless the criteria are described here for reference (El Dorado County, 2004).

Within the study area, Sierra Boulevard is within the City and therefore, primarily under the jurisdiction of TRPA, and Barbara Avenue, which is outside of the City limits, is under the jurisdiction of El Dorado County.

El Dorado County Traffic Thresholds

Standards

- Varies by intersection, LOS for County- maintained roads and state highways within the unincorporated areas of the county shall not be worse than LOS E in the Community Regions or LOS D in the Rural Centers and Rural Regions.
- LOS will be defined in the latest edition of the Highway Capacity Manual (Transportation Research Board 2000) and calculated using the methodologies contained in that manual.

Mitigation Thresholds

- Two (2) percent increase in traffic during the a.m. peak hour, p.m. peak hour, or daily, or the addition of 100 or more daily trips, or the addition of 10 or more trips during the a.m. peak hour or the p.m. peak hour.

Caltrans Traffic Thresholds
Within the study area, Caltrans has jurisdiction over Highway 50. In this region of Highway 50, Caltrans enforces the TRPA traffic threshold of LOS D, or LOS E for a period of four hours or less. (Brake 2007)

4.16.2 Significance Criteria

4.16.2.1 NEPA and CEQA

According to the checklist form in Appendix G of the CEQA Guidelines, traffic and transportation impacts would be significant if one or more of the following conditions resulted from project implementation:

- Cause an increase in traffic which is substantial in relation to the existing traffic load and capacity of the street system (i.e., result in a substantial increase in either

the number of vehicle trips, the volume to capacity ratio on roads, or congestion at intersections).

- Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways.
- Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks.
- Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).

4.16.2.2 TRPA

TRPA maintains several environmental criteria for establishing the significance impacts of a project on transportation and circulation. For the purposes of this analysis, a significant impact would result if one or more of the IEC questions is answered Yes. The TRPA IEC was completed for the Recommended Alternative, Alternative 2. The results of the checklist questions are discussed in the analysis. A copy of the TRPA IEC is included in Section 5.

4.16.3 Environmental Consequences/Environmental Impacts of the No Action/No Project Alternative

Under the No Action/No project Alternative, traffic volumes and the LOS would essentially continue at existing levels. As residential and commercial development continue to expand in the area surrounding the project, there could be increases to traffic volumes and decreases to the LOS that would be unrelated to the proposed project.

4.16.4 Environmental Consequences/Environmental Impacts of Alternative 2 – New Channel East of the Airport (Recommended Alternative)

The project as described would not affect transportation, traffic and circulation in the long term. However, short-term traffic impacts from construction may occur along Highway 50 and Sierra Boulevard near the entrances to the site. The excavated 52,000 cubic yards of fill would be stockpiled on site as indicated on Figure 3-3 and used to fill the current channel. Therefore, there would be no off- hauling of material onto public roads.

El Dorado County and the City determine their own criteria for roads while Caltrans oversees state and U.S. highways in California.

Heavy equipment would enter the site from Highway 50 through the Airport entrance and exit. This route would be used at the initiation and completion of each construction season. Deliveries would also be made through this site. Construction workers would enter and exit the site throughout the construction season using a route from Highway 50 to Sierra Boulevard to Barbara Avenue. At the southwestern

end of Barbara Avenue., the road dead-ends into Lodi Avenue where traffic is forced to turn northwest (right) onto Lodi Avenue. Vehicles would continue approximately 125 feet on Lodi until Barbara Avenue begins again in the southwesterly direction, where vehicles would turn left. This portion of Barbara Avenue ends shortly after it is intersected by Beecher Street to the north. Barbara Avenue ends at the gated entrance to a paved STPUD Maintenance Road that will lead to a parking area for construction workers. Visitors to the site will also use this construction entrance. See Figure 4.16-1 for project routes and intersections.

4.16.4.1 Construction Worker Traffic

Peak Hour Analysis

An average of 20 worker vehicles would enter and exit the site Monday through Friday during the construction season specified in the project description. The peak number of workers would be approximately 30. Vehicles would park in a gravel lot along a road maintained by STPUD off Barbara Avenue. Each vehicle would make two vehicle trips per day, one between 7:00 and 8:00 a.m. and one between 6:00 and 7:00 p.m. (Construction hours would be 8:00 a.m. to 6:00 p.m.).

Morning Vehicle Trips

The worker vehicle trips southbound on Sierra Boulevard to the site would not occur during the local morning peak-hour (11:00 a.m.) for southbound traffic on Sierra Boulevard (See table 4.16-2). Although the peak hour for northbound traffic on Sierra Boulevard is between 7:15 and 8:15 a.m., (All Traffic Data, 2000) the construction worker traffic would be traveling in the opposite direction at this time, and therefore would have no impact on a.m. westbound peak hour traffic on Sierra Boulevard.

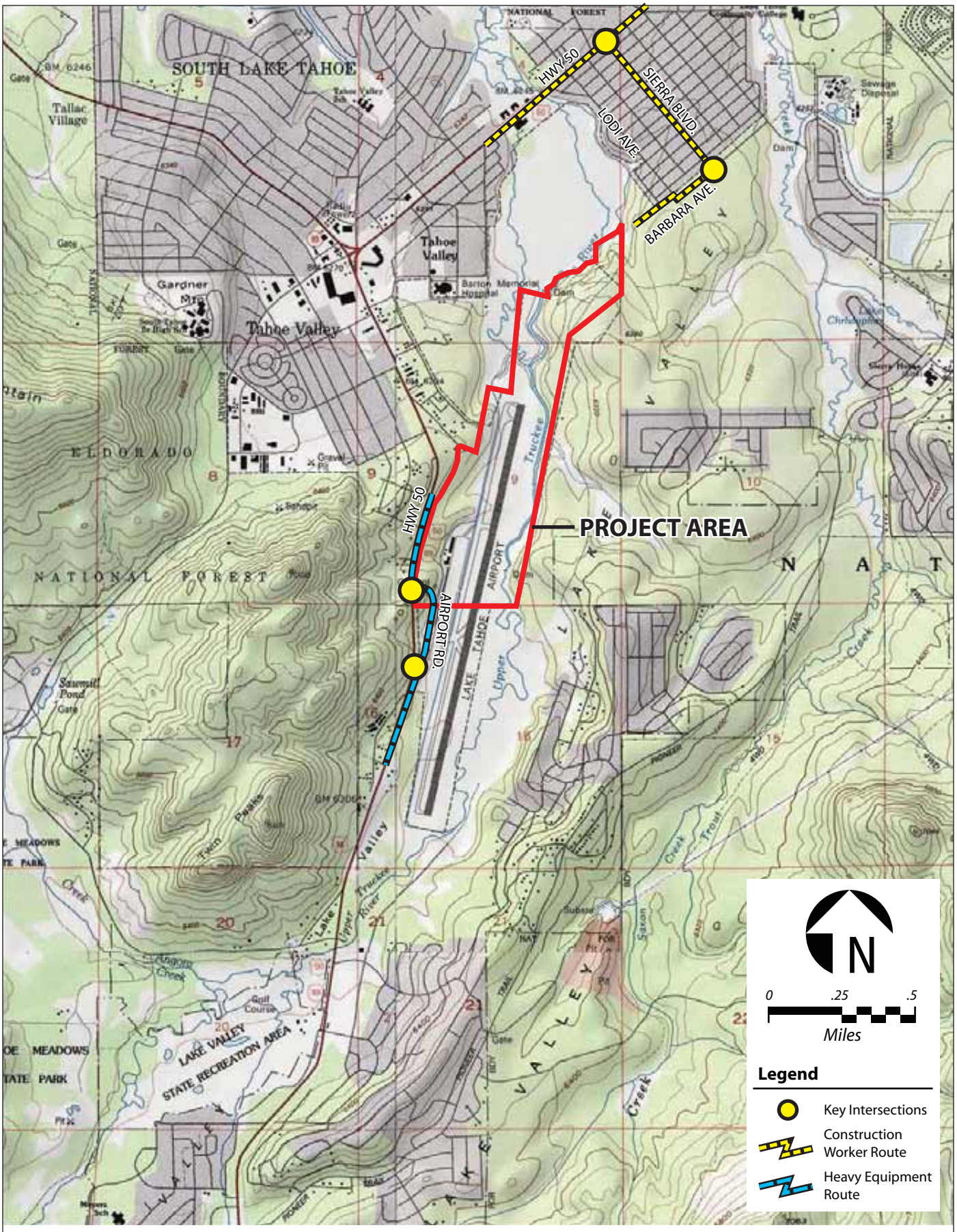
The project vehicle trips on Barbara Avenue would overlap with the 7:00 to 8:00 a.m. peak hour on this road; however, as stipulated by the El Dorado County Department of Transportation, there are no thresholds for traffic due to temporary construction (El Dorado County DOT consultation, November 29th, 2007). Therefore, there would be no exceedence of a traffic impact threshold on Barbara Avenue.

Evening Vehicle Trips

The proposed vehicle trips in the evening would not overlap with the p.m. peak hour of 5:00 to 6:00 p.m. on Sierra Boulevard and 4:00 to 5:00 p.m. on Barbara Avenue.

Average Daily Trip Analysis

In Table 4.16-4, the project vehicle trips are calculated as a percentage of the existing traffic volumes during that hour of travel.



W:\REPORTS\Upper Truckee River\Graphics\Proposed Travel Routes for Materials_Equip_Workers Fig 4.14-1.ai 01/03/08 JJT

CDM

Figure 4.16-1

Proposed Travel Routes for Materials, Equipment and Workers
Key Intersections

Table 4.16-4
Percent Increase to Traffic Volumes on Local Roadways

	Sierra Boulevard.	***Barbara Avenue.***	***Highway 50 (at Upper Truckee River Bridge segment)***
Existing ADT	2,932	3,070	33000
Existing Traffic During A.M. Project Peak Hour[(1)]	27 (southbound only)	203 (combined direction)	1600[(2)]
Existing Traffic During P.M. Project Peak Hour[(1)]	86 (northbound only)	175 (combined direction)	2000[(2)]
Project Number of Daily Vehicle Trips	Average of 40, maximum of 60	Average of 40, maximum of 60	Average of 40, maximum of 60
Percent Increase in ADT Volume	1.4-2.0 % max	1.4-2.0% max	0.18%
Percent Increase during A.M. Project Peak Hour	74-111% (does not overlap with local peak hour)	10-15%	1.3-1.9%
Percent Increase in P.M. Project Peak Hour	23%-35% (does not overlap with local peak hour)	11-17% (does not overlap with local peak hour)	1.0-1.5%

(1) This is the hour of construction worker traffic rather than the local peak hour according to the traffic counts.
(2) These values were approximated from hourly data taken at Rufus Allen Boulevard. This station, at postmile 78.420, is the nearest Caltrans traffic count station that has hourly data. As shown in Table 4.12-1, the ADT values on Highway 50 at Rufus Allen Boulevard. are very similar to those at UTR Bridge (closer to the study area) and can therefore be used for an approximation.

Table 4.16-4 indicates that proposed additional vehicle trips would be 2 percent or less than the most recent ADT volumes. Although the project worker traffic trips would be a significant percentage of the existing traffic during the project peak hour, these short term trips would not occur during the local peak hour (except for the a.m. trips on Barbara Avenue. which would only be a 10 to 15 percent increase) and are not expected to cause major congestion.

The approximate maximum of a 2 percent increase in existing ADT values is not a substantial increase compared to the current conditions on Sierra Boulevard and Barbara Avenue. Because the current ADT volume on Sierra Boulevard is likely to be greater than the volume recorded in 2000, the proposed increase to traffic would be less than the 2 percent indicated. In addition, the increase would only occur during the summer-fall construction months over a 3 year period in Years 1 and 3.

The proposed temporary increases to traffic are below TRPA significance criteria. TRPA VMT criteria are specified for the winter months and project increases to VMT would only occur during the summer and fall construction months. There would be no additional project traffic during winter months. In addition, the project vehicle trips would be below 100 per day and therefore are considered insignificant in accordance with the TRPA Code of Ordinances.

The El Dorado County traffic mitigation threshold for long term impacts is the addition of 10 or more vehicles during local peak hours, an increase of 2 percent or greater to traffic volume during peak hours, or an increase of 100 or more vehicle trips

per day. With the exception of Barbara Avenue in the morning, these thresholds for long-term impacts would not be exceeded. However, because these mitigation thresholds are intended for long-term impacts to traffic and are not intended for temporary additional vehicles during the months of construction, the proposed project would not exceed relevant thresholds, and therefore have no impact.

Volume to Capacity Analysis

The impact of the worker vehicles can also be assessed through a volume to capacity ratio analysis. The current capacity of a road can be estimated using LOS thresholds based on daily volumes, number of lanes, and facility type as presented in Table 4.16-5.

Table 4.16-5
Functional Class and Daily Roadway Segment LOS Thresholds

Functional Class	*LOS Capacity Threshold (Total vehicles per day in both directions)*				
	A	***B***	***C***	***D***	***E***
2-Lane Collector	-	-	5,700	9,000	9,800
Minor 2-Lane Highway	900	2,000	6,800	14,100	17,400
Major 2-Lane Highway1,200	1,200	2,900	7,900	16,000	20,500
4-Lane, Multilane highway	10,700	17,600	25,300	32,800	36,500

(US Army Corps of Engineers, 2006. Folsom Bridge EIS/EIR)

From the capacities specified in Table 4.16-5, and existing ADT volumes, the current volume to capacity ratio can be calculated. The project volume to capacity ratio can be calculated with the ADT increased by the number of worker vehicle trips. Comparison of the current and project ratio indicates the change to the LOS. If the proposed ratio is equal to or greater than 1.0, the additional volume would cause a decrease to the LOS. Table 4.16-6 presents the existing volume to capacity ratio based on this data, and the volume to capacity ratio with the addition of worker vehicles.

Table 4.16-6
Volume to Capacity Analysis

Roadway	***Existing ADT Volume***	***ADT volume with worker traffic (maximum)***	***Approximate Capacity***	***Existing Volume to Capacity Ratio***	***With Project Volume to Capacity Ratio***
Sierra Boulevard	2,932	2,992	5,700 to maintain LOS C	2932/5700= **0.514**	2992/5700= **0.525**
Barbara Avenue	3,070	3,130	5,700 to maintain LOS C	3070/5700= **0.539**	3130/5700= **0.549**
Highway 50 (at Upper Truckee River Bridge)	32,500	32,560	32,800 to maintain LOS D	32500/32800= **0.991**	32560/32800= **0.993**

On all roads within the study area, the temporary addition of up to 60 vehicle trips per day would not cause the volume to capacity ratio to exceed 1.0 and therefore not cause a decrease to the LOS. Although the project volume to capacity ratio along Highway 50 would approach 1.0, the existing volume to capacity ratio is already approaching 1.0, and the 0.002 temporary increase to the ratio would not be significant.

4.16.4.2 Heavy Equipment Traffic Analysis

Throughout the entire 3 year project, a total of approximately 34 pieces of heavy equipment would be employed for the recommended alternative. Most of the equipment would enter and exit the site through Airport Road once at the beginning, and once at the end of each construction season. Near the Airport entrance, Highway 50 has an annual average daily traffic (AADT) of 13000 (Caltrans 2006) and the addition of 34 equipment vehicles on a few days per year would not increase the AADT. In addition, this does not exceed any of the thresholds established by the regulatory agencies with jurisdiction over the affected roads.

4.16.4.3 Lake Tahoe Airport Air Traffic Analysis

During construction, heavy equipment would enter the site through the airfield, and this could potentially conflict with air traffic. The transport of equipment would be limited to the beginning and end of the indicated construction periods, with some additional trips when necessary. During the first year of construction, the Airport runway project would simultaneously be under construction requiring specific air traffic planning and a reduction in air traffic. This would reduce some of the potential conflict with air traffic operations. In years 2 and 3, however, environmental commitments and mitigation measures discussed below would be required to avoid conflicts and safety hazards associated with the transport of equipment on the airfield.

The analysis above determines that Alternative 2 would have no adverse impacts to automobile traffic and circulation. The project could potentially affect air traffic during construction, however, if environmental commitments and mitigation measures discussed in Section 4.16.6 are implemented those impacts would be reduced to less than significant. All TRPA IEC Transportation/Circulation questions were answered "No" or "No, with mitigation" (Section 5).

4.16.5 Cumulative Impacts

Traffic and circulation impacts from simultaneous projects in the area of the subject project have the potential to cause cumulative impacts that would exceed traffic thresholds. The South Tahoe Greenway project proposes construction of a 9.6 mile class 1 multi-use trail from Meyers, California to Stateline, Nevada. Of the two alternatives being considered, the one that proposes to place the trail along the former Highway 50 bypass corridor would be immediately east of this proposed UTR Airport Reach project. The other South Tahoe Greenway alternative would be located along Pioneer Trail, which would not influence the UTR project. The Sunset Stables

Reach project and California State Parks project are located south of the proposed project.

These projects would all likely move large volumes of soil and could possibly require off-hauling trips and construction worker trips on public roads including Highway 50. However, there is not enough information about the projects at this time to determine the combined impacts on traffic from off-hauling. Regardless of this determination, the UTR Airport Reach project would not involve off-hauling and would not contribute to these cumulative impacts. (TRPA and California Department of Parks and Recreation, 2006; TRPA and California Tahoe Conservancy 2006)

In addition, the Upper Truckee River Marsh project and the River Enhancement project (that includes the remainder of Reach 2 that is privately owned), could involve off-hauling. These projects are still in the planning phase and there is not enough information to determine their impacts on traffic. The Sierra Tract Erosion Control project is underway and would not require a significant amount of offhauling. Although these projects could impact traffic and circulation, the UTR Airport Reach project would not contribute to cumulative impacts from off-hauling.

The Lake Tahoe Airport project to reconstruct an existing runway is adjacent to the proposed project and scheduled to begin construction possibly at the same time in 2008 or in 2009. Potential traffic impacts from the Airport project would only occur along the Highway 50 entrance to the Airport, and not Sierra Boulevard and Barbara Avenue. Additionally, the Categorical Exclusion for the Airport project states that "traffic increases associated with construction activities are considered to be minor," and there is no further analysis with which to assess the cumulative impacts of this project. The impacts associated with air traffic are discussed in section 4.16.4.3 (Lake Tahoe Airport 2007)

4.16.6 Environmental Commitments and Mitigation Measures

The recommended alternative would have a less than significant impact to traffic and circulation, and potential impacts to air traffic have been mitigated to a less than significant level with environmental commitments and mitigation measures listed below.

- Although the heavy equipment that would enter and exit the site from the Airport entrance would not have a significant impact, traffic control on the specific days of transport would help to mitigate potential impacts. The equipment could be large and slow moving, and traffic control during those days would prevent congestion and safety hazards at the intersection of Highway 50 and Airport Road.

- The transportation of heavy equipment through the Airport would also require mitigation measures to eliminate conflict with air traffic and safety hazards. During days of equipment transport, a NOTAM would need to be circulated for safety purposes. The simultaneous Airport runway reconstruction project would require a modification in air traffic operations during the first year of the UTR Airport Reach

construction, and mostly eliminate potential conflicts with air traffic. However, in the second and third years of construction, this impact would be mitigated through communication with Airport staff to specify the timing of airport operations.

4.16.7 Comparative Analysis of Alternatives

The No Action/No Project Alternative would have no impacts to traffic and circulation.. Alternative 2 would no adverse impacts to automobile traffic and circulation but may have impacts to air traffic during construction. However, the impact would be less than significant with environmental commitments and mitigation measures identified in Section 4.16.6 imposed.

4.17 Utilities

The local utility providers include: South Tahoe Public Utility District (STPUD) for water and sewer, Southwest Gas Company for natural gas, Sierra Pacific Power Company for electricity, SBC Communications for telephone and Charter Communications for cable TV. Only STPUD sewer facilities are located within close proximity to the construction area.

4.17.1 Existing Conditions

Only sewer pipelines exist near the proposed disturbance area. Existing water lines and sewer service lines are within the Airport operations area, however there are none located in the proposed disturbance area. Gas and electric lines also exist within the Airport operations areas but not within the proposed areas of disturbance.

The project area lies entirely within the STPUD service area. STPUD has over 14,000 residential water connections, 17,000 sewer connections, and a 7.7 MGD treatment plant that treats 1.8 billion gallons annually. This project will not impact these public services (STPUD, 2007).

In many locations along the UTR in the project reach, municipal sewer pipelines are located near the existing channel. In the past, the STPUD has installed emergency erosion control in the form of riprap weirs or bank revetment in Reaches 2 and 3 in order to protect the lines. Within the project area, the pipelines run in the north/south direction on the eastern edge of the Airport easement. Adjacent to this edge is where land would be disturbed for the construction of a new channel. North of the Airport easement, the pipelines continue to the north, and remain on the western side of the river path though the project boundary. The specific location of the sewer pipelines within the project area is shown on Figure 4.11-1.

4.17.2 Significance Criteria

4.17.2.1 NEPA and CEQA

The project would cause significant impacts to Public Services (Utilities) if it:

- Requires or results in the construction of new water or wastewater facilities or expansion of existing facilities, the construction of which could cause significant effects.
- Requires or results in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.
- Is not served by a landfill with sufficient space permitted to accommodate the project's solid waste disposal needs.
- Does not comply with federal, state, and local statutes and regulations related to solid waste.

4.17.2.2 TRPA

TRPA maintains several environmental criteria for establishing the significance of impacts of a project on public utilities. For the purposes of this analysis, a significant impact would result if the project would result if one or more of the IEC questions was answered Yes. The TRPA IEC was completed for the Recommended Alternative, Alternative 2. The results of the checklist questions are discussed in the analysis. A copy of the TRPA IEC is included in Section 5

4.17.2.3 Assumptions

- The project would not require the expansion or modification of any public utility.
- The project would not require the disposal of excess fill material into a landfill.

4.17.3 Environmental Consequences/Environmental Impacts of the No Action/No Project Alternative

Under the No Action/No Project Alternative, the utility pipelines would not be impacted by construction or the existing river channel.

4.17.4 Environmental Consequences/Environmental Impacts of Alternative 2 – New Channel East of the Airport (Recommended Alternative)

The proposed project could potentially impact the utility pipelines during the construction near the pipelines, and in the future if the new river channel undergoes geomorphic change in areas adjacent to the pipelines.

Construction of the new river channel would require excavation within 100 feet of the existing utility pipelines. However, the existing Airport fence is located between the excavation area and the sewer pipelines. Destabilization of the soils supporting the pipelines could potentially impact the stability of the pipelines, and construction errors could directly damage the pipeline. However, the project includes measures discussed below that would protect the pipelines and the supporting soil matrix. Construction of engineered protection of the pipelines would be included along locations where the existing river channel currently approaches the pipelines and locations where the new river path and excavation would be next to the pipelines.

The project would not require construction of new pipelines, or the modification of existing pipelines. No additional water, wastewater, or stormwater would be required from, or added to, existing treatment facilities, and no new solid waste would be generated by the project. Therefore, the project would not have significant impacts as determined by NEPA or CEQA thresholds.

The TRPA IEC checklist questions for utilities are all answered “No”. Therefore, the project would have not impacts to utilities as determined by TRPA.

4.17.5 Cumulative Impacts

The projects identified in Section 4.1 that may be under construction at the same time as the proposed project have been considered and evaluated for potential combined impacts to utilities. The Airport runway project and the Highway 50 bypass alternative of the South Tahoe Greenway project are both immediately adjacent to the construction area, but would not likely impact the utilities on the site. The South Tahoe Greenway and Airport runway reconstruction projects may involve construction near the pipelines as well, however, these projects would similarly be required to mitigate significant impacts. The Sunset Stables Reach project and Sierra Tract Erosion Control project could also impact the pipelines with nearby construction, and would be required to mitigate for impacts as well.

None of the projects considered would require additional water, wastewater, treatment facilities or stormwater facilities beyond those planned by the project. Solid waste generated from the project would be disposed of according to TRPA requirements. The Airport Reach project would not significantly impact local utilities. Therefore, the project would not contribute to cumulative impacts to utilities.

4.17.6 Environmental Commitments and Mitigation Measures

Although the project would not have any significant impacts, the following measures would still be employed to address safety and potential utility conflicts during grading activities.

- The contractor shall confirm the exact location of the pipeline near the excavation area. In addition to the existing fence that borders the Airport and the pipelines, fences would be constructed to protect the pipelines in the excavation and construction areas as needed.

- Engineered bank toe protection along the Airport easement would be constructed to protect potential lateral movement of the channel into the pipelines within the Airport property.

4.17.7 Comparative Analysis of Alternatives

No significant impacts to utilities would occur from either of the alternatives. The No Action/No Project Alternative would have no utility impacts. Alternative 2 could potentially have utility impacts; however, the project includes measures to eliminate this potential.

4.18 Indian Trust Assets

Indian Trust Assets (ITAs) are land, natural resources, or other assets held in trust by the United States government for Indian tribes or individuals. Federal agencies are required to take responsibility for protection and maintenance of ITAs. NEPA documents are required to discuss all impacts to ITAs and provide appropriate compensation or mitigation.

As shown in Figure 4.18.1, ITAs are not present within the project area or adjacent to the project area. Therefore, there would be no impacts to ITAs from the project. (Bureau of Indian Affairs 2000).

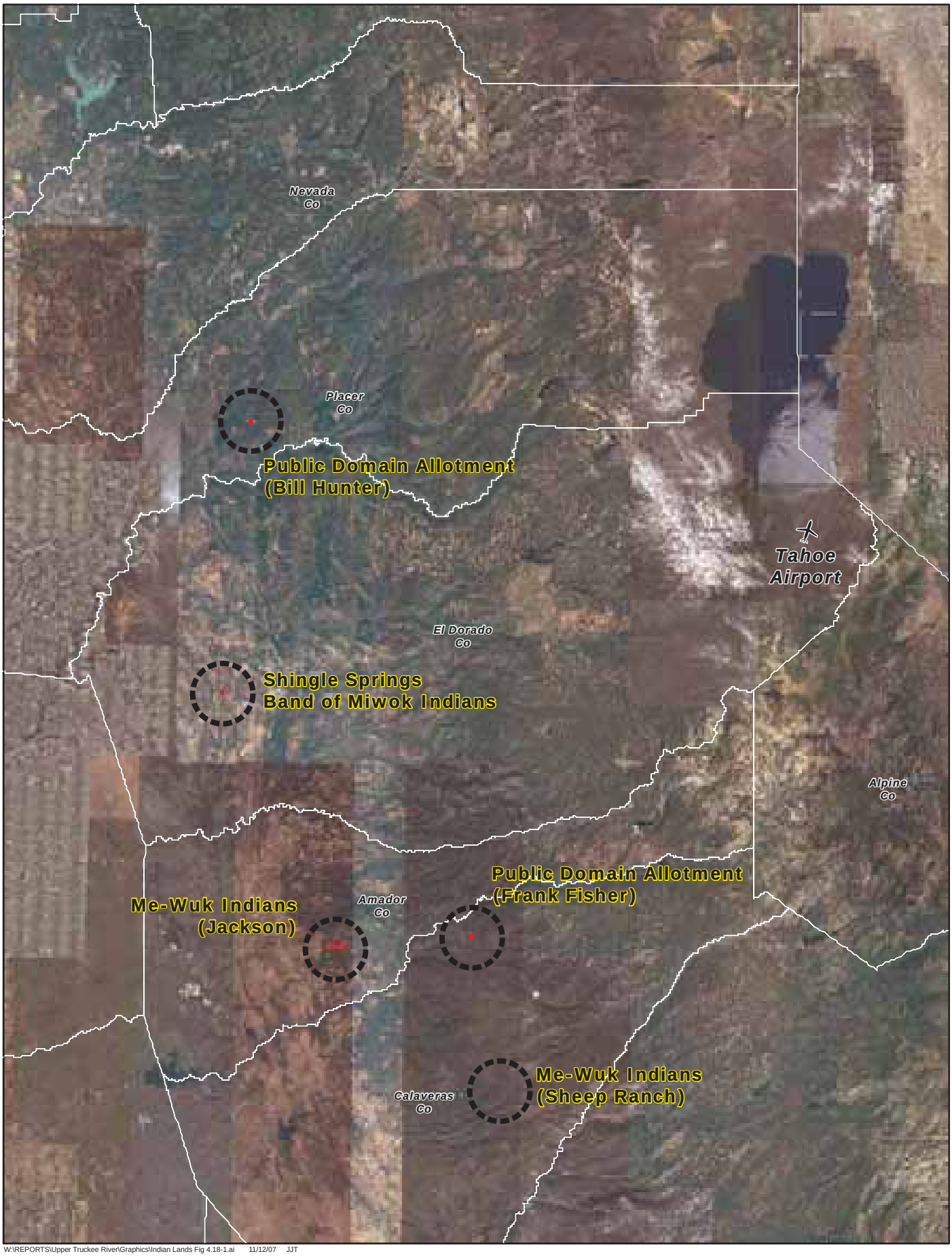


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Figure 4.18-1
Indian Lands

4.19 Environmental Justice

Environmental Justice is defined by the U.S. EPA as "….the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies (EPA 2007)."

Two principles central to the analysis of Environmental Justice are:

- Fair treatment of all people regardless of race, color, nation of origin or income; and
- Promotion of public participation by minority and/or low-income populations.

4.19.1 Existing Conditions

The following section presents 2000 Census data from the U.S. Census Bureau. Census Tract 304.02 includes the Lake Tahoe Airport and neighborhoods west of the Airport. Census Tract 305.01 includes neighborhoods east of the Airport. Figure 4.19-1 shows the locations of the Census Tracts in the vicinity of the Airport.

4.19.1.1 Minority and Low-Income Populations

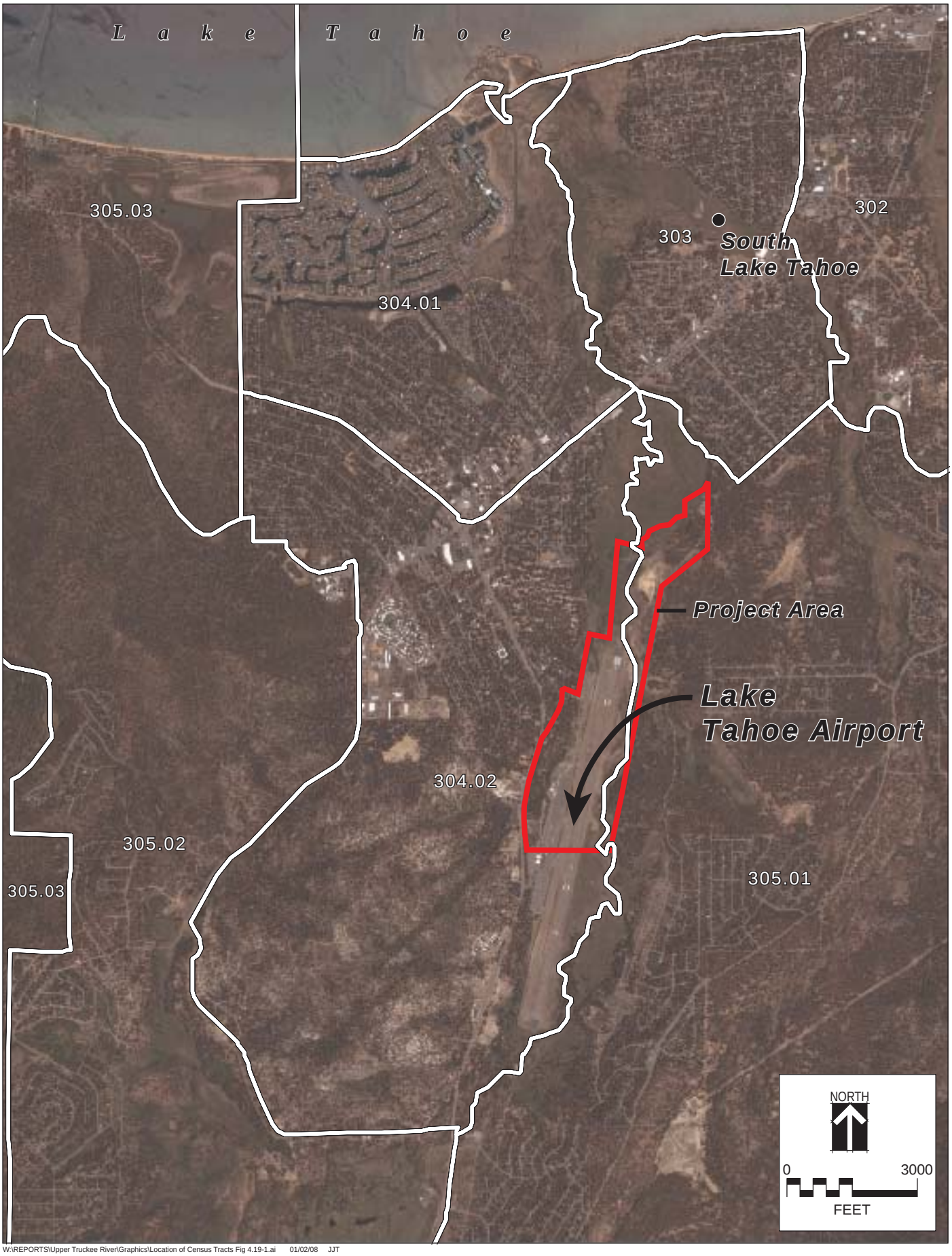
Table 4.19-1 presents population and income data for the two Census Tracts within the study area. The 1999 median household income is approximately 33,000 dollars for Census Tract 304.02, and 57,000 dollars for Census Tract 305.01. The 1999 median household income for all of El Dorado County is 51,484 dollars. Approximately 15.2 percent of the population in Census Tract 304.02 has income below the poverty level, while only 4 percent in Census Tract 305.01 has income below the poverty level.

Table 4.19-1
Population and Income by Census Tract

Parameter	*Census Tract 304.02, El Dorado County, California*	*Census Tract 305.01, El Dorado County, California*
Total Population	4,155	6,174
Minority Population[(1)]	835	607
Minority Percentage[(1)]	20%	9.9%
Median Household Income in 1999	$32,574	$56,528
Income below the poverty level in 1999.	15.2%	4%

[(1)] This includes the Hispanic or Latino population.
(U.S. Census Bureau 2000).

Table 4.19-2 shows the ethnic breakdown of the population in each Census Tract. The majority of the population in the study area (80 percent in Census Tract 304.02 and 90.1 percent in Census Tract 305.01) is white. The total minority population in Census Tract 304.02 is 835, or 20 percent of the total population. The total minority population in Census Tract 305.01 is 607 or 9.9 percent of the total population. The majority of the minority population is Hispanic or Latino in both Census Tracts.



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Source: SACOG

CDM

Figure 4.19-1
Location of Census Tracts

Table 4.19-2 Race/Ethnicity by Census Tract				
	Census Tract 304.02, El Dorado County, California		Census Tract 305.01, El Dorado County, California	
Race/Ethnicity	Total	%	Total	%
Not Hispanic or Latino:	**3,572**	**86.0%**	**5,898**	**94.5%**
White	3,320	80.0%	5,567	90.1%
Black or African American	25	0.6%	102	1.7%
American Indian and Alaska Native	58	1.4%	7	0.1%
Asian	120	2.9%	73	1.2%
Native Hawaiian and Other Pacific Islander	13	0.3%	19	0.3%
Some other race	6	0.1%	10	0.2%
Two or more races	30	0.7%	120	1.9%
Hispanic or Latino:	**583**	**14.0%**	**276**	**4.5%**
White	203	4.9%	167	2.7%
Black or African American	9	0.2%	0	0.0%
American Indian and Alaska Native	4	0.1%	0	0.0%
Asian	0	0.0%	0	0.0%
Native Hawaiian and Other Pacific Islander	0	0.0%	0	0.0%
Some other race	367	8.8%	81	1.3%
TOTAL	**4,155**	**100.0%**	**6,174**	**100.0%**

(U.S. Census Bureau 2000).

4.19.1.2 Recent Home Sales

According to Sacramento Bee's Home Sale Database, home prices in the neighborhoods near the project site are fairly similar to home prices in the surrounding South Lake Tahoe area. From February to August of 2007, the average 3 bedroom, 2 bathroom home in South Lake Tahoe with a 96150 zip code was sold for approximately 480,000 dollars. Three homes that sold in the same time period near the study area (including one on Onnontioga Street and two on Koyukon Drive) were priced at 335,000 to 490,000 dollars (Sacramento Bee 2007). Home prices in the study area appear to be relatively similar to those throughout the remaining South Lake Tahoe area.

4.19.1.3 Regulatory Framework

Executive Order 12898 of February 11, 1994 directs all federal agencies to identify and address the disproportionately high and adverse human health or environmental effects of their programs, policies, and activities on minority and low-income populations. All federal agencies are required to include analysis of Environmental Justice within NEPA documents. Minority population is defined as including all non-white racial groups and Hispanics of any racial group; low-income population is defined based on federal poverty thresholds (Council of Environmental Quality 1997).

Reclamation is required to analyze Environmental Justice issues when implementing policies, projects, or programs. A discussion of Environmental Justice is required in all NEPA-related documents. Potential impacts to minority and/or low-income populations must be identified in the document along with reasonable mitigation measures to avoid or reduce the impacts. Reclamation also promotes active engagement of minority and low-income communities within the public scoping and involvement processes.

California State Government Code Section 65040.12(e) defines environmental justice as the fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations and policies. The California Office of Planning and Research (OPR) is the state agency responsible for coordinating environmental justice programs. OPR is responsible for developing guidelines for incorporating environmental justice into general plans.

El Dorado County's General Plan and the City of South Lake Tahoe's General Plan do not contain guidelines related to Environmental Justice. TRPA does not require an analysis of Environmental Justice on their IEC.

4.19.2 Significance Criteria and Assessment Methods

4.19.2.1 NEPA

Implementation of the proposed project would result in a significant environmental justice impact if it would:

- Expose a minority or low-income population to significant and disproportionate impacts or hazards.
- Not take efforts to encourage public participation within minority or low-income population segments.

4.19.2.2 TRPA

TRPA does not list any significance criteria related to environmental justice in any of their guidance documentation.

4.19.2.3 Assessment Methods

U.S. 2000 Census data was used to identify the percentage of minority and low income populations within the study area to determine if Environmental Justice impacts would occur. Data provided the percentage of individuals who are listed as minorities in Census Tracts in the study area. The demographic analysis also identified percentage of the population living below the poverty level.

4.19.3 Environmental Consequences/Environmental Impacts of the No Action/No Project Alternative

The No Action/No Project Alternative is the future condition without the project. Under this alternative, no work would be performed in the study area, however there could be projects upstream implemented or constructed in the future.

No disproportionate effects would occur to low income or minority populations from the implementation of No Action/No Project Alternative. Under existing Federal, State and local regulations, the Airport would never be allowed to encroach further east into the floodplain with or without the project. Construction of upstream projects would have no environmental justice effect in the study area since they would be located far from any neighboring properties.

All of the land included in the project area is publicly owned and would not be subject to development projects that could have environmental justice impacts. Since no construction work would be proposed as part of the No Action/No Project Alternative, there would be no environmental justice effects as a result of this alternative.

There would be no environmental justice impacts under the No Action/No Project Alternative.

4.19.4 Environmental Consequences/Environmental Impacts of Alternative 2 – New Channel East of the Airport (Recommended Alternative)

Any construction-related effects to adjacent residential properties including traffic, noise, or visual effects would not have a disproportionate effect to low income and/or minority populations. Census data obtained from the U.S. Census Bureau shows no large populations of low-income or minority groups within the study area. All residents would be impacted equally and any impacts would only be temporary. There would be no Environmental Justice impacts under Alternative 2.

4.19.5 Cumulative Impacts

There would be no environmental justice impacts under Alternative 2; therefore Alternative 2 would not contribute to any cumulative impacts.

4.19.6 Environmental Commitments and Mitigation Measures

There would be no Environmental Justice impacts; therefore no environmental commitments or mitigation measures are necessary.

4.19.7 Comparative Analysis of Alternatives

The No Action/No Project Alternative and Alternative 2 would not result in any disproportionate effects to low income and/or minority populations and would therefore have no Environmental Justice impacts.

Section 5
TRPA Initial Environmental Checklist

This document is a joint NEPA/CEQA/TRPA Environmental Document. TRPA made an environmental determination based on review of this IEC and considering that a NEPA Environmental Assessment and a CEQA Initial Study have been prepared to analyze and provide mitigation for potentially significant environmental impacts resulting from the project. TRPA determined that the TRPA IEC was adequate for the TRPA portion of the environmental document. (Elam 2007)

The completed TRPA IEC is included on the following pages. Supplemental information including explanations of "Yes", "No, with mitigation", and "Data insufficient" answers follows the checklist. All questions were answered "No" for several resource areas including: Noise, Light and Glare, Land Use, Natural Resources, Risk of Upset, Population, Housing, Public Services, Energy, Utilities, and Scenic Resources. These questions on the checklist are used as significance criteria to determine if a resource issue would be significantly impacted by the project and during construction of the project.

TAHOE REGIONAL PLANNING AGENCY

128 Market St. Stateline, NV | PO Box 5310 Stateline, NV 89449-5310 | Mon-Fri 9:00 am-5:00 pm | Accepting Applications 9:00 am-4:00 pm

Phone: (775) 588-4547 | Fax: (775) 588-4527 | www.trpa.org | trpa@trpa.org

Print Form

INITIAL ENVIRONMENTAL CHECKLIST FOR DETERMINATION OF ENVIRONMENTAL IMPACT

I. Assessor's Parcel Number (APN)/Project Location See attached list.

Project Name UTR Restoration Project Middle Reaches 3 & 4 County/City South Lake Tahoe

Brief Description of Project:

See attached description.

The following questionnaire will be completed by the applicant based on evidence submitted with the application. All "Yes" and "No, With Mitigation" answers will require further written comments.

II. ENVIRONMENTAL IMPACTS:

1. Land

Will the proposal result in:

a. Compaction or covering of the soil beyond the limits allowed in the land capability or Individual Parcel Evaluation System (IPES)?

- ☐ Yes
- ☒ No
- ☐ No, With Mitigation
- ☐ Data Insufficient

b. A change in the topography or ground surface relief features of site inconsistent with the natural surrounding conditions?

- ☐ Yes
- ☐ No
- ☒ No, With Mitigation
- ☐ Data Insufficient

c. Unstable soil conditions during or after completion of the proposal?

- ☐ Yes
- ☐ No
- ☒ No, With Mitigation
- ☐ Data Insufficient

d. Changes in the undisturbed soil or native geologic substructures or grading in excess of 5 feet?

- ☐ Yes
- ☐ No
- ☒ No, With Mitigation
- ☐ Data Insufficient

e. The continuation of or increase in wind or water erosion of soils, either on or off the site?

- ☐ Yes
- ☐ No
- ☒ No, With Mitigation
- ☐ Data Insufficient

f. Changes in deposition or erosion of beach sand, or changes in siltation, deposition or erosion, including natural littoral processes, which may modify the channel of a river or stream or the bed of a lake?

☒ Yes ☐ No

☐ No, With Mitigation ☐ Data Insufficient

g. Exposure of people or property to geologic hazards such as earthquakes, landslides, backshore erosion, avalanches, mud slides, ground failure, or similar hazards?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

2. Air Quality

Will the proposal result in:

a. Substantial air pollutant emissions?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

b. Deterioration of ambient (existing) air quality?

☐ Yes ☐ No

☒ No, With Mitigation ☐ Data Insufficient

c. The creation of objectionable odors?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

d. Alteration of air movement, moisture or temperature, or any change in climate, either locally or regionally?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

e. Increased use of diesel fuel?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

3. Water Quality

Will the proposal result in:

a. Changes in currents, or the course or direction of water movements?

☒ Yes ☐ No

☐ No, With Mitigation ☐ Data Insufficient

b. Changes in absorption rates, drainage patterns, or the rate and amount of surface water runoff so that a 20 yr. 1 hr. storm runoff (approximately 1 inch per hour) cannot be contained on the site?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

c. Alterations to the course or flow of 100-yearflood waters?

☒ Yes ☐ No

☐ No, With Mitigation ☐ Data Insufficient

d. Change in the amount of surface water in any water body?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

e. Discharge into surface waters, or in any alteration of surface water quality, including but not limited to temperature, dissolved oxygen or turbidity?

☐ Yes ☐ No

☒ No, With Mitigation ☐ Data Insufficient

f. Alteration of the direction or rate of flow of ground water?

☐ Yes ☐ No

☒ No, With Mitigation ☐ Data Insufficient

g. Change in the quantity of groundwater, either through direct additions or withdrawals, or through interception of an aquifer by cuts or excavations?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

h. Substantial reduction in the amount of water otherwise available for public water supplies?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

i. Exposure of people or property to water related hazards such as flooding and/or wave action from 100-year storm occurrence or seiches?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

j. The potential discharge of contaminants to the groundwater or any alteration of groundwater quality?

☐ Yes ☐ No

☒ No, With Mitigation ☐ Data Insufficient

k. Is the project located within 600 feet of a drining water source?

☒ Yes ☐ No

☐ No, With Mitigation ☐ Data Insufficient

4. Vegetation

Will the proposal result in:

a. Removal of native vegetation in excess of the area utilized for the actual development permitted by the land capability/IPES system?

☐ Yes ☐ No

☒ No, With Mitigation ☐ Data Insufficient

b. Removal of riparian vegetation or other vegetation associated with critical wildlife habitat, either through direct removal or indirect lowering of the groundwater table?

☐ Yes ☐ No

☒ No, With Mitigation ☐ Data Insufficient

c. Introduction of new vegetation that will require excessive fertilizer or water, or will provide a barrier to the normal replenishment of existing species?

☐ Yes ☐ No

☒ No, With Mitigation ☐ Data Insufficient

d. Change in the diversity or distribution of species, or number of any species of plants (including trees, shrubs, grass, crops, micro flora and aquatic plants)?

☐ Yes ☐ No

☒ No, With Mitigation ☐ Data Insufficient

e. Reduction of the numbers of any unique, rare or endangered species of plants?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

f. Removal of stream bank and/or backshore vegetation, including woody vegetation such as willows?

☐ Yes ☐ No

☒ No, With Mitigation ☐ Data Insufficient

g. Removal of any native live, dead or dying trees30 inches or greater in diameter at breast height (dbh) within TRPA's Conservation or Recreation land use classifications?

☐ Yes ☐ No

☒ No, With Mitigation ☐ Data Insufficient

h. A change in the natural functioning of an old growth ecosystem?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

5. Wildlife

Will the proposal result in:

a. Change in the diversity or distribution of species, or numbers of any species of animals (birds, land animals including reptiles, fish and shellfish, benthic organisms, insects, mammals, amphibians or microfauna)?

☐ Yes ☐ No

☒ No, With Mitigation ☐ Data Insufficient

b. Reduction of the number of any unique, rare or endangered species of animals?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

c. Introduction of new species of animals into an area, or result in a barrier to the migration or movement of animals?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

d. Deterioration of existing fish or wildlife habitat quantity or quality?

☐ Yes ☐ No

☒ No, With Mitigation ☐ Data Insufficient

6. Noise

Will the proposal result in:

a. Increases in existing Community Noise Equivalency Levels (CNEL) beyond those permitted in the applicable Plan Area Statement, Community Plan or Master Plan?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

b. Exposure of people to severe noise levels?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

c. Single event noise levels greater than those set forth in the TRPA Noise Environmental Threshold?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

7. Light and Glare

Will the proposal:

a. Include new or modified sources of exterior lighting?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

b. Create new illumination which is more substantial than other lighting, if any, within the surrounding area?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

c. Cause light from exterior sources to be cast off -site or onto public lands?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

d. Create new sources of glare through the siting of the improvements or through the use of reflective materials?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

8. Land Use

Will the proposal:

a. Include uses which are not listed as permissible uses in the applicable Plan Area Statement, adopted Community Plan, or Master Plan?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

b. Expand or intensify an existing non-conforming use?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

9. Natural Resources

Will the proposal result in:

a. A substantial increase in the rate of use of any natural resources?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

b. Substantial depletion of any non-renewable natural resource?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

10. Risk of Upset

Will the proposal:

a. Involve a risk of an explosion or the release of hazardous substances including, but not limited to, oil, pesticides, chemicals, or radiation in the event of an accident or upset conditions?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

b. Involve possible interference with an emergency evacuation plan?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

11. Population

Will the proposal:

a. Alter the location, distribution, density, or growth rate of the human population planned for the Region?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

b. Include or result in the temporary or permanent displacement of residents?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

12. Housing

Will the proposal:

a. Affect existing housing, or create a demand for additional housing?

To determine if the proposal will affect existing housing or create a demand for additional housing, please answer the following questions:

(1) Will the proposal decrease the amount of housing in the Tahoe Region?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

(2) Will the proposal decrease the amount of housing in the Tahoe Region historically or currently being rented at rates affordable by lower and very-low-income households?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

Number of Existing Dwelling Units: **0**

Number of Proposed Dwelling Units: **0**

b. Will the proposal result in the loss of housing for lower-income and very-low-income households?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

13. Transportation/Circulation

Will the proposal result in:

a. Generation of 100 or more new Daily Vehicle Trip Ends (DVTE)?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

b. Changes to existing parking facilities, or demand for new parking?

☐ Yes ☐ No

☒ No, With Mitigation ☐ Data Insufficient

c. Substantial impact upon existing transportation systems, including highway, transit, bicycle or pedestrian facilities?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

d. Alterations to present patterns of circulation or movement of people and/or goods?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

e. Alterations to waterborne, rail or air traffic?

☐ Yes ☐ No

☒ No, With Mitigation ☐ Data Insufficient

f. Increase in traffic hazards to motor vehicles, bicyclists, or pedestrians?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

14. Public Services

Will the proposal have an unplanned effect upon, or result in a need for new or altered governmental services in any of the following areas?

a. Fire protection?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

b. Police protection?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

c. Schools?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

d. Parks or other recreational facilities?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

e. Maintenance of public facilities, including roads?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

f. Other governmental services?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

15. Energy

Will the proposal result in:

a. Use of substantial amounts of fuel or energy?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

b. Substantial increase in demand upon existing sources of energy, or require the development of new sources of energy?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

16. Utilities

Except for planned improvements, will the proposal result in a need for new systems, or substantial alterations to the following utilities:

a. Power or natural gas?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

b. Communication systems?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

c. Utilize additional water which amount will exceed the maximum permitted capacity of the service provider?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

d. Utilize additional sewage treatment capacity which amount will exceed the maximum permitted capacity of the sewage treatment provider?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

e. Storm water drainage?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

f. Solid waste and disposal?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

17. Human Health

Will the proposal result in:

a. Creation of any health hazard or potential health hazard (excluding mental health)?

☐ Yes ☐ No

☒ No, With Mitigation ☐ Data Insufficient

b. Exposure of people to potential health hazards?

☐ Yes ☐ No

☒ No, With Mitigation ☐ Data Insufficient

18. Scenic Resources/Community Design

Will the proposal:

a. Be visible from any state or federal highway, Pioneer Trail or from Lake Tahoe?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

b. Be visible from any public recreation area or TRPA designated bicycle trail?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

c. Block or modify an existing view of Lake Tahoe or other scenic vista seen from a public road or other public area?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

d. Be inconsistent with the height and design standards required by the applicable ordinance or Community Plan?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

e. Be inconsistent with the TRPA Scenic Quality Improvement Program (SQIP) or Design Review Guidelines?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

19. Recreation

Does the proposal:

a. Create additional demand for recreation facilities?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

b. Create additional recreation capacity?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

c. Have the potential to create conflicts between recreation uses, either existing or proposed?

☐ Yes ☐ No

☒ No, With Mitigation ☐ Data Insufficient

d. Result in a decrease or loss of public access to any lake, waterway, or public lands?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

20. Archaeological/Historical

a. Will the proposal result in an alteration of or adverse physical or aesthetic effect to a significant archaeological or historical site, structure, object or building?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

b. Is the proposed project located on a property with any known cultural, historical, and/or archaeological resources, including resources on TRPA or other regulatory official maps or records?

☐ Yes ☐ No

☒ No, With Mitigation ☐ Data Insufficient

c. Is the property associated with any historically significant events and/or sites or persons?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

d. Does the proposal have the potential to cause a physical change which would affect unique ethnic cultural values?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

e. Will the proposal restrict historic or pre-historic religious or sacred uses within the potential impact area?

☐ Yes ☒ No

☐ No, With Mitigation ☐ Data Insufficient

21. Findings of Significance.

a. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California or Nevada history or prehistory?

☐ Yes ☐ No

☒ No, With Mitigation ☐ Data Insufficient

b. Does the project have the potential to achieve short-term, to the disadvantage of long-term, environmental goals? (A short-term impact on the environment is one which occurs in a relatively brief, definitive period of time, while long-term impacts will endure well into the future.)

☐ Yes ☐ No

☒ No, With Mitigation ☐ Data Insufficient

c. Does the project have impacts which are individually limited, but cumulatively considerable? (A project may impact on two or more separate resources where the impact on each resource is relatively small, but where the effect of the total of those impacts on the environmental is significant?)

☐ Yes ☐ No

☒ No, With Mitigation ☐ Data Insufficient

d. Does the project have environmental impacts which will cause substantial adverse effects on human being, either directly or indirectly?

☐ Yes ☐ No

☒ No, With Mitigation ☐ Data Insufficient

DECLARATION:

I hereby certify that the statements furnished above and in the attached exhibits present the data and information required for this initial evaluation to the best ofmy ability, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

Signature: **(Original signature required.)**

_____ At _____ Date: _____

Person Preparing Application — County

Applicant Written Comments: (Attach additional sheets if necessary)

See attached.

Print Form

FOR OFFICE USE ONLY

Date Received: _____ By: _____

Determination:

On the basis of this evaluation:

a. The proposed project could not have a significant effect on the environment and a finding of no significant effect shall be prepared in accordance with TRPA's Rules of Procedure.

☐ Yes ☐ No

b. The proposed project could have a significant effect on the environment, but due to the listed mitigation measures which have been added to the project, could have no significant effect on the environment and a mitigated finding of no significant effect shall be prepared in accordance with TRPA's Rules and Procedures.

☐ Yes ☐ No

c. The proposed project may have a significant effect on the environment and an environmental impact statement shall be prepared in accordance with this chapter and TRPA's Rules of Procedure

☐ Yes ☐ No

_____ Date: _____

Signature of Evaluator

Title of Evaluator

The following is to be used as a supplemental checklist for the Tahoe Regional Planning Agency Initial Environmental Checklist (IEC). It is to be used when reviewing any transfer pursuant to Chapter 34 of the Code of Ordinances or Conversion of Use pursuant to Chapter 33 of the Code of Ordinances. Any question answered in the affirmative will require written documentation showing that the impacts will be mitigated to a less than significant level. Otherwise, an environmental impact statement will be required.

The asterisk (*) notes threshold subjects.

a) Land *
Does the proposal result in any additional land coverage?

☐ Yes ☐ No

☐ No, With Mitigation ☐ Data Insufficient

b) Air Quality *
Does the proposal result in any additional emission?

☐ Yes ☐ No

☐ No, With Mitigation ☐ Data Insufficient

c) Water *
Does the proposal result in any additional discharge that is in violation of TRPA discharge standards?

☐ Yes ☐ No

☐ No, With Mitigation ☐ Data Insufficient

d) Does the proposal result in an increase in the volume of discharge?

☐ Yes ☐ No

☐ No, With Mitigation ☐ Data Insufficient

e) Noise *
Does the proposal result in an increase in Community Noise Equivalency Level (CNEL)?

☐ Yes ☐ No

☐ No, With Mitigation ☐ Data Insufficient

f) Aesthetics *
Does the proposal result in blockage of significant views to Lake Tahoe or an identified visual resource?

☐ Yes ☐ No

☐ No, With Mitigation ☐ Data Insufficient

g) Recreation *
Does the proposal result in a reduction of public access to public recreation areas or public recreation opportunities?

☐ Yes ☐ No

☐ No, With Mitigation ☐ Data Insufficient

h) Land Use
Does the converted or transferred use result in a use that is not consistent with the goals and policies of the Community Plan or Plan Area Statement?

☐ Yes ☐ No

☐ No, With Mitigation ☐ Data Insufficient

i) Population
Does the proposal result in an increase in the existing or planned population of the Region?

☐ Yes ☐ No

☐ No, With Mitigation ☐ Data Insufficient

j) Housing
Does the proposal result in the loss of affordable housing?

☐ Yes ☐ No

☐ No, With Mitigation ☐ Data Insufficient

k) Transportation
Does the proposal result in the increase of100 Daily Vehicle Trip Ends (DVTE)?

☐ Yes ☐ No

☐ No, With Mitigation ☐ Data Insufficient

l) Does the proposal result in a project that does not meet the parking standards?

☐ Yes ☐ No

☐ No, With Mitigation ☐ Data Insufficient

m) Utilities
Does the proposal result in additional water use?

☐ Yes ☐ No

☐ No, With Mitigation ☐ Data Insufficient

n) Does the proposal result in the need for additional sewer treatment?

☐ Yes ☐ No

☐ No, With Mitigation ☐ Data Insufficient

o) Historical
Does the proposal result in the modification or elimination of a historic structure or site?

☐ Yes ☐ No

☐ No, With Mitigation ☐ Data Insufficient

DECLARATION:

I hereby certify that the statements furnished above and in the attached exhibits present the data and information required for this initial evaluation to the best of my ability, and that the facts, statements, and information presented are true and correct to the best of my knowledge and belief.

Signature: **(Original signature required.)**

_____ At_____Date:_____

Person Preparing Application County

Applicant Written Comments: (Attach additional sheets if necessary)

Print Form

5.1 Supplemental Information

5.1.1 Land

1b. Will the proposal result in a change in the topography or ground surface relief features of the site inconsistent with the natural surrounding conditions?

No, with mitigation. Approximately 4,000 feet of new channel would be constructed at a sinuosity of 1.24. A new floodplain would be constructed by excavating fill east of the Airport fence line. Channel capacity would be reduced in the Airport Reach from approximately 1,000 cfs, under the existing condition, to 450 cfs in the new channel. Beginning at approximately RS 13000, the Airport fill on the west bank would be excavated. The depth of excavation would progressively decrease to about 2 feet at approximately RS 12000, at which point the floodplain surface would equal the top of bank elevation of the new channel with a design discharge of 450 cfs. Excavation of 2 feet or more of the Airport fill would continue downstream and end at RS 8900, allowing the new channel to flow back into the existing channel.

The total excavation volume would be approximately 52,000 cubic yards

No floodplain would be excavated downstream of the Airport reach, between RS 8900 through RS 5050. Channel capacity in this reach would remain similar to the existing condition, ranging from about 450 cfs to 1,000 cfs. Some reduction in channel capacity would be achieved through construction of in-channel structures (e.g., large wood or boulder clusters).

Cross-section geometry in the newly constructed channel would be more heterogeneous than the largely planar bed existing condition. Constructed pools and riffles associated with the meandering channel form would add complexity to channel topography. Channel width would vary along a pool-riffle unit. At channel capacity, preliminary analysis indicates that mean channel width in the new Airport Reach channel would be about 40 feet, and mean channel depth would be about 4.0 feet.

Upstream and downstream of the new channel, channel width would continue to range from approximately 63 to 70 feet, and mean channel depth would be about 4.0 feet. Placement of habitat structures in these reaches would promote future changes in channel geometry. Alteration of hydraulics and sediment transport at the constructed habitat structures would create localized diversity in the channel geometry, including scour pools, coarse grained riffles, and depositional bars.

Downstream of the excavated Airport fill, RS 8900 to RS 5050, no changes would be made to the existing meadow surface. Overbanking onto the floodplain would slightly increase due to the increased hydraulic roughness and resultant rise in the water surface elevation created by the constructed in-channel structures.

These features would be consistent with historical topography prior to Airport construction, however, the project would not be restoring the river back to the original channel because the Airport will remain in its current location. STPUD gravity and export lines are also a constraint for placing the river back into the original channel. Topographic changes resulting

from the project would tie in with existing topography surrounding the project. Increasing floodplain and removing fill placed in the area from Airport construction would help to restore the SEZ and floodplain.

1c. Will the proposal result in unstable soil conditions during or after completion of the proposal?

No, with mitigation. Approximately 52,000 cubic yards of soil would be excavated during construction and stockpiled at an upland location on the east side of the river. The material would be stockpiled for up to 3 years while vegetation along the new channel is seasoning. Approximately 35,000 cubic yards of this fill material would be reused on site for floodplain restoration or placed in the original channel once the new channel is ready for implementation. The excess fill would remain at the stockpile location and revegetated.

A large amount of vegetation material would also be removed including willows, sod and trees. This material where salvageable would also be stockpiled until it is ready to be replanted. The time needed for stockpiling of the vegetation material would be up to 3 years.

Temporary access roads would be constructed for transport of fill and/or stockpiling material. These roads would likely be constructed of gravel and road base. These roads would not be permanent and would be removed and restored to the preconstruction condition. Areas would be revegetated or stabilized where needed once use of the roads is complete.

Most of the excavation and grading would take place between August and October 15, 2008. There could be additional grading the following summer at different times. The stockpiled fill would be placed back into the original channel between July and October 15, 2008 in 2010.

The following temporary BMPs and construction controls would be implemented during construction. These construction controls are being included to help reduce impacts to the hydrology and water quality, soils and geology, and biological resources.

- *Earthwork shall be confined to areas of construction activities according to the construction phasing plan and Figure 3-3. This information will be included in the contractor specifications. Filter fencing will be installed around all of the stockpile locations and equipment storage areas.*

- *An internal drainage system shall be constructed and maintained within the project site during all construction activities to contain any runoff within the project boundary and prevent it from exiting the site. Localized pumping will be used to hydraulically contain turbid groundwater or standing water as a result of excavation of saturated soil. The turbid water will be treated at an upland area at the project site in a temporary settling basin to levels below TRPA and Lahontan thresholds prior to discharge as described in Section 4.12.5.1. Once water has had time to settle, clean water will be released into a the UTR downstream of RS 8900.*

- *Stockpiled and transported material will be covered to control stormwater runoff.*

- *Construction vehicles will be serviced in specific upland areas or stabilized areas to prevent accidental spills of fluids, oils and lubricants into surface water. This area will consist of a clean gravel pad with an impervious liner underneath.*

- *Construction equipment shall be cleaned to remove any loose dirt or sediment prior to exiting the site. Washing will take place in an area stabilized with crushed stone and drain to an approved sediment trap or basin.*

- *The excess fill disposal locations will be regraded to the natural contours of the surrounding area and revegetated with native upland species.*

- *All spills shall be reported to Lahontan and procedures and response protocols for immediate cleanup outlined in the SWPPP shall be implemented. These procedures shall include placement of sandbags, gravel, boards or other TRPA approved methods to prevent spilled material from entering any drainage facilities or areas.*

- *Construct temporary 4 to 6 foot high water filled berms in Year 1 to isolate the construction site, and protect the river from spring runoff prior to implementation of the new channel. These water filled berms will be placed at the two tie in ends between the old and new channel and run the entire length of the existing channel from the two tie in points. The water filled berm will be wrapped around the low-water crossing at both sides to allow for access across the low-water crossing during construction. Filter fencing will also be constructed between the excavation area and the water filled berm for extra protection.*

- *A railcar crossing/bridge will be constructed to transport materials across the river to prevent interaction with the channel. The bridge will be designed with BMPs to prevent sediment discharges to the UTR. Clean gravel will be placed at the bridge approaches. A silt fence that will be placed along the east and west river banks will be tied into the railcar crossing abutments with a secondary silt fence running under the railcar crossing. Coir logs will be placed on paved surfaces under the railcar crossing. Silt curtains will be placed in the river as an additional protection along the channel from upstream to downstream of the low-water crossing. Access routes will be continuously cleaned with water trucks and brooms trucks. Silt fences and cut off channel connected to small settling basins would be placed along the sides of the access routes.*

- *In channel work sites will be isolated both upstream and downstream by water filled berms with the main flow of the river pumped around the work areas. Water that infiltrates into the isolated project site will be pumped into the new channel alignment downstream and allowed to flow the length of the channel for infiltration. At the end of the new channel alignment remaining water will be pumped to the dewatering site and go through the settling and filtration systems as describe above. Following completion of the first bank stabilization the same procedure will be used on the second bank stabilization.*

  The three fish habitat structures located downstream of the new channel alignment will be dewatered by laying a water filled berm along the existing channel bed to isolate the work area. The main flow will be slightly confined but will remain in the existing channel

alignment. While the work is being completed the water that infiltrates into the work area will be pumped to the dewatering site and go through the settling and filtration systems as describe above. Each fish habitat structure will be completed one after another.

- *The project site will be winterized according to TRPA and Lahontan RWQCB requirements at the end of each construction season. These measures will include: wrapping water filled berm to secure all isolated areas for winter and spring flows around the length of the western approach to the low-water crossing and a small portion along the existing airport fence, wrap water filled berm around the downstream end of the new channel and along a portion of the airport fence, winterize temporary irrigation system installed for plant establishment. Other proposed winterization measures are listed below.*
    - *Maintain all temporary erosion control including filter fencing and coir logs.*
    - *Stabilize all disturbed areas with a heavy mulch.*
    - *Clean up and remove all construction site waste including trash, debris and spoil piles.*
    - *Cover all soil stockpiles with a natural fiber blanket and secure stockpile locations with filter fencing.*
- *Prior to diversion of UTR flows into the new river alignment, the new river channel will be wetted in September of the second construction year, and potentially in the third construction year as well, to prepare the river channel. These wetting flows will either be allowed to infiltrate or be pumped from the downstream end of the new river alignment and treated to ensure compliance with discharge standards prior to their diversion back into to the UTR. This is described in the dewatering discussions in Section 4.12.5.1 During the third construction year clean washed gravel will be placed in the new river channel before the UTR is diverted into the new alignment.*
- *Implement the dewatering plan for each construction year as described in Section 4.12.5.1.*
- *During Year 3, the locations where the new alignment and the existing alignment converge will be graded and armored with a combination of rock and large wood elements. Willow stakes will be incorporated into these engineered areas. Propagated sod will be placed as needed on top of the armored banks.*
- *Revegetate all disturbed areas and old channel with native riparian or upland vegetation where applicable. Salvaged sod, willows and other riparian vegetation will be propagated and used where possible. Additional seed or vegetation will be added where needed for stabilization measures.*

1d. Changes in the undisturbed soil or native geologic substructures or grading in excess of 5 feet?

No, with mitigation. The project may need grading in excess of 5 feet in some locations. TRPA Land Capability staff have waived the Soils Hydrologic Report requirement because this project is a stream restoration project. The project's goal is to increase floodplain by removing large quantities of fill. It is expected that riparian habitat and water quality would benefit from the project.

1e. Will the proposal result in the continuation of or increase in wind or water erosion of soils, either on or off the site?

No, with mitigation. While the project does have the potential to increase water erosion during construction, temporary BMPs would be implemented during construction to mitigate water erosion of soils on site. These temporary BMPs are explained in answer 1c above. The project description includes permanent soil stabilization measures on banks of the UTR which include bioengineered stabilization. A rock toe with backfill would be constructed at these locations to stabilize banks and locally narrow the channel. Engineered bank toe protection along the Airport easement would be constructed to protect potential lateral movement of the channel into the airport. It is expected that once the project is complete, the project would reduce the likelihood of a continuation or increase of water erosion from existing conditions.

The failing dam at RS 12800 would be removed. Bank stabilization treatments would be focused on locations where substantial bank erosion is evident and would continue to be a fine sediment source if left untreated. These are primarily locations where the impinged channel is cutting into the steep east hillslope and producing a continuous source of sediment. Bank erosion considered to be the result of natural fluvial processes (i.e., the outside of meander bends) would not be treated. More localized bank protection would be implemented at locations where existing hydraulic structures are removed or modified, where new hydraulic/habitat structures would be constructed, and at the transition between the existing and new channel.

The failing dam at RS 13300 would be removed. Large footer rock would be placed in the channel near the east bank toe and backfilled with soil and salvaged sod. A hand placed graded rock wall would be constructed up the east bank slope along the entire eroding reach. The rock wall bank stabilization would wrap into and out of the east bank drainage. A rock fall drainage would be constructed to prevent further erosion of sediment from the drainage into the channel. The unstable conifers with exposed roots overhanging the bank would be preserved by extending the height of the rock wall.

Bank protection would be constructed at the transition of the existing channel to the new channel near RS 12000. Bank protection would be necessary to protect the new channel banks from erosive hydraulic forces as water from the higher flow capacity existing channel enters into the lower capacity new channel.

1f. Will the proposal result in changes in deposition or erosion of beach sand, or changes in siltation, deposition or erosion, including natural littoral processes, which may modify the channel of a river or stream or the bed of the lake?

Yes, however this would be a benefit to water quality.. These changes are part of the project design to restore the river channel to a more natural configuration as well as improve riparian habitat by creating additional floodplain through the Airport Reach. This would promote overbanking onto the floodplain once every 1.5 years instead of the 3 to 5 years which currently is the case. Over time, sediment deposition and lateral channel movement promoted by the inchannel structures would produce bars and new incipient floodplain within the incised meander belt. Over time, continued sediment deposition would lead to bed aggradation and a rise in the bed elevation.

Since the fill would be removed and channel capacity decreased in the Airport Reach, raising the bed elevation is probably less important in the Airport Reach than in the downstream reach where the existing meadow elevation would remain unchanged and channel capacity would remain largely high. Therefore, placement of the habitat structures would be focused to raise the bed downstream of the Airport and enhance flooding onto the existing meadow surface.

5.1.2 Air Quality

2b. Will the proposal result in deterioration of ambient (existing) air quality?

No, with mitigation. Dust would be generated during construction. Dust control measures would be implemented including the following.

- *All construction areas, unpaved access roads, and staging areas would be watered as needed during dry soil conditions.*
- *All trucks hauling soil or other loose material would be covered or have at least 2 feet of freeboard. Wherever possible, construction vehicles would use paved roads to access the construction site.*
- *Vehicle speeds would be limited to 15 mph on unpaved roads and construction areas, or as required to control dust.*
- *Streets would be cleaned daily if visible soil material is carried onto adjacent public streets. A vacuum sweeper would be used to contain the runoff and dust.*
- *Soil stabilizers would be applied daily to inactive construction areas as needed.*
- *Exposed stockpiles of soil and other excavated materials would be enclosed, covered, watered twice daily, or applied with soil binders as needed.*
- *Vegetation would be replanted in disturbed areas as quickly as possible following the completion of* construction.

5.1.3 Water Quality

3a. Will the proposal result in changes in currents, or the course or direction of water movements?

Yes, the project would change the course of water movements, however this would be a benefit. The project is to restore this portion of the UTR to a more natural channel and increase the floodplain to promote increased overbanking frequency and sediment deposition. A new channel would be constructed which would change the course of water movements. However, this approach is consistent with current Tahoe Basin restoration management approaches. The goal of the project is to restore plant and wildlife habitat by increasing floodplain area which could result in an overall improvement to the water quality of Lake Tahoe by reducing sediment load reaching the lake. It is anticipated that this action will improve the riparian habitat and ultimately improve water quality.

3c. Will the proposal result in alterations to the course or flow of 100-year flood waters?

Yes, the course of floodwaters could change. See answer to 3a above. Entrix has modeled future flooding conditions and no increase in the extent of flooding is expected to result.

3e. Will the proposal result in discharge into surface waters, or in any alteration of surface water quality, including but not limited to temperature, dissolved oxygen or turbidity?

No, with mitigation. The project includes construction of a new channel in a portion of the UTR. This would require filling of the existing channel in this area once the new channel is ready to be brought online. Natural materials such as logs, boulders, rocks and gravel are proposed to be placed within portions of the existing river channel to provide bank stabilization and habitat structures for river restoration efforts. However, these measures would be implemented to restore the river and surrounding meadow area.

During construction, the potential for a discharge to surface waters could increase. BMPs would be implemented during construction to bring potential impacts to water quality to a less than significant level. These BMPs are described in answer 1c above. A 4' to 6' high water filled berm would be constructed at the two ends of the new channel so there is no direct contact between the new and existing channel.

3f. Will the proposal result in alteration of the direction or rate of flow of ground water?

No, with mitigation. The project does propose to raise groundwater by removing fill to create a new channel and increase floodplain through the project area. However, this is expected to benefit riparian habitat and water quality which are goals of the project. This would not however, result in a change in direction or flow of groundwater.

3j. Will the proposal result in the potential discharge of contaminants to the groundwater or any alteration of groundwater quality?

No, with mitigation. During construction there is the potential of discharge of contaminants to groundwater which could alter groundwater quality. However, temporary BMPs would be constructed to lessen impacts to groundwater quality. These BMPs are described in answer 1c above.

3k. Is the project located within 600 feet of a drinking water source?

Yes. The project is located within the UTR which is an indirect source of surface drinking water for some residents in South Lake Tahoe as a tributary to Lake Tahoe. Groundwater wells may also be located in the area for drinking water. Mitigation measures have been identified in answers 1c and 1e above that will prevent environmental impacts that could affect drinking water.

5.1.4 Vegetation

4a. Will the proposal result in removal of native vegetation in excess of the area utilized for the actual development permitted by the land capability/IPES system.

No, with mitigation. The project is to restore SEZ and riparian habitat, increase floodplain and restore the river channel to a more natural channel. During construction, upland and riparian native vegetation would be removed and native riparian vegetation of good quality would be stockpiled and replanted once the new channel is constructed. Existing noxious weeds would be removed during construction which would be a benefit to the establishment of native vegetation and SEZ vegetation in this area. Approximately 463 trees 6 inches dbh and over would be removed for construction of the new river channel and restoration of the riparian area and floodplain. Approximately 60 of the 463 trees were already topped as part of the recent airport tree removal project to comply with FAA standards. Of the 463 trees listed above, 192 trees are 14 inches dbh or greater which will require approval for removal under the TRPA permit. Governing Board approval will be required for removal of over 100 trees. Many of these trees would be reused on the site for proposed inchannel improvements.

Approximately 100 trees will be used for the restoration effort for stabilization measures and to construct inchannel habitat structures. The remaining trees will be transported to an area within the Airport property to be processed for mulch and/or firewood to be donated.

4b. Will the proposal result in the removal of riparian vegetation or other vegetation associated with critical wildlife habitat, either through direct removal or indirect lowering of the groundwater table?

No, with mitigation. See answer 4a. The groundwater table would not be lowered, it is expected to rise which would benefit riparian vegetation. Approximately 463 trees would be removed for construction of the new river channel and restoration of the riparian area and floodplain. Approximately 60 of the 463 trees were already topped as part of the recent airport

tree removal project to comply with FAA standards. . Of the 463 trees listed above, 192 trees are 14 inches dbh or greater which will require approval for removal under the TRPA permit. Governing Board approval will be required for removal of over 100 trees. Many of these trees would be reused on the site for proposed inchannel improvements.

Any management activities that require removal of trees and shrubs should be conducted outside the avian nesting season (April 1 through August 15) unless a qualified biologist determines that no nesting is occurring. The project proponent shall retain a qualified biologist to conduct a focused survey for active nest sites of migratory birds covered by the MBTA within a 1/8 mile radius prior to (i.e., within 15 days) the onset of construction activities initiated during the nesting season (April 1 through August 15). If active nests are located during the preconstruction surveys, the biologist shall consult with CDFG and/or USFWS to determine an appropriate buffer around the nest. The buffer will be implemented until the juveniles fledge or the adults abandon the site if the nest fails. The size of the buffer will depend on various factors such as vegetation and topographic screening and the type of project activities in the nest's vicinity.

4c. Will the proposal result in the introduction of new vegetation that will require excessive fertilizer or water, or will provide a barrier to the normal replenishment of existing species?

No, with mitigation. The project includes massive revegetation of native SEZ and riparian species of plants. Prior to use of the new channel, the vegetation would require a large amount of water and soil amendments to get established and while it is being stockpiled. Soil amendments would also be used to help with plant establishment. Once established, this vegetation would provide soil stabilization and help to reduce erosion. A temporary drainage system would be constructed to capture excess water and keep it from discharging into the river. It is likely that most of the irrigation water would be taken up by the plants and infiltrate into the ground.

4d. Will the proposal result in a change in the diversity or distribution of species, or number of any species of plants (including trees, shrubs, grass, crops, micro flora and aquatic plants?

No, with mitigation. The project is for the purpose of habitat restoration. Therefore the amount of upland vegetation would decrease in areas where fill is proposed to be removed. This newly created floodplain would support more riparian and wetland vegetation than what previously existed in this area which is a major objective of the project and consistent with the EIP.

4f. Will the proposal result in removal of stream bank and/or backshore vegetation, including woody vegetation such as willows.

No, with mitigation. See answers 4a and 4b.

4g. Will the proposal result in removal of any native live, dead or dying trees 30 inches or greater in diameter at breast height (dbh) within TRPA's Conservation or Recreation land use classifications?

No, with mitigation. The project will require the removal of 2 trees that are greater than 6 inches in diameter. Both of the trees are lodge pole pine trees, one is 33 inches and the other is 46 inches in diameter. These trees are located where the new channel and floodplain are being graded for the purpose of restoring the river and riparian habitat.

5.1.5 Wildlife

5a. Will the proposal result in a change in the diversity or distribution of species, or numbers of any species of animals.

No, with mitigation. The project could result in a change in numbers of birds, reptiles, fish, benthic organisms, insects, mammals, amphibians or microfauna during construction. However, the goal of the project is to restore wildlife and riparian habitat. Mitigation measures to be incorporated to help reduce impacts during construction would include the following.

- *Conduct Willow flycatcher protocol level surveys prior to construction. If birds or nests are discovered implement LOPs as required by managing agency.*
- *Conduct winter acoustical surveys for Northern goshawk prior to construction. If birds are detected implement LOPs as required by USFS Lake Tahoe Basin Management Unit.*
- *Additional BMPs listed under 1c above and in Section 4.6 Wildlife Resources would help to reduce impacts to water quality to reduce impacts to water species to a less than significant level.*

5d. Will the proposal result in deterioration of existing fish or wildlife habitat quantity or quality?

No, with mitigation. The project is to restore this portion of the UTR to a more natural river channel, restore terrestrial wildlife and riparian habitat and to increase floodplain. During construction their could be a deterioration of existing fish or wildlife habitat quality, however, after construction wildlife and aquatic habitat would be greatly improved because of the project. Mitigation measures are discussed in answer 1c above and in Section 4.6 Wildlife Resources.

Approximately 60 of the 463 trees were already topped as part of the recent airport tree removal project to comply with FAA standards. Many of these trees would be reused on the site for proposed inchannel improvements. Any management activities that require removal of trees and shrubs should be conducted outside the avian nesting season (April 1 through August 15) unless a qualified biologist determines that no nesting is occurring. The project proponent shall retain a qualified biologist to conduct a focused survey for active nest sites of migratory birds covered by the MBTA within a 1/8 mile radius prior to (i.e., within 15 days) the onset of construction activities initiated during the nesting season (April 1 through August 15). If active nests are located during the preconstruction surveys, the biologist shall consult with CDFG and/or USFWS to determine an appropriate buffer around the nest. The buffer will be implemented until the juveniles fledge or the adults abandon the site if the nest

fails. The size of the buffer will depend on various factors such as vegetation and topographic screening and the type of project activities in the nest's vicinity.

5.1.6 Transportation/Circulation

13b. Will the proposal result in changes to existing parking facilities or demand for new parking?

No, with mitigation. During construction, temporary parking would be provided for construction workers at various locations on Airport property or on the east side of the river as shown on figure 3-3. A stabilized area would be used for temporary parking and this area would be removed and restored to preconstruction conditions.

13e. Will the proposal result in alterations to waterborne, rail or air traffic.

No, with mitigation. During construction there could be instances when a NOTAM would need to be circulated due to the presence of construction equipment within the Airport operations area. Mitigation measures identified in Sections 4.11 Public Safety and Hazards and 4.16 Traffic and Circulation will bring this potential impact to a less than significant level..

5.1.7 Human Health

17a. Will the proposal result in creation of any health hazard or potential health hazard.

No, with mitigation. The project is for the purpose of habitat restoration which proposes increasing floodplain and wetland areas. These areas could attract more bird wildlife to the area particularly water fowl. The project is located in close proximity to the Lake Tahoe Airport. Bird strikes are an increasing hazard to aircraft according to the FAA and Caltrans Aeronautics Division. An FAA Preliminary Wildlife Hazard Assessment has been prepared to determine the potential for bird and is discussed in Section 4.11. The findings stated in the report state that the project would not increase bird strike potential at the airport.

17b. Will the proposal result in exposure of people to potential health hazards?

No, with mitigation. See answer 17a above.

5.1.8 Recreation

19c. Does the proposal have the potential to create conflicts between recreation uses, either existing or proposed?

No, with mitigation. Existing recreation uses include an existing walking trail along the river from neighboring subdivisions and river recreation such as fishing, rafting and kayaking. The trails are not considered to be designated recreation areas by any agency in the Tahoe Basin. One of the proposed alternatives for the South Tahoe Multi-use Greenway would be constructed in the vicinity of the project beginning in 2009 or 2010 and it would not be

completed for use in time for a recreation impact to be caused from the construction of the restoration project. It is possible that the existing walking trail and river recreation could become inaccessible at certain times during construction. Where possible, the contractor would provide access to walking trail users. River recreation users would be informed at the Elks Club area where boaters are likely to access the river through signage and other appropriate notification measures. This information would include information that construction would be happening and the river could be closed along various stretches. It could be possible for rafters and kayakers to portage the area under construction and continue on, or they may wish to start further downstream. Construction periods along the river channel would likely happen in late summer and fall when water is low and less attractive to boaters.

5.1.9 Archaeological/Historical

20b. Is the proposed project located on a property with any known cultural, historical, and/or archaeological resources, including resources on TRPA or other regulatory official maps or records?

No, with mitigation. While historic and cultural resources were found within the project area, it has been determined by a qualified archaeologist that none of these resources are significant by a qualified archaeologist. Section 4.9 Cultural Resources discusses cultural resource findings related to potential project impacts and lists mitigation measures to bring potential impacts to a less than significant level.

5.1.10 Findings of Significance

21a. Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California or Nevada history or prehistory?

No, with mitigation. The project is for the purpose of riparian habitat restoration including fish habitat restoration. During construction removal of existing riparian vegetation and work within the river channel could affect fish populations during construction. However, once the project is complete, the project would provide a benefit to fish populations and riparian habitat. No rare plant communities are present in the project area. Habitat exists for some special status species as described in Section 4.6 Wildlife. Previous known wildlife and vegetation surveys did not identify the presence of any of these species. However, protocol level surveys would be conducted for nesting Willow flycatcher prior to construction. If nesting birds are present then LOPs would be implemented. Some artifacts were discovered in areas where disturbance is proposed. An evaluation of historical significance determined that none of these artifacts are historically significant. There are no potential impacts to Native American resources. If historic features are found to be significant, adequate impact mitigation measures could amount to their full recordation and subsequent interpretation.

21b. Does the project have the potential to achieve short-term, to the disadvantage of long-term, environmental goals?

No, with mitigation. During construction and while the vegetation is seasoning over a 2 to 3 year period prior to use of the new river channel, a major storm event could cause significant erosion which could impact water quality or degrade newly created riparian or wildlife habitat to the disadvantage of long-term environmental goals. BMPs would be implemented during this period to reduce impacts to a less than significant level. These BMPs are discussed in answer 1c above.

21c. Does the project have impacts which are individually limited, but cumulative considerable?

No, with mitigation. Other projects planned along the UTR and within the Sierra Tract Erosion Control Project area would likely be under construction at some point during the 3-year construction period for the Airport Reach project. Water Quality impacts from construction and during the seasoning period for new channel alignments along the river could occur during a major storm event. BMPs would be implemented along all of the projects along the UTR Middle Reach. This would help to reduce impacts to a less than significant level. BMPS proposed for use on the Airport Reach project include those listed above in answer 1c. Many of the other UTR projects have not chosen a recommended alternative so BMPs have not been identified. It is likely that most of the projects would implement BMPs similar to those listed in answer b above. A significant amount of coordination between the projects would take place since many of the projects share funding agencies, lead agencies, property ownership and design teams.

21d. Does the project have environmental impacts which will cause substantial adverse effects on human being, either directly or indirectly?

No, with mitigation. A Preliminary FAA Wildlife Hazard Assessment has been conducted and is discussed in Section 4.11. The findings in this report have determined that the project would increase the potential for bird strikes at the airport. Mitigation measures have been described in Section 4.11 to bring other potential impacts to public safety and hazards/risk of upset to a less than significant level.

Section 6
Table of Environmental Commitments and Mitigation Measures

The project will not result in any permanent adverse impacts to the environment and will provide many environmental benefits to the project area and the UTR corridor. Short-term impacts during construction may result because of grading and construction activities within the 100-year floodplain and the river channel to Hydrology and Water Quality, Air Quality, Aquatic Resources, Wildlife Resources, Vegetation, Wetlands, Geology and Soils, Public Safety and Hazards, Recreation and Traffic and Circulation. The project is for the purpose of Habitat Restoration. The objectives of the Project, as stated in the Project Workplan (City 2004), are to improve natural function of the channel, increase over bank flow, and deposit sediment into the floodplain more frequently. Controlling the flow and gradient, protecting the stream banks and designing to allow the creek to overtop its banks during peak periods would have many benefits. Benefits are reduced velocities, more frequent flooding of the meadow during high flows, improved riparian and meadow vegetation, higher groundwater, more productive fisheries, improved macroinvertebrate populations and terrestrial wildlife habitat, and a reduction in fine sediment transport during overbanking events.

Environmental commitments and mitigation measures listed in Table 6-1 will reduce potential significant environmental impacts to less than significant. Many of these measures are already part of the project description as described in Section 3. The table also describes the responsibility of ensuring implementation of the required environmental commitments and mitigation measures and monitoring.

Table 6-1 ***Environmental Commitments and Mitigation Measures for Alternative 2***			
Potential Significant Impacts	***Environmental Commitment/Mitigation Required***	***Monitoring Responsibilities***	***Potential Benefits after Construction***
Aesthetics			
No permanent aesthetic impacts	None	None	Scenic quality would improve because of increase to riparian vegetation.
Agricultural Resources			
None	None	None	None
Air Quality			
Fugitive dust could be generated during construction.	AQ-1 Construction operator shall submit a permit application for fugitive dust control plan including the dust control measures as stipulated in EDAQMD Rule 223-1 Table 1 and 2, such as spraying water, applying soil stabilizer, covering stockpiles, haul materials, etc. The permit application must be submitted and approved prior to the construction project. The details of the fugitive dust control measures can be found in Appendix F.	Contractor shall submit permit application to El Dorado County AQMD. Contractor or City's Construction Manager will monitor during construction.	None
Aquatic Resources			
Fish could be stranded or impacted during instream work and during water diversions	AR-1 Fish rescue shall be performed prior to dewatering or partial diversion of water from the stream course or other aquatic habitats in the project area where fish may be present, in order to avoid stranding of fish during construction activities. The removal and relocation of fish shall be performed by a qualified biologists using techniques such as electrofishing and seining. Specimens shall be relocated to viable and comparable habitats in the immediate vicinity that are to remain undisturbed for the duration of construction activities.	The City will be responsible for fish rescue as part of a Construction Management/Oversight contract with a qualified consultant.	The project would benefit the fishery by improving aquatic habitat for salmonoid species.

Table 6-1 ***Environmental Commitments and Mitigation Measures for Alternative 2***			
Potential Significant Impacts	***Environmental Commitment/Mitigation Required***	***Monitoring Responsibilities***	***Potential Benefits after Construction***
Wildlife Resources			
Short-term impacts to wildlife habitat could occur during construction	W-1 Any sighting of listed species, sensitive species, or location of nest or dens of these species will be reported to a USFS or TRPA biologist. These nest or den locations will be protected in accordance with the SNFPA (2000) and the Environmental Threshold Carrying Capacities for the Lake Tahoe Region guidelines (TRPA 1982).	Contractor and City's Construction Manager to monitor during construction.	The project could benefit wildlife because increased wetland and riparian area is expected upon project completion.
	W-2 The project proponent will consult with agency biologists (e.g., TRPA, LTBMU) to determine whether information on northern goshawk nesting is available. If no agency surveys have been performed, pre-project surveys will be conducted to determine the location of any active nests.	City of South Lake Tahoe or their Construction Manager shall contact TRPA and LTBMU for updated information. If protocol level surveys are needed the City will require the Construction Manager to hire a qualified biologist to conduct protocol level surveys for the goshawk nesting.	
	W-3 An annual protocol level willow flycatcher survey will be performed. If willow flycatchers are detected nesting in the project area, an agency mandated protected activity center will be delineated and a LOP will be applied.	The City or their Construction Manger will be required to hire a qualified biologist to conduct protocol level willow flycatcher surveys.	The project is expected to increase habitat for Willow flycatcher after construction.
	W-4 If special status wildlife species with agency-mandated protected activity centers and limited operating periods are found breeding in the project area, a protected activity center will be delineated by a LTBMU or TRPA wildlife biologist and a LOP will be implemented.	Special status species sitings shall be reported to the City or their Construction Manager by the contractor. The City or their Construction Manger shall be responsible for information LTBMU or TRPA.	
	W-5 All trash created during construction will be properly contained (wildlife-proof containers) and removed at the end of each day.	Contractor to monitor during construction. This will be included in the plans and specifications.	

Table 6-1 ***Environmental Commitments and Mitigation Measures for Alternative 2***			
Potential Significant Impacts	***Environmental Commitment/Mitigation Required***	***Monitoring Responsibilities***	***Potential Benefits after Construction***
	W-6 Any management activities that require removal of trees and shrubs should be conducted outside the avian nesting season (April 1 through August 15) unless a qualified biologist determines that no nesting is occurring. The project proponent shall retain a qualified biologist to conduct a focused survey for active nest sites of migratory birds covered by the MBTA within a 1/8 mile radius prior to (i.e., within 15 days) the onset of construction activities initiated during the nesting season (April 1 through August 15). If active nests are located during the preconstruction surveys, the biologist shall consult with CDFG and/or USFWS to determine an appropriate buffer around the nest. The buffer will be implemented until the juveniles fledge or the adults abandon the site if the nest fails. The size of the buffer will depend on various factors such as vegetation and topographic screening and the type of project activities in the nest's vicinity.	The City or their Construction Manager will be required to hire a qualified biologist to conduct nesting bird surveys.	
Vegetation Resources			
Vegetation may be impacted during construction.	V-1 During construction, upland and riparian native vegetation would be removed and native riparian vegetation of good quality shall be stockpiled and replanted once the new channel is constructed.	Direction for this task will be included in the Contractor plans and specifications. City or their construction manager will monitor during construction.	The project could benefit vegetation because increased wetland and riparian area is expected upon project completion.
	V-2 The vegetation shall be irrigated and soil amendments added while it is being stockpiled. Soil amendments and irrigation shall also be used to help with plant establishment after replanting.	Direction for this task will be included in the Contractor plans and specifications. City or their construction manager will monitor during construction.	
	V-3 Over-plant new vegetation or provide fence protection of new vegetation to help prevent beaver browsing.	Contractor to monitor during construction under the direction of City contracted construction inspector.	
	V-4 Disturbed areas shall be revegetated or stabilized where needed once construction is complete.	Direction for this task will be included in the Contractor plans and specifications. The City or their construction manager will monitor during construction. TRPA and Lahontan to inspect for permit compliance.	
	V-5 The stockpile site shall be regraded to the natural contours and revegetated at the completion of the project.	Direction for this task will be included in the Contractor plans and specifications. The City or their construction manager will monitor during construction. TRPA and Lahontan to inspect for permit compliance.	

Table 6-1 ***Environmental Commitments and Mitigation Measures for Alternative 2***			
Potential Significant Impacts	***Environmental Commitment/Mitigation Required***	***Monitoring Responsibilities***	***Potential Benefits after Construction***
Construction activities may cause the spread of noxious weeds in the project area.	V-6 Noxious and invasive weed control shall be implemented according to instructions included in the plans and specifications.	The City or their Construction Manager will monitor during construction. TRPA will require this prior to permit approval. The project shall include a provision in the project plans and specifications to remove identified noxious weeds from the project area.	The project shall include a provision in the project plans and specifications to remove identified noxious weeds from the project area. This will help to eradicate noxious weeds in the project area.
Wetlands			
Construction activities may disturb existing delineated wetlands in the project area.	Wet-1 Place construction fencing around wetland areas identified on the Wetlands Delineation Map that are located outside of proposed disturbance to avoid disturbance during construction.	The City or their Construction Manager to monitor during construction. TRPA will inspect during pregrade inspection.	The project is for the purpose of river and SEZ restoration. After completion of the project, wetland area could increase by 54 percent which would be a benefit to wetlands.
Cultural Resources			
The project could disturbed buried and/or unknown heritage resources during grading and construction activities.	CR-1 In the event of fortuitous discoveries of buried or concealed heritage resources, ground disturbance activities should cease in the area of the find and the project sponsor should consult a qualified archaeologist for recommended procedures. If human remains are inadvertently discovered, California law requires that work must stop immediately and the county coroner must be notified. If the remains are Native American, AB 297 makes it mandatory that the coroner notifies the members of the Washoe Tribe to insure that proper treatment is given to the burial site.	Contractor, the City and their Construction Manager to monitor during construction.	
Geology and Soils			
Grading and construction activities could introduce sediment to water ways or cause erosion.	GS-1 Implement appropriate bank stabilization measures to reduce erosion as described in the project description and Section 4.12 Hydrology and Water Quality.	All of these measures will be included in the Contractor plans and specifications. The City or their Construction Manager will monitor during construction. Lahontan and TRPA to monitor as part of issuance of the construction permits and permit compliance.	Bank stabilization is included in the project description along the Upper Truckee River. This is a benefit to soils and geology in the project area. The project would increase overbank flow that would help to reduce sediment loading downstream to Lake Tahoe as a benefit from project implementation.
	GS-2 Revegetate all disturbed areas and reuse excavated top-soil and vegetation whenever possible.		
	G-3 Use gravel with road base to construction access roads.		
	GS-4 Cover all exposed stockpiles to reduce wind and water erosion.		
	GS-5 Keep construction vehicles and equipment within designated areas.		
	GS-6 Implement environmental commitments and mitigation measures described in Section 4.12.7.		

Table 6-1 ***Environmental Commitments and Mitigation Measures for Alternative 2***			
Potential Significant Impacts	***Environmental Commitment/Mitigation Required***	***Monitoring Responsibilities***	***Potential Benefits after Construction***
Public Safety and Hazards/Risk of Upset			
Construction activities would take place within Runway Safety Zones and could cause safety impacts to Airport operations and construction workers.	PS-1 The contractor shall develop and implement a construction safety plan that will include safety measures for travel through Runway Safety Zones to include schedule of travel, procedures to ensure Airport Safety, NOTAM procedures, and responsible personnel.	Contractor, Construction Manager and Airport staff to monitor during construction.	
	PS-2 Daily coordination between the contractors for both the River Restoration project and the Runway Reconstruction project for safety related issues shall be conducted while both projects are under construction at the same time.		
The project would be conducting grading and construction activities in close proximity to existing STPUD facilities which could increase the potential of impacting underground facilities.	PS-3 Determine and mark the location of existing STPUD facilities prior to construction. Contractor shall conduct an Underground Service Alert (USA) notice prior to excavation. Excavation will not begin until all utilities in the area have been marked.	City of South Lake Tahoe will provide STPUD with plans and specifications for review prior to construction. Instructions will be included in the Contractor's plans and specifications to conduct USA and STPUD.	
Proposed new river channel alignment is closer to existing STPUD facilities.	PS-4 Construct engineered bank stabilization at the edge of the Airport easement to protect STPUD facilities and the Airport runway from complications due to lateral movement of the river.	The City and their Construction Manager will monitor during construction.	
Equipment and material transport routes will require access through the Runway Safety Zone and the existing runway.	PS-1 The contractor shall develop and implement a construction safety plan that will include safety measures for travel through Runway Safety Zones to include schedule of travel, procedures to ensure Airport Safety, NOTAM procedures, and responsible personnel.	Contractor, Construction Manager and Airport staff to monitor during construction.	
	PS-2 Daily coordination between the contractors for both the River Restoration project and the Runway Reconstruction project for safety related issues shall be conducted.		

Table 6-1 ***Environmental Commitments and Mitigation Measures for Alternative 2***			
Potential Significant Impacts	***Environmental Commitment/Mitigation Required***	***Monitoring Responsibilities***	***Potential Benefits after Construction***
Hydrology and Water Quality			
Short-term and temporary impacts to water quality could result from grading and construction activities. Stormwater runoff could exceed discharge standards for the Upper Truckee River during construction and prior to completion of stabilization efforts.	WQ-1 Earthwork shall be confined to areas of construction activities according to the construction phasing plan and Figure 3-3. This information will be included in the contractor specifications. Filter fencing will be installed around all of the stockpile locations and equipment storage areas.	The City and their Construction Manager will monitor during construction. Lahontan and TRPA to monitor as part of issuance of the construction permits and permit compliance. Both agencies will conduct preconstruction inspections for stormwater BMPs and may inspect periodically during construction.	The project is expected to benefit water quality due to increased floodplain and bank stabilization measures. The project will increase flooding frequency on the newly restored floodplain. It is expected that less sediment will reach Lake Tahoe because more will be deposited on the restored floodplain before it reaches the Lake. The project will also be stabilizing eroding banks along the Airport Reach portion of the UTR which will also reduce the amount of sediment reaching the lake from the Airport Reach.
	WQ-2 An internal drainage system shall be constructed and maintained within the project site during all construction activities to contain any runoff within the project boundary and prevent it from exiting the site. Localized pumping will be used to hydraulically contain turbid groundwater or standing water as a result of excavation of saturated soil. The turbid water will be treated at an upland area at the project site in a temporary settling basin to levels below TRPA and Lahontan thresholds prior to discharge as described in Section 4.12.5.1. Once water has had time to settle, clean water will be released into a the UTR downstream of RS 8900.		
	WQ-3 Stockpiled and transported material will be covered to control stormwater runoff.		
	WQ-4 Construction vehicles will be serviced in specific upland areas or stabilized areas to prevent accidental spills of fluids, oils and lubricants into surface water. This area will consist of a clean gravel pad with an impervious liner underneath.		
	WQ-5 Construction equipment shall be cleaned to remove any loose dirt or sediment prior to exiting the site. Washing will take place in an area stabilized with crushed stone and drain to an approved sediment trap or basin.		
	WQ-6 The excess fill disposal locations will be regraded to the natural contours of the surrounding area and revegetated with native upland species.		

Table 6-1 ***Environmental Commitments and Mitigation Measures for Alternative 2***			
Potential Significant Impacts	***Environmental Commitment/Mitigation Required***	***Monitoring Responsibilities***	***Potential Benefits after Construction***
	WQ-7 All spills shall be reported to Lahontan and procedures and response protocols for immediate cleanup outlined in the SWPPP shall be implemented. These procedures shall include placement of sandbags, gravel, boards or other TRPA approved methods to prevent spilled material from entering any drainage facilities or areas.		
	WQ-8 Construct temporary 4 to 6 foot high water filled berms in Year 1 to isolate the construction site, and protect the river from spring runoff prior to implementation of the new channel. These water filled berms will be placed at the two tie in ends between the old and new channel and run the entire length of the existing channel from the two tie in points. The water filled berm will be wrapped around the low-water crossing at both sides to allow for access across the low-water crossing during construction. Filter fencing will also be constructed between the excavation area and the water filled berm for extra protection.		
	WQ-9 A railcar crossing/bridge will be constructed to transport materials across the river to prevent interaction with the channel. The bridge will be designed with BMPs to prevent sediment discharges to the UTR. Clean gravel will be placed at the bridge approaches. A silt fence that will be placed along the east and west river banks will be tied into the railcar crossing abutments with a secondary silt fence running under the railcar crossing. Coir logs will be placed on paved surfaces under the railcar crossing. Silt curtains will be placed in the river as an additional protection along the channel from upstream to downstream of the low-water crossing. Access routes will be continuously cleaned with water trucks and brooms trucks. Silt fences and cut off channel connected to small settling basins would be placed along the sides of the access routes.		

Table 6-1 ***Environmental Commitments and Mitigation Measures for Alternative 2***			
Potential Significant Impacts	***Environmental Commitment/Mitigation Required***	***Monitoring Responsibilities***	***Potential Benefits after Construction***
	WQ-10 In channel work sites will be isolated both upstream and downstream by water filled berms with the main flow of the river pumped around the work areas. Water that infiltrates into the isolated project site will be pumped into the new channel alignment downstream and allowed to flow the length of the channel for infiltration. At the end of the new channel alignment remaining water will be pumped to the dewatering site and go through the settling and filtration systems as describe above. Following completion of the first bank stabilization the same procedure will be used on the second bank stabilization. The three fish habitat structures located downstream of the new channel alignment will be dewatered by laying a water filled berm along the existing channel bed to isolate the work area. The main flow will be slightly confined but will remain in the existing channel alignment. While the work is being completed the water that infiltrates into the work area will be pumped to the dewatering site and go through the settling and filtration systems as describe above. Each fish habitat structure will be completed one after another.		
	WQ-11 The project site will be winterized according to TRPA and Lahontan RWQCB requirements at the end of each construction season. These measures will include: wrapping water filled berm to secure all isolated areas for winter and spring flows around the length of the western approach to the low-water crossing and a small portion along the existing airport fence, wrap water filled berm around the downstream end of the new channel and along a portion of the airport fence, winterize temporary irrigation system installed for plant establishment. Other proposed winterization measures are listed below. ■ Maintain all temporary erosion control including filter fencing and coir logs. ■ Stabilize all disturbed areas with a heavy mulch. ■ Clean up and remove all construction site waste including trash, debris and spoil piles.		

Table 6-1 ***Environmental Commitments and Mitigation Measures for Alternative 2***			
Potential Significant Impacts	***Environmental Commitment/Mitigation Required***	***Monitoring Responsibilities***	***Potential Benefits after Construction***
	■ Cover all soil stockpiles with a natural fiber blanket and secure stockpile locations with filter fencing.		
	WQ-12 Prior to diversion of UTR flows into the new river alignment, the new river channel will be wetted in September of the second construction year, and potentially in the third construction year as well, to prepare the river channel. These wetting flows will either be allowed to infiltrate or be pumped from the downstream end of the new river alignment and treated to ensure compliance with discharge standards prior to their diversion back into to the UTR. This is described in the dewatering discussions in Section 4.12.5.1 During the third construction year clean washed gravel will be placed in the new river channel before the UTR is diverted into the new alignment.		
	WQ-13 Implement the dewatering plan for each construction year as described in Section 4.12.5.1.		
	WQ-14 During Year 3, the locations where the new alignment and the existing alignment converge will be graded and armored with a combination of rock and large wood elements. Willow stakes will be incorporated into these engineered areas. Propagated sod will be placed as needed on top of the armored banks.		
	WQ-15 Revegetate all disturbed areas and old channel with native riparian or upland vegetation where applicable. Salvaged sod, willows and other riparian vegetation will be propagated and used where possible. Additional seed or vegetation will be added where needed for stabilization measures.		

Table 6-1 ***Environmental Commitments and Mitigation Measures for Alternative 2***			
Potential Significant Impacts	***Environmental Commitment/Mitigation Required***	***Monitoring Responsibilities***	***Potential Benefits after Construction***
Land Use			
No land use impacts	None	None	Provide restoration improvements described in planning considerations and special policies of the PASs
Noise			
No noise impacts would result from the project.	N-1 Equip all construction equipment with operating mufflers N-2 Limit construction hours to 8 AM to 6:30 PM.	Construction Manager to monitor during construction.	
Recreation			
During construction of the project recreational boating along the UTR could be impacted	REC-1 Post signs upstream of the project site to notify boaters of access restrictions during construction. REC-2 Restore river access at the close of construction.	Contractor and/or City's Construction Manager to post signs during construction and inspect at the close of construction.	
Traffic and Circulation			
During construction of the project air traffic could be impacted by equipment and materials transport through the Runway Safety Zone	TR-1 Provide traffic control on the specific days of transport of heavy equipment to help prevent congestion and safety hazards at the intersection of Highway 50 and Airport Road. TR-2 During days of equipment transport through runway safety areas, a Notice to Airmen would need to be circulated for safety purposes.	Traffic control and safety measures shall be included in the construction plans and specifications. Construction Manager to monitor during construction.	
Utilities			
Excavation and grading activities could conflict with existing underground STPUD facilities.	UT-1 The contractor shall confirm the exact location of the pipeline near the excavation area. In addition to the existing fence that borders the Airport and the pipelines, fences would be constructed to protect the pipelines in the excavation and construction areas as needed. UT-2 Engineered bank toe protection along the Airport easement would be constructed to protect potential lateral movement of the channel into the pipelines within the Airport property.	Contractor and Construction Manager to consult with STPUD prior to construction. STPUD will review the plans prior to construction.	
Indian Trust Assets			
No impacts	None	None	None
Environmental Justice			
No impacts	None	None	None

Table 6-1 ***Environmental Commitments and Mitigation Measures for Alternative 2***			
Potential Significant Impacts	***Environmental Commitment/Mitigation Required***	***Monitoring Responsibilities***	***Potential Benefits after Construction***
Cumulative Impacts			
The project could contribute to cumulative water quality impacts as other river restoration projects would be under construction during the 3 year construction period. Large areas of unstabilized soil along the river corridor could cause discharges that exceed water quality standards during storm events.	The project design features described in the short term impact analysis for Alternative 2 have been structured to make sure that this discharge goal is achieved. This discharge plan plus the fact that all the cumulative projects, including the proposed project, would implement erosion and runoff measures required by the TRPA, Lahontan RWQCB, DFG, and the NPDES permit and SWPPP, support the expectation that the implementation of these measures would result in a less than cumulatively considerable impact associated with hydrology and water quality. It is assumed that the BMPs designed for the 50 year water flow event proposed for the UTR Airport Reach would be similar to precautions required for all of the cumulative projects and that the discharge level below reporting requirements from the project area planned for the UTR Restoration Project would apply to all of the cumulative projects.	Construction Manager to monitor during construction for short-term impacts that could have cumulative effects. Project design of cumulative projects would be reviewed by Lahontan RWQCB and TRPA during their permitting and planning processes.	The cumulative projects that involve river restoration upstream of the study area (Sunset Stables Reach, and Golf Course River Restoration) could have long-term cumulative benefits because they would stabilize the stream banks and restore the river to its previous natural function. It is assumed that these projects which are still in the planning stages will be subject to similar water quality requirements and will as a result utilize many of the same BMPs to prevent discharge to the river in a 50 year storm event. These measures and the project's overarching goal to improve river health by increasing the sinuosity to mimic natural fluvial processes should improve cumulative water quality conditions. This return to natural fluvial processes would improve water quality conditions by reducing erosion and sediment transport. When considered together, these projects, including the proposed project, could reduce the potential for bank failure and sediment loading to Lake Tahoe.

Section 7
List of Preparers

Name/Expertise	*Role in Preparation*
CDM	
Suzanne Wilkins	Project Planner and Project Coordination; Project Description, Wetlands, Wildlife, Land Use, Public Safety and Hazards, Cultural Resources, and Utilities
Stefan Schuster, P.E.	Project Manager
Henry Boucher, AICP	Technical Review
Thomas Quasebarth	Water Quality and Hydrology Technical Review
Patricia Reed	Technical Review/Wetlands Analysis/Biological Resources
Stacy Porter	Geology and Soils, ITAs, Environmental Justice, Aesthetics, Agricultural Resources, and Recreation
Ilana Cohen	Vegetation, Traffic and Circulation, Utilities, Noise
Christopher Parks	Hydrology and Water Quality
	Traffic and Circulation/Air Quality
Wei Guo, P.E.	Air Quality
Murray Wade	Preliminary Wildlife Hazard Assessment
Entrix	
Mike Rudd, P.E.	Alternatives/Project Description, Hydrology and Water Quality
Charley Miller, P.E.	
Brendan Belby	Alternatives/Hydrology and Geomorphology
Garcia and Associates	
Ian Chan	Aquatic Resources
Wildlife Resource Consultants	
Susan Fox	Wildlife
Western Botanical Services	
Julie Etra	Vegetation
Other Consultants	
Susan Lindstrom	Cultural Resources
Judith Marvin, Foothill Resources	Cultural Resources
Linda Thorpe, Foothill Resources	Cultural Resources

Section 8
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