Squaw Valley Public Service District

Redundant Water Supply – Preferred Alternative Evaluation Project

Phase 3 – Feasibility Study Update

November 2015

Prepared by:

FARR WEST

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SQUAW VALLEY PUBLIC SERVICE DISTRICT

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ENGINEERING

EXECUTIVE SUMMARY

SQUAW VALLEY PUBLIC SERVICE DISTRICT

REDUNDANT WATER SUPPLY – PREFERRED ALTERNATIVE EVALUATION PROJECT PHASE 3 - FEASIBILITY STUDY UPDATE

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Date: November 10, 2015

Subject: **Executive Summary**

ES.1 PURPOSE

The primary goal of the District's Redundant Water Supply – Preferred Alternative Evaluation Project (Project) is to identify a redundant source of water supply for Olympic Valley (Valley) to allow for reliable quantity and quality that is geographically diverse from the aquifer currently used as the primary source of potable water, and to provide redundancy for improved emergency preparedness.

The purpose of the Project is to evaluate water supply and transmission alternatives and identify a preferred water supply project for the District. To satisfy this purpose, the scope of work for the Project includes three distinct phases:

- Phase I – Water Supply Feasibility Summary and Gap Analysis,
- Phase II – Evaluation of Water Supply Source(s) Identified in Gap Analysis, and
- Phase III – Preferred Alternative Evaluation.

The District recently completed Phase I – Water Supply Feasibility Summary and Gap Analysis (November 6, 2014) and Phase II – Evaluation of Water Supply Source(s) Identified in Gap Analysis (February 24, 2015).

The purpose of Phase I was to review and summarize the water supply investigations that have been performed by the District in past evaluations of local water sources. This memorandum summarized this work and presented the key findings as to which water supply alternatives were considered to be infeasible and why. Methods used to define redundant water supply needs were also defined under Phase I. Finally, Phase I also identified gaps in evaluations of other potential local water sources as well.

The purpose of Phase II included a feasibility level evaluation of other potential water sources in or near the Valley. These potential water supply sources were identified in the Phase I analysis and included the North and South forks of Squaw Creek, North and South flank horizontal wells, Squaw Creek surface water storage, wastewater treatment and reuse, and the Alpine Springs County Water District. Phase II concluded that these potential local water sources were not a feasible alternative to satisfy the District's redundant water supply needs.

ES.1.1 PHASE III PURPOSE

Phase III – Preferred Alternative Evaluation will evaluate the feasible water supply options and develop a preferred alternative and project description. This phase includes updating the 2009 Alternative/Supplemental Water Supply and Enhanced Utilities Feasibility Study, and performing a detailed ranking and evaluation of supply and transmission alternatives. In the end, a preferred water supply project and its associated components will be recommended and a detailed project description will be prepared. This will put the District in position to move forward with the environmental permitting process and design.

Specific objectives of Phase III include:

- Quantify existing and future water demand scenarios and establish redundant water supply needs;
- Verify the availability of groundwater available in the Martis Valley as a supply for the Valley;
- Evaluate water supply and transmission alternatives and identify a preferred water supply project;
- Define the environmental constraints and permitting process for the water supply project, and
- Develop a project description that would be used to support moving forward with the CEQA process, public outreach program, planning, permitting, and design of the water supply project.

ES.1.2 FEASIBILITY STUDY UPDATE

In September 2009, the District completed the Squaw Valley Public Service District – Alternative/Supplemental Water Supply and Enhanced Utilities Feasibility Study. The purpose of the study was to determine potential project "fatal flaws" and it investigated the feasibility of importing water supplies from outside District boundaries as a redundant water supply for the Valley's current and future water supply customers. The Study concluded that the feasibility of the project was apparent based on the available water supply from the Martis Valley, desire of

local water purveyors to work with the District on the project, potential transmission main corridors within the Highway 89 corridor and USFS rights of way, and no major environmental fatal flaws.

Much time has expired since completion of the 2009 Feasibility Study and prior to moving forward to a formal alternatives analysis for the Project, it is necessary to update the previous study.

This Feasibility Study Update is presented in the same format as the 2009 study, and addresses the following topics:

Technical Memorandum No. 1 – Water Demand Projections and Water Supply Needs
Technical Memorandum No. 2 – Truckee River Side Drainages Evaluation
Technical Memorandum No. 3 – Groundwater Availability in the Martis Valley
Technical Memorandum No. 4 – Transmission Main Alignment Evaluation
Technical Memorandum No. 5 – Environmental Constraints Analysis
Technical Memorandum No. 6 – Planning Level Facilities Cost Estimate

ES.2 REDUNDANT WATER DEMAND PROJECTIONS AND WATER SUPPLY NEEDS

ES.2.1 NEED FOR A REDUNDANT WATER SUPPLY

The need for a redundant water supply has long been established as a primary goal in the District's Strategic Plan. The need has been defined in a number of studies prepared on behalf of the District. The redundant water supply will provide the necessary reliability and flexibility to the water system in case of emergency, drought, etc., diversifying the water supply source to allow for necessary system redundancy in the case of declining groundwater levels and/or groundwater contamination in the Olympic Valley Aquifer.

ES.2.2 REDUNDANT WATER SUPPLY QUANTITY

There are two water purveyors in the Valley, the District and the Squaw Valley Mutual Water Company (SVMWC). The redundant water supply demand is defined as being the quantity of water necessary to maintain indoor water use patterns for all water customers. The redundant water supply does not include irrigation for District customers or snowmaking/irrigation demands met with supply from the Squaw Valley Resort or the Resort at Squaw Creek. Indoor water use patterns are defined as water demands seen in the fall, winter, and early spring months where no outside irrigation is seen (October-April). Baseline existing water demands for both the District and SVMWC are based on an average of production data for the years 2000-2014. For the District, projected water demands include existing demands plus the VSVSP project, Resort at Squaw Creek Phase 2, vacant single family residential parcels, and General Plan buildout estimates for multi-family and commercial zoned properties (VSVSP Water System Capacity Analysis, Farr West Engineering, January 29, 2015). The SVMWC projected water demands include existing demands and development of a few remaining single family residential lots within their service territory. Estimated redundant water demands under

existing and buildout development conditions for the District and SVMWC are presented in Table ES-1.

Table ES-1 – Redundant Water Quantity

Existing Demands	Buildout Demands
371 acre-feet/year (AFY)	863 acre-feet/year (AFY)
20-36 acre-feet/month	45-86 acre-feet/month
153-265 gpm (ADD)	340 - 650 gpm (ADD)
221,000 - 381,000 GPD	489,000 - 936,000 GPD

ES.3 TRUCKEE RIVER SIDE DRAINAGES

A component of the redundant water supply investigation included the review of potential well sites along the side drainages along the Truckee River in the Highway 89 corridor between Truckee and Squaw Valley. The side drainages evaluated included Silver Creek, Deer Creek, Pole Creek, Deep Creek and Cabin Creek, which flow into the Truckee River along Highway 89 (Figure ES-1). The drainages have a different hydrogeologic setting than the Martis Valley, and their potential to produce significant groundwater is largely unknown.

Based on the geology, observations, and known groundwater quality issues along the Truckee River, none of the drainages investigated appear to be particularly favorable for production of groundwater for use as a water supply for Squaw Valley, and some of the sites are considered unfavorable. All of the sites have relatively thin alluvial aquifers underlain at shallow depth by volcanic bedrock which may have either low permeability or poor water quality.

ES.4 GROUNDWATER AVAILABILITY IN THE MARTIS VALLEY

ES.4.1 AVAILABLE GROUNDWATER RESOURCES

There have been a number of studies performed in the recent past discussing the availability of groundwater in the Martis Valley Groundwater Basin (MVGB). In 2011, work on the collaborative Martis Valley Groundwater Management Plan (MVGMP) began. This effort attempted to provide an up-to-date summary of the resources available in the basin and the current level of development. As a component of this work, the Desert Research Institute (DRI) (Rajagopal, et al., 2012) reviewed potential groundwater recharge using additional reconnaissance estimating techniques and hydrologic watershed modeling. Annual groundwater recharge was estimated to be quite variable, ranging between 12,100 AFY to 56,800 AFY depending on precipitation totals for the year. A long-term average annual recharge to Martis Valley was estimated at approximately 32,700 to 35,200 AFY, very similar to the estimate made by Interflow Hydrology in 2003. The recently published numerical groundwater flow model for the Martis Valley region (Rajagopal, et al., 2015) relies upon this magnitude of groundwater recharge.

As presented in the MVGMP, the current best available estimate for recharge to the Martis Valley groundwater basin is approximately 33,000 AFA as a long-term annual mean, a low to midrange value based on the most current evaluations by DRI. Secondary recharge occurs to the groundwater system by infiltration of treated effluent at the Tahoe Truckee Sanitation Agency (TTSA) facility, and to a lesser degree by effluent from septic systems.

ES.4.2 GROUNDWATER RESOURCE DEMANDS AND AVAILABILITY

Currently, there are four major water purveyors/parties that pump water from the MVGB. They include:

- Truckee Donner Public Utility District (TDPUD);
- Northstar Community Services District (NCSD);
- Martis Valley Water System (Zone 4), and
- Other Purveyors (Donner Creek Mobile Home Park, Ponderosa Golf Course, Teichert Aggregates, and other individual well owners).

The TDPUD Urban Water Management Plan (2011) indicated a buildout water demand for all water producers in the MVGB of 21,000 AFY. Using the MVGMP groundwater availability estimate of 33,000 AFY, there would be as much as 12,000 AFY available groundwater resource in the MVGB for the District's and SVMWC's redundant water supply.

Based on the available literature related to available groundwater resources and demands in the MVGB, it appears as if there are adequate water resources to provide groundwater in amounts sufficient to meet the existing and estimated buildout redundant water demands of the District.

ES.4.3 TRUCKEE RIVER OPERATING AGREEMENT (TROA)

TROA was signed on September 6, 2008 and is currently going through the implementation planning process. The California allocation of water for the Truckee River basin downstream of Lake Tahoe provides up to 32,000 AFY net diversion, of which surface water diversions cannot exceed 10,000 AFY, to water users in the basin. TROA additionally imposes a consumptive use (depletion) limit of 17,600 AFY. As a redundant water supply, it is assumed that the water supply from Martis Valley would be replacing water supplies otherwise pumped from Olympic Valley, therefore the redundant water supply effectively do not present an increase in net diversion or consumptive use depletion from the TROA segment.

TROA also sets requirements on well locations and design criteria. The well location and design criteria in TROA section 10.B.2 are not onerous and do not significantly impact the drilling of wells in the Tahoe-Truckee Sanitation Agency Special Zone, the TDPUD/Martis Valley Special Zone and the Northstar/Placer County Special Zone, provided that the appropriate setbacks are maintained. The major design criterion listed in 10.B.2 is a well seal depth requirement that is present in some of the special zone standards. When present in a zone standard, the well sealing requirement is a specified depth or it is to the first aquitard.

ES.4.4 DISTRICT'S RIGHT TO WATER FROM THE MVGB

The two limitations on the District's right to export water from the MVGB include California groundwater law and the quantity limitations set forth in TROA. A 2007 letter from the Placer County Water Authority (PCWA's) attorney Janet Goldsmith to Mal Toy (PCWA) provided legal opinion on these issues.

With respect to California water law, use of MVGB groundwater by the District as well as by TDPUD, and NCSD is considered an appropriation of groundwater (an export not directly serving overlying landowners in the basin of origin). As appropriators from the MVGB they may only take water in excess of that necessary to serve the overlying lands. The 2007 letter indicated that "the limitation of appropriable water to the surplus over the needs of overlyers and prior appropriators creates uncertainty about the long-term availability of water for export". Based on this uncertainty, it is recommended that the District work with NCSD and/or TDPUD to agree upon a long term allocation of potentially available water supplies from the MVGB.

Based on the TROA allocation of 32,000 AFY for water supply in the Truckee River basin and the water use estimates for the MVGB, it appears that the District's redundant water supply need will not cause the basin water demands to exceed the allocation limit.

ES.4.5 EXPORT WATER SUPPLY ALTERNATIVES

There are two reasonable alternatives for developing sources of groundwater in the MVGB that might be supplied to the District. These include obtaining water service from the TDPUD, NCSD, and/or the Zone 4 water system, or construction of new well or wells in the MVGB expressly for this purpose.

The TDPUD will require new wells to meet their buildout demand. Consequently, they do not have excess production capacity that could be supplied to Squaw Valley.

The groundwater derived from NCSDs the Zone 4 system (Martis Valley Water System) provides the supply for the Lahontan, Martis Camp, and Schaffer's Mill subdivisions. In past communications, PCWA (former owner of Zone 4) had indicated no excess well capacity to provide a source of water supply to Squaw Valley. However, recent conversations with PCWA and NCSD indicate there may be excess capacity in the Zone 4 system. Water supply to this area includes the Lahontan 1 and 2 wells which are both reported to produce 1250+ gpm, and the Schaffer's Mill Well (Well #3) which is reported to produce 200-235 gpm. Golf course irrigation wells in Zone 4 could also potentially become a source for redundant water supply, provided sufficient excess capacity exists.

Zone 4 water may be conveyed through the TDPUD system, either through an existing intertie at Sierra Meadows, or through a connection to the TDPUD 14-inch waterline at the Airport.

The NCSD's current water supply includes a surface water source and two existing groundwater wells, TH-1 and TH-2. The surface water treatment plant has a capacity of 700 gpm, with 1,206 AFY of spring and reservoir water rights and 560 AFY of drought year capacity (Stantec, 2015).

NCSD's two wells each have a reported capacity of 800 gpm, with a potential combined annual capacity of 2,581 AFY. NCSD's long term plans include potential construction of an additional well, TH-3, to meet buildout water demands. This well could potential be a source to serve as a redundant water source for the District. The expected capacity of the future well is 500 gpm.

Current water usage within NCSD is 538 AFY, with projected water use in 2034 at 1,204 AFY. Based on the recent Water Supply Assessment completed for the Martis Valley West Parcel (MVWP) (Stantec, 2015), it appears that NCSD has additional supply capacity, some of which may be allocated to the MVWP. Alternatively, MVWP has identified an on-site groundwater resource that may be developed to support the project.

For new sources within the MVGB, four areas of interest have been identified.

Area of interest A includes:

- A parcel of land owned by the Airport Authority located near the intersection of Schaeffer Mill Road and State Route 267. This site is located approximately 1,500 feet southwest of TDPUD's Airport Well.
- The Sayers-Tong property located between Schaffer Mill Road and State Route 267.

Area of Interest B includes potential well sites in proximity to the Highway 89 Corridor alignment alternatives. Areas of Interest C and D includes potential well locations to the west of the Zone 4 and NCSD water systems.

Prospective well sites will need to be evaluated through a comprehensive exploratory drilling and testing program. In addition to addressing the probable yield of production wells, the testing program would be expected to yield information related to the potential for the new wells to interfere with the existing TDPUD and Zone 4 wells.

ES.5 TRANSMISSION MAIN ALTERNATIVE ALIGNMENTS

Previous planning level efforts grouped potential alignment alternatives into two corridors: the Highway 89 corridor and the United States Forrest Service (USFS) 06 corridor. Further study of the alignment corridors by Farr West has yielded a total of five alternative alignments within these two corridors. These alignments are presented in Table ES-2.

Table ES-2 – Alternative Corridors and Alignments

Highway 89 Corridor	USFS 06 Corridor
• Highway 89 Alignment	• USFS 06 Alignment
• Placer County Bike Path Alignment (Bike Path)	• Liberty Energy Pole Line Alignment (Powerline)
• TTSA TRI Alignment	

Each of these alternative alignments would require the District to partner with the NCSD, TDPUD, or a combination of both. In some cases, these alignments will have to traverse parallel to or across other alignments. In order to move water from a source location in the Martis Valley to a destination of Squaw Valley, the alternatives examined include:

- Water wheeled through the TDPUD water system and a new transmission main along the Highway 89 corridor;
- Water wheeled through the NCSD and/or Zone 4 water systems and new transmission main along the USFS corridor.

Figure ES-1 shows all five of the alternative alignment corridors along with the Zone 4, NCSD, and TDPUD water system boundaries.

The feasible water supply options discussed with TDPUD, PCWA, and NCSD include the following:

- The District supplying water and conveying water through either the Zone 4 or TDPUD system;
- NCSD supplying water to the District and conveying water through the Zone 4 and/or TDPUD existing infrastructure, and
- Zone 4 supplying water to the District and conveying water through Zone 4 and/or TDPUD existing infrastructure.

Any of the options would require the District to construct and potentially operate a number of new water supply facilities including a new water supply well, booster pump station, transmission main, and terminal water storage tank in Squaw Valley.

ES.5.1 HIGHWAY 89 CORRIDOR

In this alternative, the District redundant water supply would either come from a District owned well or via existing or new well(s) within the NCSD or Zone 4 water systems. Depending on the

location of the well, water can be wheeled through the TDPUD, Zone 4, and/or the NCSD existing water system infrastructure to one of two connection points (Figure ES-1):

- The intersection of Highway 80 and Highway 89 (near the intersection of Donner Pass Road), and
- The intersection of Highway 89 and West River Road (South of the Mousehole).

From these locations, a new pipeline could be constructed along three alternate alignments along the Highway 89 corridor for approximately 8-9 miles towards Squaw Valley Road. These alignments include:

- Highway 89 alignment;
- Placer County Bike Path alignment, and
- TTSA TRI alignment.

The pipeline would terminate at a new water storage tank north of Squaw Creek and the Painted Rock subdivision, or south of Squaw Valley Road in USFS property near the Placer County park property as shown in Figure ES-1.

Alignment alternatives along this corridor present several challenges including:

- Addressing concerns of the public and regulatory agencies;
- Determining if existing water systems can convey a flow up to 650 gpm to Squaw Valley;
- Obtaining utility easements with both public and private land owners;
- Construction access and material staging issues;
- Protecting existing utility infrastructure;
- River, bridge and culvert crossings;
- Asphalt concrete paving, and
- Night work traffic control.

Highway 89 Alignment

The Highway 89 Alternative would include a transmission line which encroaches into the Caltrans right-of-way for about 8.5 miles along Highway 89 from Truckee to Squaw Valley. Both the east and west shoulders of Highway 89 presents a previously disturbed area which would be highly conducive to an underground utility alignment. However, there is a significant potential for costly paving and resurfacing needed to rehabilitate the shoulder to bring it back into compliance with Caltrans specifications. In addition, Caltrans staff have indicated that all construction activities would either have to occur at night, 9 pm to 6 am, or be protected by K-rail barrier structures for the full length of work. The cost estimate provided with this memorandum assumes a mix of K-rail and traffic control personnel for three full construction seasons. Also, there are approximately 60-70 culverts that run along Highway 89 that would require a jack and bore pipeline construction

method. This alternative assumes that construction would require rock excavation for up to 15% of the proposed route.

Placer County Bike Path Alignment

Placer County is currently undertaking a planning and environmental study for approximately nine miles of Class I bike trail from Truckee to Squaw Valley Road. The bike trail would average 10 to 12-feet in width, would be paved with asphalt, and would route through federal or public land for the entire length. In its completed state the bike path would also require multiple retaining walls. The cost estimate presented with this memorandum assumes that the water project could be coordinated with Placer County in such a way that the Bike Trail project would provide all paving and the majority of retaining walls. The water project would include much of the initial vegetation removal, rock excavation for up to 20% of the proposed route, grading of slopes, construction access improvements, and construct a minimal number of retaining walls. Bridge crossings would be required for the eight bridges that are indicated as a part of the most recent Bike Path alignment.

TTSA TRI Alignment

TTSA currently maintains and operates over twelve miles of sewer interceptor between Tahoe City and Truckee, commonly referred to as the TRI interceptor, with much of the alignment following the Truckee River corridor favorable to the water line project. The TRI Interceptor is a gravity sewer main built in the 1970's, is comprised mostly of reinforced concrete pipe (RCP), has an average depth to pipe of two to three feet, an existing 20-foot easement on USFS property, and an existing 10-foot easement on private parcels along the alignment. A water pipeline installed along this alignment would require asphalt paving in areas inside of Caltrans ROW, jack and bore construction where the alignment crosses the Truckee River, rock excavation for approximately 20% of the proposed route, and retaining walls in areas of steep side slopes. Construction would also require easements through private parcels and special construction approvals from the State Water Resources Control Board, Division of Drinking Water, to install the water main within five to ten feet of a sewer main.

ES.5.2 UNITED STATES FOREST SERVICE (USFS) CORRIDOR

In this alternative, the District redundant water supply would either come from a District owned well or via existing or new well(s) within the NCSD or Zone 4 water systems. If the well is drilled inside of NCSD service territory, water would be wheeled through NCSD and Zone 4 existing water system infrastructure to one of two connection points (Figure ES-1):

- Carson Range Tank (Zone 4 Westerly Tank), and
- Olana Tank (Zone 4 Easterly Tank).

If the well is drilled or developed inside of Zone 4 or near Highway 267, water could be wheeled through the Zone 4 existing water system infrastructure alone to either of the two connection

points. Farr West has analyzed two alternative routes for the transmission main and has identified them as:

- USFS 06 Road alignment, and
- Liberty Energy Pole Line alignment.

A new booster pump station would be required adjacent to either the Carson Range or Olana water tanks to convey water to Squaw Valley. Due to different tank elevations, the Carson Range booster pump station would require higher horsepower pumps than that of the Olana booster pump station. The pipeline along both alignments would be a high pressure line with operating pressures up to 400 pounds per square inch (psi). The USFS 06 and Powerline alignments are shown on Figure ES-1.

USFS 06 Alignment

The USFS 06 alternative includes piping from the existing Zone 4 Water System Carson Range Tank along the NFS 06 Road to Squaw Valley Road (approximately 12.8 miles), and a jack and bored crossing of the Truckee River to get to the proposed terminal tank in Squaw Valley. This alternative has minimal costs associated with pavement restoration, traffic control, bridge reinforcement, and retaining walls. However, this alignment does have significant costs associated with the length of the alignment, rock excavation up to 40% of the proposed route, construction access, and materials staging. The alignment is in a remote location which would not lend itself to materials transport by large construction vehicles or two-way traffic. In addition, Farr West anticipates a significant re-vegetation and Best Management Practices (BMP's) effort for this corridor.

Liberty Energy Pole Line Alignment

Research of the USFS 06 corridor alternative yielded the discovery of an existing utility corridor which may facilitate the construction of an underground water main from the Zone 4 Water System Olana Drive Tank to Squaw Valley (approximately 8.1 miles). As with the USFS 06 alignment, the power line alternative would require a single Truckee River crossing, rock excavation up to 60% of the length of the route, and a significant re-vegetation/BMP effort. Construction access and material staging is also a significant concern with this route. The two most significant disadvantages to this alternative is the steep rock field which the alignment descends from the bluff towards the Truckee River, and receiving consent from Liberty Energy to install an underground utility line inside of their existing easement(s).

ES.5.3 POTENTIAL JOINT TRENCH UTILITY PARTNERS

Suddenlink Communications

Farr West met with SuddenLink Communications in Truckee to discuss their interest in participating in the project as part of a joint utility corridor. Currently, Suddenlink has above ground fiber optic infrastructure along the Highway 267 corridor to Kings Beach, along Highway

28 from Kings Beach to Tahoe City, and finally North along Highway 89 to Squaw Valley Road. Suddenlink expressed their interest in an underground fiber optic conduit from Truckee to Squaw Valley, however, they were steadfast in their inability to share any cost of construction for a joint utility trench or corridor. Suddenlink did express interest to lease conduit space if the District were to install empty conduit and pull boxes with the transmission main construction.

Southwest Gas (SWG)

Farr West also met with SWG to discuss their interest in joining the project as part of a utility corridor. SWG made it clear that they will not pay out of pocket up front expenses for new infrastructure. Their company policy requires a third party to fund the necessary infrastructure to get natural gas to new customers. Only after new customer's sign up for service will SWG provide a reimbursement check to the third party and the reimbursement program will only occur for a ten year period, after which SWG would not provide any further reimbursement to the third party.

SWG has communicated with KSL regarding natural gas supply to the VSVSP project. SWG provided planning level cost estimates for natural gas feed from both Tahoe City and Truckee. KSL would be the only viable third party currently that could facilitate construction of a high pressure natural gas main to Squaw Valley. KSL recently indicated to Farr West that the cost of bringing natural gas to the Valley was likely too high to consider for the VSVSP project. Their current planning efforts use propane as a gas supply.

At this point, it would be inappropriate to attribute any benefit to the Highway 89 corridor or the USFS 06 corridor by way of a utility provider as a joint trench partner.

ES.6 ENVIRONMENTAL CONSTRAINTS ANALYSIS

The purpose of the environmental constraints analysis was to determine whether there are any major liabilities or fatal flaws that would severely constrain the intended use of the studied alignment alternatives and to assess the routes from an environmental permitting/compliance perspective. The specific objectives of the analysis were to (1) identify any documented constraints through literature surveys, and (2) define any additional site-specific constraints through local area knowledge. The goal is to assist in identifying the most efficient pipeline alignment from an environmental perspective.

The environmental analysis was organized to evaluate the five potential alternative alignments following the two general corridors discussed in Section ES-5. Due to the similar nature and proximity of the alignments, the analysis discusses environmental constraints relating to the two corridors when there is no difference between the alignments within the corridor and only as separate alignments where distinguishing factors apply.

In general, based on a literature review and reconnaissance level field survey there appears to be no outstanding environmental compliance "fatal flaws" associated with any of the alignments studied for the water supply pipeline. In this context a "fatal flaw" is defined as a biological cultural or land use impact that could result in a regulatory agency denying a permit outright. The installation of pipelines along either corridor would require compliance with CEQA, Clean Water

Act Section 401 and 404, Federal Endangered Species Act Section 7, California Endangered Species Act, California Fish and Game Code Section 1600, and potentially Placer County's General Plan. Placer County would be considered a "responsible agency" under CEQA (Public Resource Code section 21069; 14 California Code of Regulations section 15381). The NFS 06 Road, Powerline, and Bike Trail alignments cross federal lands (US Forest Service), which would also trigger the need to comply with NEPA. The Highway 89, TTSA TRI, and Bike Trail alignments are also located partially in the Town of Truckee and Nevada County, triggering potential additional compliance with the Town and Nevada County's General Plans and both jurisdictions would also be considered "responsible agencies" under CEQA. Below is a summary of the findings.

ES.6.1 LISTED AND SPECIAL STATUS SPECIES

Plant Species

A desktop analysis of potential special status plant species within the alternative pipeline alignments indicates a low to medium potential of listed status plant species being present. There is a medium potential for occurrence of Donner Pass buckwheat, Plumas ivesia, Marsh skullcap, and American manna grass. Three other species that have a low potential of impact from the proposed project are the Carson Range rock cress, the Nevada daisy, and Munroe's desert mallow because the project alignments are outside of the range of known populations of these species. The County would need to be consulted to determine if a tree removal permit is needed, if so, the timeline takes approximately one month to complete. Potential impacts and mitigation measures would need to be addressed in the CEQA/NEPA document.

Fish and Amphibians

The Lahontan cutthroat trout and mountain yellow-legged frog are known to occur in tributaries to the Truckee River. Both species have a low potential for occurrence within the area of the alignments. The Lahontan cutthroat is limited to Pole Creek upstream of a natural barrier where it cannot be harmed by predators and Martis Creek (CNDDB, 2015). The Sierra Nevada yellow-legged frog was historically found along Squaw Creek and in Squaw Meadow upstream from the end of both alignments. This area also now has designated Critical Habitat for the species. Federally listed species and their habitat are protected under the Federal Endangered Species Act and state listed species are protected under the State Endangered Species Act. Therefore potential impacts to these fish and Amphibian species' habitat would require United States Fish and Wildlife Service and California Department of Fish and Wildlife consultations.

Nesting Raptors and Migratory Birds

Nesting raptors and migratory birds are protected by the Migratory Bird Treaty Act as well as those protected by the State and Federal Endangered Species Acts. Stantec's review of the potential for nesting raptors and other migratory birds to occur and/or nest in the vicinity of the alternatives indicates that northern goshawk, spotted owl, bald eagle, yellow warbler, willow flycatcher, and the osprey all have the potential to occur within the area. Impacts to these species, should they nest on site, could be avoided by avoiding construction during the nesting season and/or nest buffer planning. There is known northern goshawk habitat along the USFS 06 and Powerline alignments indicating a greater lever for occurrence than along the Highway 89 corridor alignments.

Additionally, protocol-level spotted owl surveys may be required along the USFS 06 alignment. Nesting raptor surveys would likely be required along the alignments within either the Highway 89 corridor or the USFS 06 corridor.

Mammals

The long-legged myotis, California wolverine, Sierra Nevada mountain beaver, and the Sierra Nevada red fox have a medium potential to be impacted by either alignment. There is suitable habitat along both corridors and the species range is known to cover all or part of the project area. The Sierra Nevada mountain beaver has a greater chance of potential impact from the Highway 89 corridor alignment variations, since it is known to occur in several of the tributaries to the Truckee River that the alignments would cross. Other mammals that could possibly be impacted by either alignment corridor (low potential) are the Sierra Nevada snowshoe hare, the Sierra pine marten, and the western white-tailed jackrabbit.

Special Status Species Summary

Based on Stantec's literature review, the Army Corps of Engineers would likely need to conduct Federal ESA Section 7 consultations with the USFWS for the federal species mentioned above. If there is a potential to "kill, harm or harass" a federally listed species or disturb its habitat, formal consultations and an incidental take permit would be required. This permit process can take over one year to complete; therefore, it is recommended the permit process begin early in the project design phase. Potential impacts or lack thereof to all species listed in this analysis would need to be addressed in detail. However, given their listing status and high profile it is expected that the Lahontan cutthroat trout, Sierra Nevada yellow-legged frog and Northern goshawk would require extensive documentation and study.

ES.6.2 WATERS OF THE US

The potential National Forest Service 06 Road corridor alignments would be drilled under the Truckee River, thereby likely avoiding Corps jurisdiction (and impacts to aquatic species); however, the 06 Road Alignment would cross Deer Creek and could cross wetlands or other jurisdictional waters of the U.S. The Powerline Alignment would not cross Deer Creek, however, it still has the potential to cross wetlands or other jurisdictional waters of the U.S.

The potential Highway 89 corridor alignments would cross multiple tributaries to the Truckee River and possibly unidentified wetlands. Variations on this alignment, such as the TTSA TRI and Bike Path alignments would entail four and ten crossing of the Truckee River, respectively. A "waters of the US" delineation should be the first step once the preferred pipeline route is defined. If impacts to wetlands/waters of the US can be reduced to less than 0.5 acres, the District may qualify for coverage under a Nationwide Permit #12 for Utility lines. If the impact area is larger than 0.5 acres, the District would need to apply for an individual permit. The Army Corps of Engineers would require avoidance, mitigation, or compensation for any proposed activities that would entail fill in jurisdictional waters of the US.

ES.6.3 LAND USE

Based on Stantec's literature reviews of the relevant planning documents and sources, there appear to be no land use constraints associated with the development of any of the alignment alternatives of the District water supply pipeline.

ES.6.4 CULTURAL RESOURCES

Based on Stantec's review of publically available information, no specific cultural resources constraints could be identified along any of the potential alignments. However, the potential for cultural resources is considered moderate in the upland areas and high along water ways. Records searches at the North Central Information Center (NCIC) and USFS, field surveys by a qualified archaeologist, and Native American consultations should be completed once a proposed alignment is defined and the Area of Potential Effects is developed and approved. If during the cultural resources inventory level study, cultural resources are identified that cannot be avoided, California Register of Historical Resources (CRHR) and National Register of Historical Places (NRHP) evaluations must be completed. Any unavoidable CRHR/NRHP eligible cultural resources would require the development of a treatment plan and approval by SHPO and any other federal agencies involved in the Project.

ES.6.5 ADDITIONAL ENVIRONMENTAL CONSIDERATIONS

In general, all of the proposed alignment alternatives would require Best Management Practices (BMPs) during construction and possible mitigation measures to minimize potential environmental impacts to less than significant with regards to CEQA. Many of these standard BMPs can be included in the project description as environmental commitments the District is willing to make upfront in the process. Potential impacts on air quality, water quality, hydrology, geology, traffic, recreation, and climate change would need to be addressed in the CEQA/NEPA document for all alignments.

ES.6.6 ENVIRONMENTAL APPROVALS AND PERMITTING

The project would require compliance with several environmental laws and acquisition of several environmental permits and approvals. Crossing federal lands as well as jurisdictional waters of the US would trigger compliance with all federal and state environmental regulations.

The potential project would likely trigger the following permit/environmental compliance requirements:

- SVPSD California Environmental Quality Act Compliance (CEQA)
- USFS or Caltrans National Environmental Quality Act Compliance (NEPA- Forest Service Corridor Alignments and Bike Path Alignment)
- USACE Clean Water Act Section 404 Permit
- RWQCB Clean Water Act Section 401 Water Quality Certification
- RWQCB Lahontan Regional Board Discharge Prohibition Exception under Resolution No. 6-93-08
- US Fish and Wildlife Service Endangered Species Act Section 7 consultations

- SHPO NHPA Section 106 consultations
- CDFW Fish and Game Code 1602 Permits
- Placer County Grading Permit
- Placer County Tree Permit

The timeline for these permits ranges from several weeks to over one year. Several of these permits, such as the Clean Water Act Section 404 permit can be streamlined by designing the project to avoid (to the extent feasible) and minimize impacts to jurisdictional waters of the United States. Such measures would enable the District to apply for coverage under existing nationwide permits rather than go through the longer process of obtaining an individual permit. Table ES-3 below summarizes the necessary permits and required timeline for each.

Table ES-3 – Permit Timeline

Permit Name	Trigger	Estimated Timeline
CEQA Compliance	Discretionary Action by a SVPSD	1 year to 18 months
NEPA Compliance	Special Use Permit from National Forest Service	12 – 24 months
Clean Water Act 401 Certification (and Board – Resolution No. 6-93-08)	Surface Waters of the US	4 – 6 months
Wetland Delineation Verification	Waters of US (ordinary high water mark) and wetlands	6 – 8 months
Clean Water Act 404 Permit	Waters of US wetlands/vernal pools (ordinary high water mark)	1 year to 18 months
USFWS ESA Section 7 Consultations	Federally listed species of potential habitat for federally listed	12 months (assuming formal consultations)
SHPO NHPA Section 106 Consultations	Cultural Resources	3 – 6 months
CDFW DFG Code 1602 Permits	Impacts to Bed/Bank and floodplain	6 – 9 months
Placer County Tree Permit	Removal of trees 6” dbh or greater	1 – 2 months
Encroachment Permits (Caltrans and local agency)	Placement of pipeline within Caltrans or County Easements	2 – 6 months
Grading Permit and SWPP	County grading permit and State SWPPP for grading > 1 acre	2 – 6 months

* Estimated Timeline includes APPROXIMATIONS for Farr West’s time to prepare an application and the agency’s review period.
** Public Utilities may be exempt.

ES.7 PLANNING LEVEL FACILITIES COST ESTIMATE

In general, there are four significant facilities that are needed to provide a redundant water supply for the Valley from the Martis Valley. Each of these facilities are similar regardless of alignment alternative. They include the following:

- Well (650+ gpm capacity)
- Transmission Line (10" pipeline)
- Booster Pump Station (650+ gpm capacity)
- Terminal Tank (1 million gallons)

In the 2009 Feasibility Study, planning level efforts grouped potential alignment alternatives into two corridors: the Highway 89 corridor and the United States Forrest Service (USFS) corridor. Further study of the project and of the alignment corridors has yielded a total of five alternative alignments within these corridors. These alignments include:

- Highway 89 alignment
- Placer County Bike Path alignment
- TTSA TRI alignment
- USFS 06 Road alignment
- Liberty Energy Pole Line alignment

Figure ES-1 provides a summary of these alignments. Farr West developed a detailed planning level cost estimate for each one of these facilities for each of the five potential alignments. The costs for the well and terminal water storage tank are similar for each option. The cost for transmission line construction for each alternative is different due to the fact the pipelines follow five completely different routes from the Martis Valley to Squaw Valley. The cost for the booster pump station is different based on the required pumping head for the various alternatives, with the USFS 06 and Pole Line alternatives requiring much higher horsepower pumps.

In addition to the four facilities described above, line items have also been added for the following:

- EIR preparation, environmental permitting, and preliminary planning and design
- Administrative and legal costs associated with land acquisition, easements, etc.
- Design engineering and construction management
- Construction contingency

Table ES-4 provides a side by side comparison of the summary costs associated with each alignment.

Table ES-4 – Summary of the Redundant Water Supply Project Cost Estimate

	Highway 89	
1	Well Construction	$ 1,153,000
2	10 Inch Transmission	$ 15,833,000
3	Booster Pump Station	$ 1,030,000
4	Terminal Tank	$ 1,085,000
5	EIR/Permitting/Preliminary Design	$ 500,000
6	Administrative/Legal (10%)	$ 1,910,100
7	Engineering Design (8%)	$ 1,528,080
8	Construction Management (10%)	$ 1,910,100
9	Construction Contingency (10%)	$ 1,910,100
	Total	**$ 26,860,000**
	Placer County Bike Path	
1	Well Construction	$ 1,153,000
2	10 Inch Transmission	$ 12,858,000
3	Booster Pump Station	$ 1,030,000
4	Terminal Tank	$ 1,085,000
5	EIR/Permitting/Preliminary Design	$ 1,500,000
6	Administrative/Legal (10%)	$ 1,612,600
7	Engineering Design (8%)	$ 1,290,080
8	Construction Management (10%)	$ 1,612,600
9	Construction Contingency (10%)	$ 1,612,600
	Total	**$ 23,750,000**
	TTSA TRI	
1	Well Construction	$ 1,153,000
2	10 Inch Transmission	$ 12,689,000
3	Booster Pump Station	$ 1,030,000
4	Terminal Tank	$ 1,085,000
5	EIR/Permitting/Preliminary Design	$ 1,500,000
6	Administrative/Legal (10%)	$ 1,595,700
7	Engineering Design (8%)	$ 1,276,560
8	Construction Management (10%)	$ 1,595,700
9	Construction Contingency (10%)	$ 1,595,700
	Total	**$ 23,520,000**

	USFS 06 Road	
1	Well Construction	$ 1,153,000
2	10 Inch Transmission	$ 19,816,000
3	Booster Pump Station	$ 1,121,000
4	Terminal Tank	$ 1,085,000
5	EIR/Permitting/Preliminary Design	$ 1,500,000
6	Administrative/Legal (10%)	$ 2,317,500
7	Engineering Design (8%)	$ 1,854,000
8	Construction Management (10%)	$ 2,317,500
9	Construction Contingency (10%)	$ 2,317,500
	Total	**$ 33,480,000**
	Liberty Energy Power Line	
1	Well Construction	$ 1,153,000
2	10 Inch Transmission	$ 13,869,000
3	Booster Pump Station	$ 1,070,000
4	Terminal Tank	$ 1,085,000
5	EIR/Permitting/Preliminary Design	$ 1,500,000
6	Administrative/Legal (10%)	$ 1,717,700
7	Engineering Design (8%)	$ 1,374,160
8	Construction Management (10%)	$ 1,717,700
9	Construction Contingency (10%)	$ 1,717,700
	Total	**$ 25,200,000**

ES.8 CONCLUSIONS

The purpose of the District's Redundant Water Supply – Preferred Alternative Evaluation project Feasibility Study Update was to determine potential project "fatal flaws" on a component by component basis. The components that ultimately make this project feasible are available supply to meet demand, construction of high pressure water mains in sensitive areas, and the ability to permit the project with the numerous agencies that will become vital players in the design and construction process.

Based on this, the technical feasibility of the project is apparent based on the following:

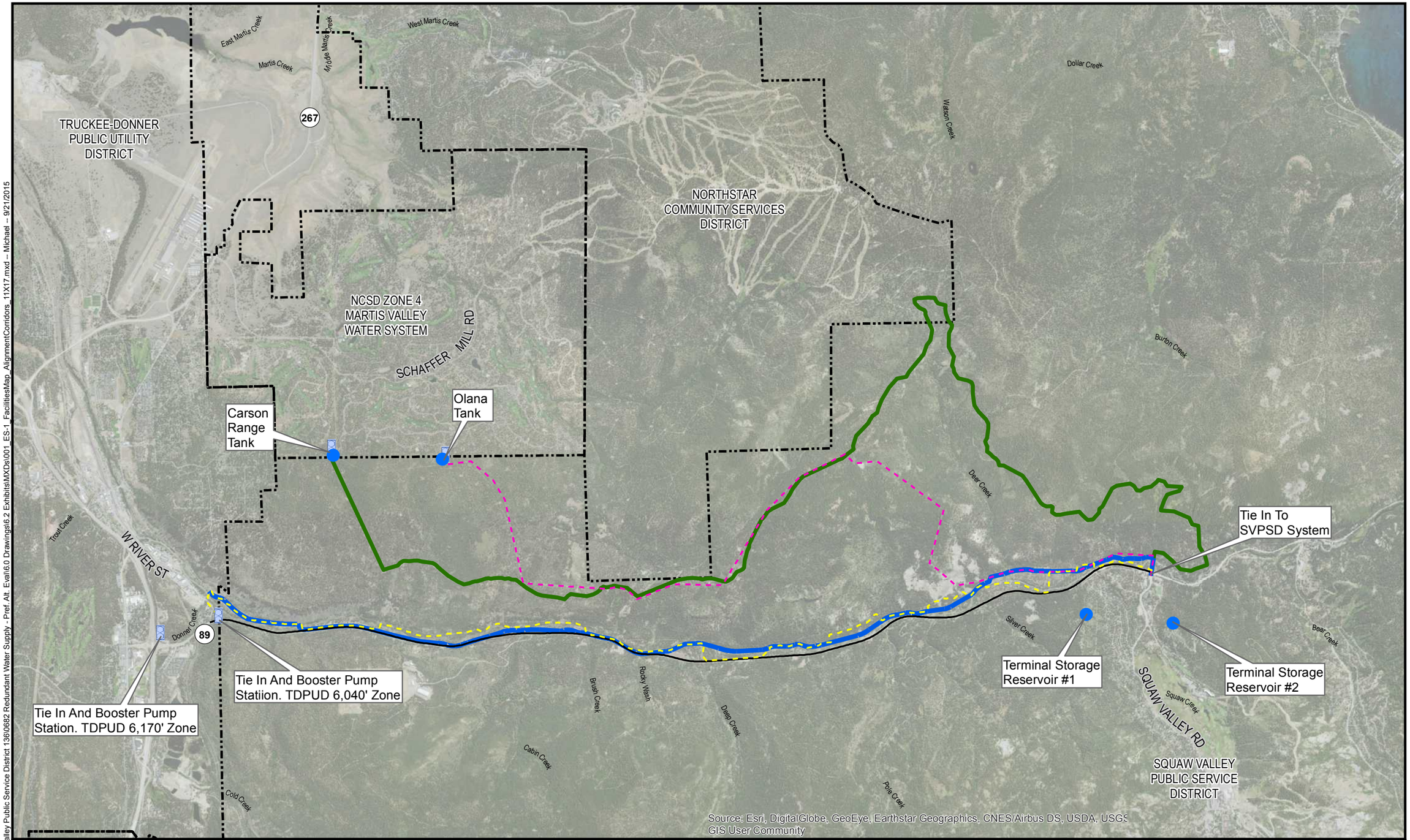
ES.8.1 WATER DEMAND AND SUPPLY

- The emergency redundant water supply needs for the Valley are 371 AFY under existing development conditions (293 AFY for the District and 78 for the SVMWC) and 863 AFY under projected buildout development conditions (776 for the District and 87 AFY for the SVMWC).

- Based on numerous independent studies completed on the MVGB, and the recently completed MVGMP, the current best available estimate for recharge to the MVGD is approximately 33,000 AFY.
- The current buildout water demand estimate for the other MVGB area water purveyors, including individual well owners, is approximately 21,000 AFY.
- Opportunities appear to exist for potential use of excess capacity from the NCSD system, and potentially the Zone 4 system.
- There exists possibilities to develop a redundant water supply well(s) outside of the NCSD, Zone 4, and TDPUD areas within the MVGB.
- Based on a review of the TROA, these potential well locations will meet the criteria required to drill a new well within the MVGB.
- Numerous meetings with TDPUD and the NCSD have shown that these water purveyors have the potential infrastructure and desire to work with the District on this water supply project.
- Based on Truckee River basin water demand estimates, the Valley's redundant water supply need should not cause the basin water demands to exceed the 32,000 AFY allocation limit or 17,600 AFY net depletion (consumptive use) limit under TROA.
- Under California groundwater law, transfers are allowed from MVGB to Squaw Valley.

ES.8.2 TRANSMISSION MAIN ALTERNATIVES

- The two transmission main corridors, and associated alignment alternatives were studied based on right of way availability, permitting, and constructability.
- Within the Highway 89 corridor, the Highway 89, Placer County Bike Trail and TTSA alignments were developed.
- Within the NFS 06 Road corridor, the NFS 06 and Liberty Energy Pole Line alignments were developed.
- Farr West met with the Caltrans permitting staff and it was concluded that the Highway 89 corridor meets the above mentioned criteria.
- For the NFS 06 Road corridor, Farr West and the District met the USFS District Ranger and it was concluded that this alignment also meets the feasibility requirements.
- The environmental constraints analysis showed that both alternative transmission main corridors have no major environmental or permitting related "fatal flaws".



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LEGEND

- Storage Reservoir
- Booster Pump Station
- Bike Path Alignment
- Powerline Alignment
- USFS 06 Alignment
- Highway 89 Alignment
- TTSA TRI Alignment
- Water Purveyor Boundary

0 2,000 4,000 Feet

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SQUAW VALLEY PUBLIC SERVICE DISTRICT

REDUNDANT WATER SUPPLY - PREFERRED ALTERNATIVE EVALUATION PROJECT
PHASE 3 - FEASIBILITY STUDY UPDATE

SHEET TITLE: FACILITIES MAP & ALIGNMENT CORRIDORS

FIGURE NUMBER: ES-1

FARR WEST
ENGINEERING

TECHNICAL MEMORANDUM

SQUAW VALLEY PUBLIC SERVICE DISTRICT

REDUNDANT WATER SUPPLY – PREFERRED ALTERNATIVE EVALUATION PROJECT PHASE 3 - FEASIBILITY STUDY UPDATE

Prepared For: Mike Geary, P.E., General Manager

Prepared By: David Hunt, P.E.

Reviewed By: Lucas Tipton, P.E.

Date: November 10, 2015

Subject: **Technical Memorandum No. 1 – Water Demand Projections and Water Supply Needs**

1.1 PURPOSE

This technical memorandum presents a summary of the District's existing water demands as well an estimate of buildout water demands based on projected development. These demands define the District's redundant water supply need, and thus the amount of infrastructure necessary to provide an adequate redundant water supply. This memorandum also presents a summary of the existing and estimated buildout water demands for the Squaw Valley Mutual Water Company (SVMWC). Collectively, these represent the total domestic water demands in the Olympic Valley (Valley), excluding golf course irrigation and snowmaking.

1.2 DISCUSSION

1.2.1 REDUNDANT WATER SUPPLY REQUIREMENT

By definition, redundancy is the duplication of critical components or functions of a system with the intention of increasing reliability of the system, usually in the form of a backup or fail-safe. California Waterworks Standards, Chapter 15 Section 64544(c) requires that water systems using only groundwater as a source must be capable of meeting the maximum day demands of the system with the highest capacity source off line. This achieves well field redundancy and the District meets this regulatory requirement. Well field redundancy assumes no failure of the source, which in this case is the Olympic Valley Aquifer. Supply source redundancy, on the other hand, does

consider the loss of the primary aquifer due to drought or contamination. To provide supply source redundancy, the District must look outside the Olympic Valley Aquifer to provide a safe and reliable water supply in the event of failure of the primary aquifer.

The redundant water supply for the Valley, including the District and SVMWC demands, will be defined as the quantity of water necessary to maintain indoor water use patterns for their customers every month in the year. This methodology is consistent with that developed for the Reno/Sparks area. The Truckee Meadows Water Authority 2010-2030 Water Resource Plan adopted the policy that they maintain, as a minimum, the ability to meet daily indoor water use with their wells if their primary surface water source is lost due to a water supply emergency on the Truckee River. This level of water resource planning will allow the District to mitigate drought impacts and emergency situations to their primary water supply with minimal impact to customers.

The redundant water supply does not include irrigation for District customers or snowmaking/irrigation demands met with supply from the Squaw Valley Resort or the Resort at Squaw Creek. This assumes that the Valley is in a condition of Stage 3 drought, appropriate water conservation measures are in place to eliminate outdoor watering, and groundwater pumping for golf course irrigation and snowmaking has ceased.

1.2.2 OLYMPIC VALLEY REDUNDANT WATER SUPPLY QUANTITY

There are two water purveyors in the Olympic Valley, the District and the SWMWC. The District and the SVMWC have a responsibility to provide a safe and reliable water supply to not only existing customers, but future customers also. While it is Placer County's responsibility to establish general planning strategies and approve or deny development projects for the Olympic Valley, the provision of water supply lies solely in the hands of the District and the SVMWC.

The District has put a tremendous amount of effort in the recent past evaluating existing water demand patterns, as well as future water demands associated with projected development. These efforts have been well documented in the Village at Squaw Valley Specific Plan (VSVSP) Water Supply Assessment 2015 Update (WSA) (Farr West Engineering, et. al, July 22, 2015), and the VSVSP Water System Capacity Analysis (Farr West Engineering, January 29, 2015). The District's water demands are made up of existing customers and future projected development including the VSVSP, vacant single family residential, and demands associated with the 1983 Squaw Valley General Plan and Land Use Ordinance. The SVMWC water demands are made up of existing customers and development of a few remaining single family residential lots within their service territory.

As presented above, redundant water supply needs are defined as being the quantity of water necessary to maintain indoor water use patterns for all water customers. Indoor water use patterns are defined as water demands seen in the fall, winter, and early spring months where no outside irrigation is occurring (October-April). This level of water supply will allow the District and the SVMWC to mitigate drought impacts and emergency situations to their primary water supply with minimal impact to customers, while providing the minimum water demand to meet standards of public health and safety.

Table 1-1 shows the District's existing and projected buildout water demands and redundant water supply demands by month in acre-feet per month (AF), gallons per minute (gpm) and gallons per day (GPD). Baseline existing water demands are based on an average of production data for the

years 2000-2014. Projected water demands include existing demands plus the VSVSP project, Resort at Squaw Creek Phase 2, vacant single family residential parcels, and General Plan buildout estimates for multi-family and commercial zoned properties (VSVSP Water System Capacity Analysis, Farr West Engineering, January 29, 2015). Redundant water supply demands for the months of May-October were estimated based on occupancy estimates of surrounding months where no irrigation would occur. Table 1-2 provides a summary of the estimated redundant water supply quantities based on these demands for the District.

Table 1-3 shows the SVMWC's existing and projected buildout water demands and redundant water supply demands by month in acre-feet per month (AF), gallons per minute (gpm) and gallons per day (GPD). Baseline existing water demands are based on an average of production data for the years 2000-2014. Projected water demands include existing demands plus vacant single family residential parcels. Redundant water supply demands for the months of May-October were estimated based on occupancy estimates of surrounding months where no irrigation would occur. Table 1-4 provides a summary of the estimated redundant water supply quantities based on these demands for the SVMWC.

Tables 1-5 and 1-6 summarize the existing and projected buildout water demands and redundant water supply demands for both the District and SVMWC.

Table 1-1 - SVPSD Existing and Projected Buildout Water Demands

	Existing Demands			**Estimated Existing RWS Demands**			Buildout Demands			**Estimated Buildout RWS Demands**		
	AF	gpm	GPD	AF	gpm	GPD	AF	gpm	GPD	**AF**	**gpm**	**GPD**
January	26	193	278,000	**26**	**193**	**278,000**	72	526	757,957	**72**	**526**	**758,000**
February	28	219	315,000	**28**	**219**	**315,000**	76	597	859,160	**76**	**597**	**859,000**
March	27	197	284,000	**27**	**197**	**284,000**	79	574	826,667	**79**	**574**	**827,000**
April	22	164	236,000	**22**	**164**	**236,000**	57	430	619,734	**57**	**430**	**620,000**
May	29	212	306,000	**20**	**146**	**210,000**	61	445	640,670	**50**	**365**	**526,000**
June	45	337	485,000	**23**	**173**	**250,000**	87	655	942,931	**60**	**453**	**652,000**
July	58	426	613,000	**28**	**204**	**294,000**	119	866	1,247,680	**76**	**555**	**799,000**
August	57	414	597,000	**28**	**204**	**294,000**	119	868	1,249,231	**76**	**555**	**799,000**
September	44	333	480,000	**24**	**181**	**261,000**	89	674	970,592	**64**	**483**	**695,000**
October	26	193	278,000	**26**	**193**	**278,000**	61	448	644,656	**61**	**448**	**645,000**
November	15	117	168,000	**15**	**117**	**168,000**	40	299	431,056	**40**	**299**	**431,000**
December	24	179	257,000	**24**	**179**	**257,000**	64	470	677,305	**64**	**470**	**677,000**
Total Annual	403	250		**293**	**181**		924	573		**776**	**481**	

Table 1-2 - SVPSD Estimated Redundant Water Quantity Summary

Existing Demands	**Buildout Demands**
293 acre-feet/year	776 acre-feet/year
15-28 acre-feet/month	40-79 acre-feet/month
117-219 gpm (ADD)	299 - 597 gpm (ADD)
168,000 - 315,000 GPD	431,000 - 859,000 GPD

Table 1-3 - SVMWC Existing and Projected Buildout Water Demands

	Existing Demands			**Estimated Existing RWS Demands**			Buildout Demands			**Estimated Buildout RWS Demands**		
	AF	gpm	GPD	AF	gpm	GPD	AF	gpm	GPD	**AF**	**gpm**	**GPD**
January	6	46	67,000	**6**	**46**	**67,000**	7	52	75,000	**7**	**52**	**75,000**
February	6	46	67,000	**6**	**46**	**67,000**	7	53	77,000	**7**	**53**	**77,000**
March	7	51	73,000	**7**	**51**	**73,000**	8	57	82,000	**8**	**57**	**82,000**
April	6	44	63,000	**6**	**44**	**63,000**	6	48	69,000	**6**	**48**	**69,000**
May	10	76	110,000	**8**	**55**	**79,000**	11	80	115,000	**8**	**55**	**79,000**
June	16	119	171,000	**6**	**45**	**65,000**	17	125	180,000	**7**	**49**	**71,000**
July	20	147	212,000	**7**	**51**	**74,000**	22	158	228,000	**8**	**58**	**84,000**
August	20	148	213,000	**6**	**44**	**63,000**	22	159	228,000	**7**	**51**	**74,000**
September	18	132	190,000	**6**	**45**	**65,000**	19	141	203,000	**7**	**53**	**76,000**
October	10	71	102,000	**10**	**71**	**102,000**	10	76	110,000	**10**	**76**	**110,000**
November	5	37	53,000	**5**	**37**	**53,000**	5	40	58,000	**5**	**40**	**58,000**
December	6	46	67,000	**6**	**46**	**67,000**	7	51	73,000	**7**	**51**	**73,000**
Total Annual	130	80		**78**	**48**		140	87		**87**	**54**	

Table 1-4 - SVMWC Estimated Redundant Water Quantity Summary

Existing Demands	**Buildout Demands**
78 acre-feet/year	87 acre-feet/year
5-10 acre-feet/month	5-10 acre-feet/month
37-71 gpm (ADD)	40 - 76 gpm (ADD)
53,000 - 102,000 GPD	58,000 - 110,000 GPD

Table 1-5 – SVPSD and SVMWC Combined Existing and Projected Buildout Water Demands

	Existing Demands			**Estimated Existing RWS Demands**			Buildout Demands			**Estimated Buildout RWS Demands**		
	AF	gpm	GPD	AF	gpm	GPD	AF	gpm	GPD	**AF**	**gpm**	**GPD**
January	33	240	345,000	**33**	**240**	**345,000**	79	578	833,000	**79**	**578**	**833,000**
February	34	265	381,000	**34**	**265**	**381,000**	83	650	936,000	**83**	**650**	**936,000**
March	34	248	357,000	**34**	**248**	**357,000**	86	631	909,000	**86**	**631**	**909,000**
April	28	207	299,000	**28**	**207**	**299,000**	63	478	689,000	**63**	**478**	**689,000**
May	39	288	415,000	**28**	**201**	**289,000**	72	525	756,000	**58**	**420**	**604,000**
June	60	456	656,000	**29**	**219**	**315,000**	103	780	1,123,000	**67**	**502**	**722,000**
July	78	573	825,000	**35**	**255**	**368,000**	140	1025	1,476,000	**84**	**613**	**883,000**
August	77	562	810,000	**34**	**248**	**357,000**	141	1026	1,478,000	**83**	**606**	**872,000**
September	62	466	670,000	**30**	**226**	**326,000**	108	815	1,173,000	**71**	**536**	**771,000**
October	36	264	381,000	**36**	**264**	**381,000**	72	524	755,000	**72**	**524**	**755,000**
November	20	153	221,000	**20**	**153**	**221,000**	45	340	489,000	**45**	**340**	**489,000**
December	31	225	324,000	**31**	**225**	**324,000**	71	521	750,000	**71**	**521**	**750,000**
Total Annual	533	329		**371**	**229**		1,065	658		**863**	**533**	

Table 1-6 – SVPSD and SVMWC Combined Estimated Redundant Water Quantity Summary

Existing Demands	**Buildout Demands**
371 acre-feet/year	863 acre-feet/year
20-36 acre-feet/month	45-86 acre-feet/month
153-265 gpm (ADD)	340 - 650 gpm (ADD)
221,000 - 381,000 GPD	489,000 - 936,000 GPD

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TECHNICAL MEMORANDUM

SQUAW VALLEY PUBLIC SERVICE DISTRICT

REDUNDANT WATER SUPPLY – PREFERRED ALTERNATIVE EVALUATION PROJECT PHASE 3 - FEASIBILITY STUDY UPDATE

Prepared For: Mike Geary, P.E., General Manager

Prepared By: Mark Hanneman, R.G. *(formerly ECO:LOGIC)*

Updated By: David Hunt, P.E.
Dwight Smith, PG, CHg (Interflow Hydrology)

Date: November 10, 2015

Subject: **Technical Memorandum No. 2 – Truckee River Side Drainages Evaluation**

2.1 PURPOSE

This technical memorandum presents a discussion of the evaluation of certain tributaries, or side drainages, along the Truckee River as potential water supplies to Squaw Valley. The investigation looked at the potential for producing groundwater from wells within these drainage areas.

This technical memorandum was originally prepared by ECO:LOGIC Engineering to support the September 2009 Alternative/Supplemental Water Supply and Enhanced Utilities Feasibility Study. It remains largely unchanged, although minor updates have been made to this current version, including the addition of water source information associated with the Big Chief Lodge project near Pole Creek.

2.2 SUMMARY

A component of the redundant water supply investigation included the review of potential well sites in drainages tributary to the Truckee River in the Highway 89 corridor between Truckee and Squaw Valley. The "side drainages" evaluated, Silver Creek, Deer Creek, Pole Creek, Deep Creek and Cabin Creek, flow into the Truckee River along Highway 89 (Figure 2-1). The drainages have a different hydrogeologic setting than the Martis Valley, and their potential to produce significant groundwater is largely unknown.

Groundwater in the vicinity of the side drainages is developed by domestic or campground wells located near the mouth of each drainage where it enters the Truckee River canyon. The wells are predominantly completed in volcanic bedrock, or within an overlying layer of glacial outwash or till. These areas near the Truckee River were the focus of the investigation. Although sites for groundwater development may also exist in the upper portions of the creeks away from the river, physical access for drill rigs and infrastructure would likely be difficult or costly, so these areas were not investigated.

Field inspections of each drainage were completed on November 21, 2007 (Mark Hanneman). Prior to the field inspection, topographic maps, aerial images (from Google Earth) and the geologic map of the area were reviewed. Well logs for the existing wells, and parcel and land ownership maps were not available at the time, although some well logs were provided at a later date. Unless posted as private property, it was assumed that most land in the area is public land managed by the United States Forest Service (USFS).

As shown in Figure 2-1, the geology of the upper Truckee River corridor and the side drainages includes a predominance of volcanic rocks locally overlain by alluvial or glacial deposits (mostly till). Granite may be present near the head of the valleys west of the river. Wells completed in volcanic bedrock can have variable production depending on the type of volcanic rock in which they were completed. In general, volcanic rocks have lower primary permeability than alluvial sediments, and must be subject to post-deposition fractures or faults (in brittle units) to enhance their secondary porosity and groundwater production potential. Wells drilled in unwelded volcanic tuffs or agglomerates, which tend to contain clays and be more ductile, generally produce limited water, even from fault zones. Furthermore, permeable fractured zones must be extensive and connected to a source of groundwater recharge, or pumping will rapidly dewater them.

Water produced from volcanic rock can have variable quality. After some of the older volcanic rocks in the Truckee River corridor were deposited, hot spring/geothermal activity locally existed in the area. As hot water moved along faults and fractures, it changed the composition of the rocks, a process known as “hydrothermal alteration”. The alteration is indicated by areas of bluish-grey rock containing sulfide minerals, or yellow and orange colored rocks. The alteration often added deleterious substances such as manganese, iron, sulfur or arsenic to the rock. Consequently, wells completed in hydrothermally-altered rocks may produce water that does not meet drinking water standards.

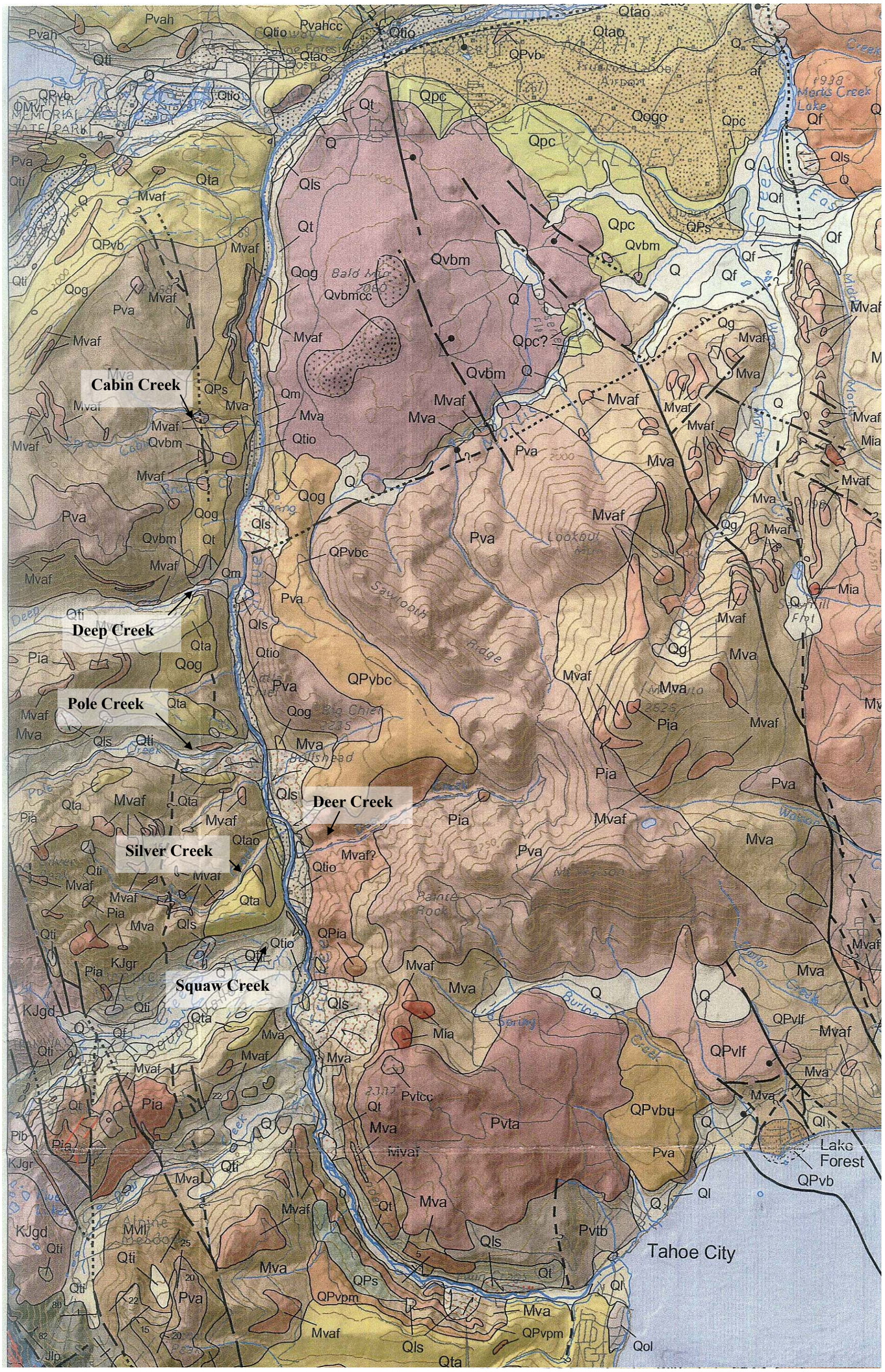


Figure 2-1
Geologic Map of the Upper Truckee River area

2.3 RESULTS OF FIELD INSPECTIONS

2.3.1 SILVER CREEK

Silver Creek is located immediately north of Squaw Valley and hosts a small perennial stream. At one time, a surface water supply system operated near the mouth of the canyon to supply the Silver Creek Cabins situated west of Highway 89. One or more small concrete dams were constructed, which fed water into a small steel pipeline (later replaced by a PVC pipeline). Two small buildings containing equipment for operating the water pipeline are also present.

Access, Existing Houses and Wells

A narrow road was at one time present along the south side of the creek which provided access to the water system, dams and buildings. This road is now largely overgrown and there is currently no vehicle access into the canyon itself. Approximately 25 cabins are situated north of creek, built on USFS lands under long-term land lease agreement. One well is present which in the past has been used to provide water to the cabins, but use has been discontinued due to excess iron content (5 mg/L) in the water. Local volcanic rocks in which the well is completed are hydrothermally altered. A small spring to the west of cabins and outside the area of hydrothermal alteration provides the current source of water to the cabins and is of good quality.

Directly across Highway 89, the Silver Creek Campground is present. A water supply well is present in the campground, and is reported to also have elevated iron content, but is otherwise in use. A second, hand-pumped well is present, which was labeled "Water not tested, do not drink". It is unknown if the sign indicates that the well produces poor quality water. No well logs were available for the campground wells.

Geology

Alluvial

As shown on Photograph 2-1, there is a very thin to non-existent layer of glacial outwash at the mouth of Silver Creek, although thicker alluvial materials are present to the east at the Silver Creek Campground.

Bedrock

Bedrock geology in the Silver Creek drainage consists of variably hydrothermally-altered volcanic rocks. This type of alteration resulted from movement of hot water along faults and fractures, which changed the mineralogy of the rock and resulted in bluish-grey, yellow or reddish colors. Frequently, elevated concentrations of iron, manganese, arsenic, sulfur and other deleterious substances are present in this type of altered rock and water produced from wells drilled into the rock may not meet drinking water standards.

Other outcrops on the side of the canyon were less altered than those in the stream bed itself, which may indicate that the stream locally follows a narrow altered fault zone.

Potential Drill Sites

The Silver Creek drainage appears to have poor groundwater production potential. Drilling sites at the mouth of the creek would be limited to the shoulder of Highway 89, which is likely not feasible. North and south of the creek, the proximity of private residences could restrict drilling from those areas. Water quality issues are likely due to locally altered bedrock.

2.3.2 DEER CREEK

Deer Creek is located on the east side of the Truckee River. The mouth of the creek exits the range several hundred feet from the Truckee River, but then flows over a bench of glacial outwash that hosts a manicured estate of large log homes before entering the river (Photograph 2-3). No well logs were made available for area wells.

The lower reach of the creek was not inspected because of the estate at the mouth of the creek, and because access appeared to be via a private bridge which was posted with no trespassing signs. However, a reconnaissance of the upper reaches of the Deer Creek drainage was made by accessing USFS roads originating in the Martis Valley.

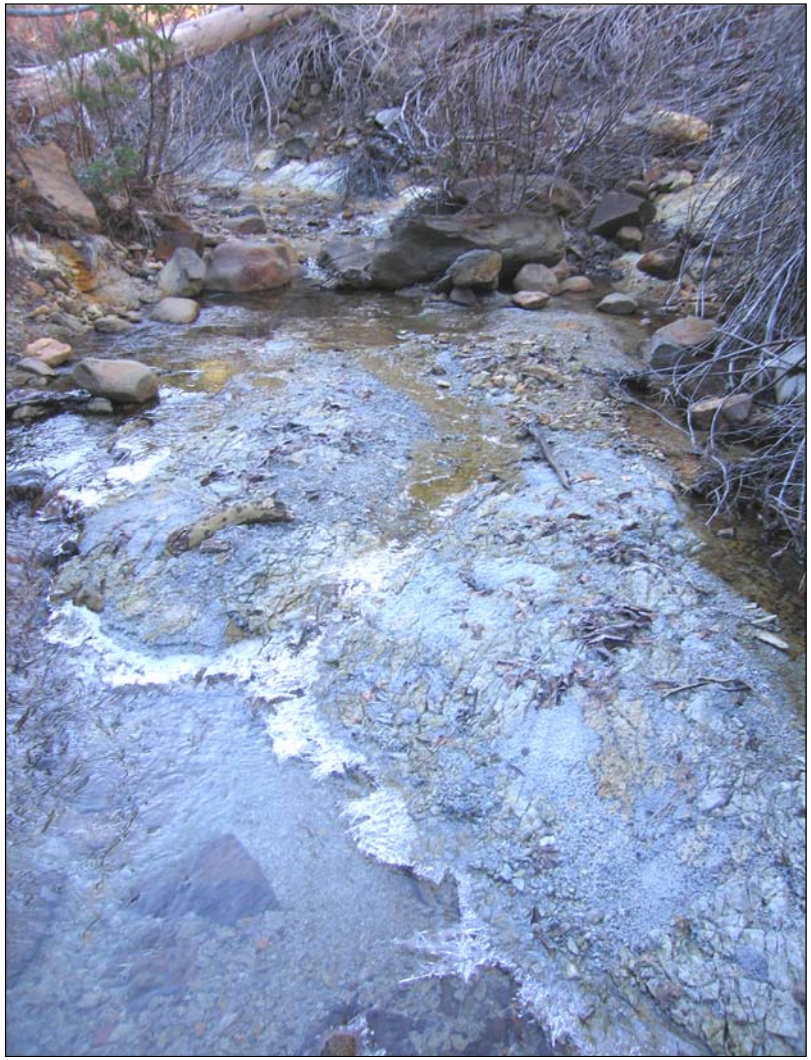
Geology

Alluvial

There is a bench of glacial outwash at the mouth of Deer Creek that is likely relatively thin. This bench appears to be private property and is developed with lawns surrounding large homes. Alluvial deposits are virtually absent in the upper reaches of the drainage basin.

Bedrock

The geologic map indicates the primary bedrock geology in the Deer Creek canyon is older Miocene andesite flows. The map symbol is queried for the lower portion of the drainage likely because extensive hydrothermal alteration is present in the area. Large areas of yellowish-altered outcrop are visible on the aerial photographs on the north side of the drainage, and on the south side a peak named Painted Rock is present. District staff stated that some mine tailings are also present in the valley, and that ground water quality in the area is thought to be poor.



Photograph 2-1
Bluish-grey (unoxidized) and orange (oxidized), hydrothermally-altered volcanic bedrock in the bottom of the Silver Creek drainage.

Photograph 2-2
Old well in Silver Creek Campground with "Do Not Drink" label.

Photograph 2-3
Homes located where Deer Creek enters the Truckee River. Deer Creek canyon is in background.

Potential Drill Sites

The lower Deer Creek drainage appears to have poor groundwater production potential due to limited access, large private estates at the mouth of the canyon, and hydrothermally-altered volcanic bedrock in the creek drainage, which likely generates poor quality groundwater. USFS roads originating in Martis Valley do provide access to upper Dear Creek canyon for drilling equipment and there is at least one site where an exploration well might be drilled with minimal pad preparation. This site is located near the southeast corner of Section 14, approximately 1.5 miles southwest of Mount Pluto and one-half mile northwest of Mount Watson. The geologic materials in this area comprise the older Miocene andesitic rocks, described above, that typically yield only moderate quantities of groundwater to wells, unless they have been highly fractured as a result of faulting. The site is situated on a linear northwest-trending topographic feature aligned with upper Martis Creek. But, no fault corresponding to this lineament has been mapped, suggesting no geologic structure is present that might enhance the yield of a well at this site. Drilling and test pumping of an exploratory well are required to determine if an anomaly exists at this site that might result in a higher than expected well yield at this locale.

2.3.3 POLE CREEK

Pole Creek, a perennial stream, is located about one mile north of Silver Creek on the west side of the Truckee River. As shown in Photograph 2-4, the main access route to the canyon is on a well-graded gravel road located on the south side of the creek. The start of this road is less than 500 feet west of the Truckee River. The road extends several miles into the canyon and is relatively

well traveled. From Highway 89 the road climbs fairly steeply for about ¼ mile, makes two switchbacks, and then traverses across a relatively large, flat bench before climbing again.

Several signs were present further up the canyon, apparently placed by the USFS. One sign describes the ban on fishing in the creek due to a small self-sustaining population of threatened Lahontan cutthroat trout; a second describes landslide restoration efforts in the area; while a third described sensitive deer fawning areas.

Existing Houses and Wells

Homes exist both north of the creek and on the east side of Highway 89. No well logs were available for these homes. Approximately 600 feet north of where Pole Creek enters the Truckee River the office of Olson Construction exists and the Big Chief Lodge development is currently being constructed. New water system facilities were recently constructed to support this development, including two wells, storage, and booster pump system to provide domestic and fire protection water. An additional well is situated on the east side of the river and provides water to several cabins. Wells for the Big Chief Lodge have estimated long-term sustainable yields of 20 to 40 gpm, reported in water supply documents filed with Placer County. Water quality is generally good, with mildly elevated manganese and iron, which requires treatment.

Geology

Alluvial

The geology at the mouth of the creek consists of a relatively large landslide deposit that extends across the Truckee River. The creek has mostly eroded down through these deposits. Further up the stream canyon, glacial till is mapped in the canyon bottom, while a veneer of slightly older glacial till caps volcanic rock on either side of the creek canyon.

Bedrock

The geologic map indicates the creek has eroded into Miocene, andesitic volcanic rocks. Significant hydrothermal alteration was not observed in the creek area, although some is present in road cuts south of the creek.

Potential Drill Sites

Limited drilling sites are present near Pole Creek. A parking area near the base of the access road next to Highway 89 is a possibility, although it is located very close to the highway. The bench of land just west of the first switchbacks has flat areas atop the landslide deposits where a drill rig could set up. However, the land appears to be USFS property, and there may be significant issues associated with the area due to its heavier recreation and wildlife use. Further, the bench area, although mapped as landslide deposits, may be underlain by altered volcanic rocks. Water quality issues are possible.

Photograph 2-4
Aerial photograph of Pole Creek drainage.

2.3.4 DEEP CREEK

Deep Creek, a perennial stream, is located about 1.5 miles north of Pole Creek on the west side of the Truckee River. A private home is located at the mouth of the creek on the west side of Highway 89. The main access route to the canyon is a gravel 4WD road located on the south side of the creek. An unlocked USFS gate is present across that road, about ¼-mile west of Highway 89. The creek has formed a narrow, steep canyon, and the road is located one hundred or more feet above the creek bed. Access to the private parcel is from a driveway located north of the creek.

Photograph 2-5
View of portion of private parcel at the mouth of Deep Creek. The parcel is relatively flat and has sites where a well could be completed a sufficient distance away from both the creek and the Truckee River.

Existing Houses and Wells

The private home, which includes a guest house and well, is located on a relatively flat, 9.6-acre parcel west of Highway 89 at the mouth of Deep Creek. The owner provided a well log and water quality analyses from three samples collected from both the well and from two interior taps. Apparently, the well water flows through a filtration system before it enters the buildings. As shown in Table 2-1, the groundwater at this location has moderate total dissolved solids and is a sodium-bicarbonate type. Iron exceeded the drinking water standard at the well head, but apparently is removed by the home's filtration system. Inside the home, however, manganese exceeded the drinking water standard. The well is 200 feet deep and was initially airlifted at more

than 50 gpm. When sampled in May 2007, the well had 29 gpm of artesian flow. Well geology is described in the following section.

Table 2-1 – Well and Water Quality Data [(a)] [(b)]

Parameter	Goose Meadow Well	Domestic Well	Domestic Well Kitchen after filter	Domestic Well Guest House after filter
Depth Drilled	380 feet	200 feet		
Volume (gpm)	10 gpm airlift from bottom	29 gpm flowing artesian		
pH	7.2	6.65	6.61	6.83
TDS	NA	355	326	345
Ec (umhos/cm)	NA	320	320	340
Bicarbonate	**1,020**	206	201	206
Total Alkalinity	**840**	167	165	169
Hardness	125	20	18	6
Calcium	28.1	4.8	4.6	0.92
Magnesium	13.3	2	1.7	0.99
Sodium	**380**	60.3	55.5	63
Manganese	**0.59**	<0.05	**1.27**	<0.05
Iron	**1.14**	**2.34**	0.07	0.58
Arsenic	NA	<0.01	<0.01	<0.01
Nitrate	ND	<0.5	<0.5	<0.5
Fluoride	ND	0.22	0.25	0.23

(a) All results in ppm (mg/l) unless noted.
(b) Values in bold exceed drinking water standards.

Across Highway 89, numerous small homes and cabins are present along the Truckee River and south of Deep Creek. North of these houses, and along Deep Creek itself, is the Goose Meadows Campground. A water supply well is present in the campground, and a well log and water quality analysis were provided by the USFS. The well geology is described in the following section. The well only air-lifted 10 gpm from the bottom, and the water quality was poor and contained high concentrations of bicarbonate (1,020 mg/L), sodium (380 mg/L), iron (1.14 mg/L) and manganese (0.059 mg/L). Total dissolved solids (TDS) and arsenic were not reported, but based on the information provided, the TDS is likely in the range of 1,800 mg/L. The analysis also reported

elevated hardness (125 mg/L). The results are unusual when compared to the private residence across the street, as the concentrations of all the major cations and bicarbonate in the private well are roughly 5 to 6 times lower than in the Goose Meadows well. As described in the next section, the domestic well produces water largely from unaltered basalt, while the campground well appears to produce water largely from clay-altered volcanic rock.

Geology

Alluvial

The geology at the mouth of Deep creek and the 9-acre parcel is mapped on Figure 2-1 as either Glacial till (Qti) or Quaternary Mudflow deposits (Qm). The ground surface appeared to consist largely of cobbles and boulders. Near the mouth of the creek, the material is exposed in a steep bank, and is mostly sand, gravel and rounded cobbles (Photograph 2-6). Mudflow deposits also cover the surface at the Goose Meadows Campground. The well log for the Goose Meadows Campground well was obtained from the Truckee Ranger District, which indicated that the boulder and gravel deposits are about 47 feet thick, and underlain by clay and volcanic rock. The well log for the private residence indicated that clay, and cobbles with clay, were present to a depth of 16 feet, and were underlain by basalt.

Bedrock

The well log for the Goose Meadows Campground well indicated that the bedrock is dominantly blue, red, brown and pink clay, with lesser volcanic conglomerate and other volcanic rock to the total depth of 380 feet. These materials are likely those mapped in the area as Mva (Miocene lahars, flows, breccia and volcaniclastic sediments). These rocks are also present south of Deep Creek along the west side of Highway 89, where they are fractured and variably altered (Photograph 2-7). Wells completed in these materials could produce poor quality groundwater.

Photograph 2-6
Lower portion of Deep Creek just west of the highway, showing coarse materials in the stream bed, and rounded gravels and cobbles mapped as either glacial till or mudflow deposits.

The well log for the private residence indicated that the bedrock is black "basalt" that was fractured from 140 to 145 feet bgs and from 160 to 190 feet bgs. This material is apparently that shown in Figure 2-1 as Qvbm (Bald Mountain Olivine Latite), which was mapped near the residence in two thin strips on either side of Deep creek. The clayey volcanic rocks in the Goose Meadows well were not present, although they may underlie the latite at unknown depth. Because these rocks are not altered, the well produces better quality groundwater, although it still does not meet drinking water standards. During drilling, groundwater was first reported from the fractured zone beginning at 140 feet. The static water level after drilling rose to 5 feet below the surface, but artesian flow was not reported. The flowing conditions reported when the well was sampled (in May of 2007) may be seasonal.

Photograph 2-7
View of volcanic rock in road cut south of Deep Creek that has been variably altered along faults and fractures.

Potential Drill Sites

Flat areas suitable for well drilling exist on the 9-acre private parcel at the mouth of Deep Creek canyon. Groundwater produced from the well at the private residence does not meet drinking water standards for iron and possibly manganese, but it is vastly better quality than that produced from the campground well to the east. The volume of water that could be produced from a municipal well at the property is unknown, but aquifer parameters could be estimated by completing an aquifer stress test on the well, or if not possible, on a new test well. Because the well produces water from a fractured rock aquifer, a 10-day constant discharge test would be recommended. The principal reason for extended-duration testing is that the well is located within fractured rock and the aquifer is likely bounded by numerous geologic contacts. Fractured-rock hydraulics are fairly complicated and projecting the long-term performance of a well in this terrain on the basis of a short-term test has resulted in over-estimating the available water supply at other locations throughout the Sierra. An extended pumping test would provide a higher level of confidence in the amount of water that a production well could provide over the long term.

2.3.5 CABIN CREEK

Cabin Creek is a small intermittent stream present in a steep narrow drainage. It is located about 1.5 miles north of Deep Creek on the west side of the Truckee River. A paved road is present just north of Cabin Creek which leads about one mile in a north-northwesterly direction, away from the creek and toward to the Eastern Regional Landfill. The road receives relatively heavy vehicle traffic. A few dirt 4WD side roads are present off the paved road, which provide limited access to the Cabin Creek drainage. A second, smaller, unnamed drainage is present immediately north of the Cabin Creek Road. This stream was dry during the site visit.

Existing Houses and Wells

A few houses are present on the south side of the creek and just off of Highway 89. Numerous other houses are present east of the highway and along the Truckee river. Tahoe Truckee Sierra Disposal operates the Eastern Regional Landfill in the area. The landfill has an existing well used to satisfy daily water demands of approximately 60,000 gpd. A 2012 EIR for the Cabin Creek Biomass Project referenced an additional groundwater well to satisfy the peak water demands as well as provide redundancy for the primary supply. This well has yet to be completed. Placer County Public Works also has a transportation hub and office located on Cabin Creek Road, adjacent to the landfill. Water supply to this facility comes from the same well. Based on the annual consumer confidence reports, water quality of the well meets drinking water standards.

Geology

Alluvial

A veneer of glacial till (Donner Lake till) is present near the creek and surrounding areas. It is underlain at shallow depth by volcanic bedrock (Bald Mountain latite).

Bedrock

Bedrock near the creek is mapped as various volcanic rocks. A large outcrop of andesite is present across from cabin creek road and on the east side of Highway 89, although it is not shown on the geologic map (Photographs 2-8 and 2-9). The rock is not altered. Similar volcanic rocks are likely to underlie glacial till in the area. Site characterization work for the Eastern Regional Landfill defines a sequence of Quaternary age Bald Mountain latite volcanic rocks underlain by an interbedded Quaternary alluvial strata, the Cabin Creek alluvium, which is underlain by older Tertiary volcanic rocks (GeoLogic Associates, in LRWQCB Revised Waste Discharge Requirements, 2004).

Photograph 2-8
View of turnoff to Cabin Creek Road.

Photograph 2-9
View of volcanic rock in road cut across from Cabin Creek Road

Groundwater Production Potential and Drill Sites

Any wells drilled in this area would be completed almost entirely within volcanic bedrock, with the exception of possible interception of the Cabin Creek alluvium. Although apparently unaltered, significant groundwater production would only occur if large fault or fracture zones, connected to a source of recharge, were present in the volcanic rock, and significant potential yield in the Cabin Creek alluvium is possible. Information from the Eastern Regional Landfill indicates that locally the Cabin Creek alluvium is of moderate permeability.

The closest possible drill site is located on a small spur off of the Cabin Creek road, a few hundred feet from Highway 89. The site is considered to have moderate potential for producing significant groundwater, especially if the Cabin Creek alluvium is encountered. However, significant concerns of water quality exist because the Eastern Regional Landfill being less than a mile up-gradient of the site.

2.4 CONCLUSIONS AND RECOMMENDATIONS

Based on the mapped geology, field observations, and known groundwater quality issues along the Truckee River, none of the drainages investigated appear to be particularly favorable for production of groundwater for use as a redundant water supply for Squaw Valley, and some of the sites are considered unfavorable. All of the sites have relatively thin alluvial aquifers underlain at shallow depth by volcanic bedrock which may have either low permeability or poor water quality.

The site with the best potential appears to be the private parcel at the mouth of Deep Creek Canyon. The surface geology includes permeable boulders, cobbles and gravels, while the well produces water from fractured, but apparently unaltered volcanic rocks. A large area of flat ground is available for drill rig access that is more than 500 feet from the creek and the Truckee River; a power line is present; and it would be relatively easy to pipe water from the site. Water quality samples indicate that iron and possibly manganese exceed drinking water standards, and the volume of water that could be reliably produced from a production well at the site is unknown. Because the site's well produces groundwater from a confined, fractured-rock aquifer, an extended-duration pumping test of up to 10 days would be necessary to evaluate the aquifer's hydraulic parameters. A pumping test on the well, or on a new test well, should be completed before the district considers purchasing the property.

A second site may exist in the headwaters of Deer Creek. The geologic materials in this area typically do not yield large quantities of groundwater to wells. However, the site is aligned with a northwesterly-trending linear feature in the topography coincident with upper Martis Creek which may or may not have any significance. Drilling and testing an exploratory well in the headwaters of Deer Creek would be required to determine if this linear feature represents a geologic anomaly that might result in higher than expected well yield.

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SQUAW VALLEY PUBLIC SERVICE DISTRICT

REDUNDANT WATER SUPPLY – PREFERRED ALTERNATIVE EVALUATION PROJECT FEASIBILITY STUDY UPDATE

Prepared For: Mike Geary, P.E., General Manager

Prepared By: Dwight L. Smith, PG, CHg, Principal Hydrogeologist, Interflow Hydrology, Inc.

Reviewed By: David Hunt, P.E.

Date: November 10, 2015

Subject: **Technical Memorandum No. 3 – Groundwater Availability in the Martis Valley**

3.1 PURPOSE

This technical memorandum was originally prepared by Dale Bugenig of ECO:LOGIC Engineering to support the September 2009 Alternative/Supplemental Water Supply and Enhanced Utilities Feasibility Study. Since the issuance of the 2009 study, a significant body of work has been published, including the Groundwater Management Plan for Martis Valley (MVGMP). The Truckee River Operating Agreement (TROA) underwent the NEPA process and nears implementation, and the TROA section has also been refined. Lastly, this update is providing a number of additional areas of interest for possible redundant water supply development. Accordingly, this technical memorandum has undergone significant revision from the 2009 version.

The purpose of this technical memorandum is to:

- Summarize the available groundwater resources in the Martis Valley Groundwater Basin (MVGB);
- Assess whether or not there are sufficient groundwater resources in the basin to accommodate the redundant water demands for the Squaw Valley Public Service District (District) and Squaw Valley Mutual Water Company (SVMWC);
- Discuss the implications of TROA;
- Discuss the District's right to water from the MVGB;
- Determine whether or not there is excess capacity in existing municipal water supply wells in Martis Valley that can be used to meet the Squaw Valley redundant water supply needs, and
- Discuss potential new well sites in the MVGB.

3.2 SUMMARY

Resources of the MVGB appear sufficient to support development of a redundant water supply for the Olympic Valley (Valley), including the District and the SVMWC. Current water use from the basin is estimated at 9,430 acre-feet per year (AFY) with potential buildout use estimated at 21,000 AFY. The best available estimate of annual average recharge to the basin is 33,000 AFY.

Future projected water use from the TROA watershed segment defined from Lake Tahoe to the CA-NV stateline is 32,000 AFY, with a net depletion (consumptive use) limit of 17,600 AFY. Projected gross diversions and net depletion are well within the TROA limits. Furthermore, use of the Martis Valley aquifer as a redundant water supply for the District will not effectively change the gross or net depletion.

A redundant water supply source of approximately 650 gpm should be sufficient for the District and SVMWC, under implementation of water conservation measures. The duration of a redundant water supply could be for several months to several years, or potentially longer depending on the degree of potable water supply shortage. The buildout water demand for the District is estimated at 924 AFY and for the SVMWC at 140 AFY (VSVSP Water System Capacity Analysis, Farr West Engineering, January 29, 2015), but a redundant water supply of 863 AFY (776 AFY for the District and 87 AFY for the SVMWC) should be sufficient to meet primary indoor uses (see TM #1 Water Demand Projections and Water Supply Needs).

Opportunities appear to exist for potential use of excess capacity from the NCSD system, and potentially from the Martis Valley Zone 4 system, which is owned and operated by NCSD. Water service to the Martis Valley West Parcel (MVWP) will have some bearing on potential NCSD water supply availability. Local water development is one proposed option for the MVWP, which could result in additional available capacity from existing and planned (well TH-3) NCSD water system sources. Subject to further review, several wells in the Zone 4 system may also have

redundant water supply capacity, such as the Lahontan 1 and 2 wells, although previously, it was indicated the capacity was needed for future buildout.

Opportunities exist for new well drilling in the vicinity of the existing water systems, however, potential interference with existing wells will require site-specific review. An area of interest for a new well has been identified between the Truckee Donner Public Utility District (TDPUD) Airport Well and PCWA Martis Valley Well No. 1. Wells in this vicinity produce at rates of 1,750 to 2,000 gpm.

There exists possibilities to develop a redundant water supply well(s) outside the areas already exploited in the basin. For example, in this memorandum we have identified three areas of interest within the defined MVGB which presently have little or no groundwater development. One area of interest is near the Highway 89 and Donner Creek on the southwest side of Truckee. This area of interest resides generally between the TDPUD's Northside Well and Donner Creek Well.

Two other areas of interest are geographically east of the Truckee River and west of the Martis Camp and Placer County portions of Truckee. This area is accessed by Forest Service Road 06 and is an upland area containing Bald Hill, Sawtooth Ridge and Big Chief. These areas have had little to no exploration to date, but are defined as being within the MVGB based on interpreted subsurface geology. While surface rocks are volcanic, it is interpreted that alluvium deposited by paleo-alignments of the Truckee River potentially underlain the younger volcanic rocks in this region. This geologic environment could be favorable to production wells, particularly if underlying alluvium is encountered. Exploration drilling will be required to determine the feasibility of these alternative areas of interest.

3.3 DISCUSSION

3.3.1. AVAILABLE GROUNDWATER RESOURCES

The study area encompasses a portion of the MVGB (Figure 3-1). The groundwater resources of the MVGB are discussed in a number of documents. These include:

Hydro-Search, Inc., 1975. *Availability of ground water*: consulting report prepared for Truckee Donner Public Utility District.

Hydro-Search, Inc., 1980. *Truckee and vicinity ground-water resource evaluation*: consulting report prepared for Dart Resorts, Inc.

Hydro-Search, Inc., 1995. *Ground-water Management Plan, Phase 1, Martis Valley Ground-Water Basin, Basin No. 6-67, Nevada and Placer Counties*: consulting report prepared for Truckee Donner Public Utility District.

Nimbus Engineers, 2000. *Ground water resource evaluation*: consulting report prepared for Truckee Donner Public Utility District.

Nimbus Engineers, 2001. *Ground water availability in the Martis Valley Ground Water Basin, Nevada and Placer Counties*: consulting report prepared for Truckee Donner Public Utility District, Placer County Water Agency, and Northstar Community Services District.

Kennedy/Jenks Consultants, Cordilleran Hydrology, Inc. and Todd Engineers, 2002. *Independent analysis of Martis Valley ground water availability Nevada and Placer Counties, California*: consulting report prepared for Martis Valley property owners.

InterFlow Hydrology, Inc., and Cordilleran Hydrology, Inc., 2003. Measurement of ground water discharge to streams tributary to the Truckee River in Martis Valley, Placer and Nevada Counties, California.

Truckee Donner Public Utility District, 2005. Truckee Donner Public Utility District *Urban Water Management Plan.*

Truckee Donner Public Utility District, 2011. *Truckee Donner Public Utility District Urban Water Management Plan (Update).*

Desert Research Institute (Rajagopal, et al.), 2012, Estimates of Ground Water Recharge in the Martis Valley Ground Water Basin, Technical Note to Placer County Water Agency.

Brown and Caldwell and Balance Hydrologics, 2013, *Martis Valley Groundwater Management Plan:* consulting report prepared for the Truckee Donner Public Utility District, Placer County Water Agency, and Northstar Community Services District.

Stantec, 2015, Martis Valley West Parcel Project – Water Supply Assessment.

Desert Research Institute (Rajagopal, et al.), 2015, Integrated Surface and Groundwater Modeling of Martis Valley, California, for Assessment of Potential Climate Change Impacts on Basin-Scale Water Resources, DRI Publication No. 41261, prepared for the US Bureau of Reclamation.

The water resources of a groundwater basin can be summarized in a water budget, which is an accounting of inflows to and outflows from the basin. The various documents listed above provide a range of values for the various components of the water budget for the MVGB. A water budget for the MVGB is summarized in Table 3-1. It is adapted from the work of several sources including estimates by Nimbus Engineers (2001), Kennedy-Jenks (2002), Interflow Hydrology (2003), the MVGMP for the basin (2013), and work by Desert Research Institute (DRI) (Rajagopal et al., 2012 and 2015). For a basin that is in equilibrium, the inflows should be equal to the outflows. The budget illustrated in Table 3-1 has a 7% imbalance, which may be due to estimating errors or disequilibrium to pumping. In some groundwater flow systems, the disequilibrium imposed by pumping requires many decades to fully reach a state of steady-state equilibrium.

Many of the components of a water budget have a degree of uncertainty associated with them. This can be seen in a comparison of the estimates of recharge arising from precipitation falling on the basin and groundwater discharge to the Truckee River presented by Hydro-Search (1995), Nimbus Engineers (2001), and Rajagopal, et al. at the DRI (2012). For example, Hydro-Search (1995) estimated 18,179 acre-feet per year of recharge from precipitation versus Nimbus's (2001) estimate of 23,744 AFY. Likewise, Hydro-Search (1995) estimated groundwater discharge to the Truckee River as 8,170 AFY versus Nimbus's (2001) estimate of 20,207 AFY. Kennedy Jenks (2002) provided a review of the water budget estimates and identified one potential component

that was not fully accounted, being groundwater discharge to tributary streams to the Truckee River. Interflow Hydrology (2003) followed up with data collection to help quantify this component of the water budget, estimating approximately 7,000 AFY of previously unaccounted groundwater discharge, and an estimated total groundwater budget for Martis Valley of 34,560 AFY.

In 2011, work on the collaborative MVGMP began. This effort attempted to provide an up-to-date summary of the resources available in the basin and the current level of development. As a component of this work, the DRI (Rajagopal, et al., 2012) reviewed potential groundwater recharge using additional reconnaissance estimating techniques and hydrologic watershed modeling. Annual groundwater recharge was estimated to be quite variable, ranging between 12,100 AFY to 56,800 AFY depending on precipitation totals for the year. A long-term average annual recharge to Martis Valley was estimated at approximately 32,700 to 35,200 AFY, very similar to the estimate made by Interflow Hydrology in 2003. The recently published numerical groundwater flow model for the Martis Valley region (Rajagopal, et al., 2015) relies upon this magnitude of groundwater recharge.

As presented in the MVGMP, the current best available estimate for recharge to the Martis Valley groundwater basin is approximately 33,000 AFY as a long-term annual mean, based on the most current evaluations by DRI. Secondary recharge occurs to the groundwater system by infiltration of treated effluent at the Tahoe Truckee Sanitation Agency (TTSA) facility, and to a lesser degree by effluent from septic systems. A water budget summary is presented in Table 3-1.

Table 3-1
Martis Valley Estimated Groundwater Basin Water Budget – values rounded [(a)]

Component	Acre-feet per year
Inflow	
Direct infiltration of precipitation falling within the basin	33,000
Infiltration of treated effluent (effluent from TTSA, including Effluent from sewage imported into the basin)	5,430
Septic system return flow	490
Total Inflow	**38,900**

Outflow	
Discharge to the Truckee River	18,000
Evaportranspiration (vicinity of Martis Creek)	1,540
Discharge via municipal, industrial, and golf course irrigation wells	9,340
Discharge from domestic wells	180
Discharge from springs (Ponderosa Golf Course and Juniper Flat)	1,490
Discharge to tributary streams: Alder, Prosser, Juniper, Trout, Donner, and Martis Creeks	10,320
Subsurface outflow (to the east in the vicinity of Hirschdale)	690
Total Outflow	**41,600**

(a) Nimbus (2000 & 2001), Kennedy/Jenks, *et al*. (2002), Interflow Hydrology (2002), Rajagopal (2012), and Brown and Caldwell (2013).

3.3.2. GROUNDWATER RESOURCES POTENTIALLY AVAILABLE FOR A REDUNDANT SUPPLY TO SQUAW VALLEY

The current concept of a redundant water supply for the District is not intended to be a long-term sustained yield from the MVGB, rather a short to intermediate term source of water, should the primary water supply in the Valley become compromised. However, the duration of such an event is unknown so the water supply availability is initially reviewed in the context of a permanent water demand in the basin.

The estimated recharge and discharge to Martis Valley (Table 3-1) provides an estimate of the upper limit of potential sustained groundwater development. The MVGMP provides some guidance to long-term groundwater quantity and quality management in the basin, which has bearing on potential locations for future groundwater development.

From a water balance perspective, additional groundwater resources in Martis Valley could be available to serve current and future water needs in basin and provide a redundant water supply, if needed, to the Valley. The TDPUD Urban Water Management Plan (2011) indicates the basin could support at least 24,000 AFY of demand, and the plan has not been updated to incorporate the work the MVGMP, including higher revised recharge estimates.

Buildout water demand from the MVGB is estimated at approximately 21,000 AFY by Kaufman (2011) as cited in the MVGMP. Current estimated production is 9,341 AFY, as summarized in the MVGMP. Projected build-out redundant water demands for the Olympic Valley, including the District and SVMWC are 863 AFY. Based on current estimates, the MVGB could conceptually support an additional 3,000 to 12,000 AFY of future demand (Table 3-2), sufficient to accommodate a redundant water supply demand for the Valley, if needed.

Table 3-2
Groundwater Resources Potentially Available for Export to Squaw Valley

	Based on Estimated Water Demands 2011 TDPUD Urban Water Management Plan	
Available resource (AFY)	24,000 (a)	33,000 (b)
Buildout Demand (AFY)	21,000 (c)	21,000 (c)
Available resource (AFY)	3,000	12,000
Olympic Valley Redundant Buildout Demand (AFY)	863 (d)	863 (d)

(a) Lower limit of estimated resource (TDPUD Urban Water Management Plan, 2011)
(b) Upper limit of estimate of resource (MVGMP, 2013; Rajagopal, et al., 2012; InterFlow Hydrology, Inc. and Cordilleran Hydrology, Inc., 2003)
(c) Source: MVGMP (2013), TDPUD UWMP (2011)
(d) Technical Memorandum #1

3.3.2.1. TRUCKEE RIVER OPERATING AGREEMENT

In 1990 Congress passed, and on November 16, 1990, the President of the United States signed into law Senate Bill 3084, which contains the Truckee-Carson-Pyramid Lake Water Rights Settlement Act (Title II of PL 101-618). Section 204 of the Act addresses the equitable apportionment of the waters of the Truckee River, Carson River, and Lake Tahoe between the State of California and the State of Nevada and it became effective upon the effective date of TROA which is required to be negotiated under Section 205 of the Settlement Act. TROA was signed on September 6, 2008, and is currently going through the implementation planning process.

Section 204 of the Act defines the Lake Tahoe basin and the Truckee River basin, each with specifically defined diversion allocations. The Lake Tahoe basin provides for uses within the drainage area naturally tributary to Lake Tahoe, including the lake. The Truckee River basin provides for uses within the area which naturally drains into the Truckee River and its tributaries, but excluding the Lake Tahoe basin. The Olympic Valley, being within the Truckee River basin, has rights to water only from within the Truckee River basin. No diversions from Lake Tahoe basin are available to the Olympic Valley.

Water Diversion and Net Depletion Limits

The California allocation for the Truckee River basin downstream of Lake Tahoe as described in Section 204(c) allocates 32,000 AFY of gross water diversion from all natural sources, including both surface and groundwater, in the Truckee River basin. One condition of this allocation includes a maximum annual diversion of surface supplies not exceed 10,000 acre-feet. Enforcement of the California/Nevada interstate allocation of water is left to the states to monitor

and manage the allocation of water within their respective jurisdictions. TROA additionally imposes a consumptive use (depletion) limit of 17,600 acre feet per year. Disputes arising over the enforcement of the interstate allocations are subject to adjudication through the federal court system.

Article 6 of TROA includes a calculation of depletion as a parallel measure of compliance with the interstate allocation contained in the Settlement Act. The depletion calculation specified in TROA Section 6.E does not supersede the Settlement Act provisions, but it does provide a mechanism to more appropriately account for such things as reservoir storage and management, effluent reuse, and aquifer storage and recovery. The California Truckee River Basin depletion is not to exceed 17,600 acre feet per year, which is 55 percent of the California allocation of water. For a typical mix of residential and commercial water uses, the 17,600 acre foot depletion limit would significantly impact diversions. The 17,600 acre foot consumptive limit is designed to limit diversions of water if the consumptive uses of the community grow beyond those typically seen in urban settings. Increased consumptive use such as pond evaporation, effluent reuse or extensive landscaping will tend to increase the consumptive use and may lead to triggering this limit on the use of water in the basin.

Projected future water demands for the California segment include a 2033 estimate of 22,700 AFY (Nelson, 2003), and a 2034 estimate of 18,630 AFY (Stantec, 2015). The consumptive use portion of this projected demand should be significantly lower, perhaps near 50%, assuming current water use practices continue into the future, being within the depletion limit of 17,600 AFY.

A large percentage of any redundant water supply brought into the Valley would be returned to Martis Valley for treatment and subsequent infiltration at the TTSA facilities. Assuming 60% of the redundant water demand in the Valley of 863 AFY is returned to the basin, the consumptive use will be only 345 AFY. It can be assumed that if a redundant water supply condition existed, then outdoor water use restrictions would be in effect, lowering the total water demand. The District and SVMWC estimated future water demand for indoor use to be 863 AFY (see TM #1 Water Demand Projections and Water Supply Needs), about 81 percent of full projected demand.

It should also be noted that as a redundant water supply, it is assumed that the water supply from Martis Valley would be replacing water supplies otherwise pumped from the Valley, therefore the redundant water supply effectively does not present an increase in net diversion or consumptive use depletion from the TROA segment.

New Well Construction Regulations

Article 10 of TROA addresses the design and location of wells in California within the Truckee River basin (downstream of Lake Tahoe) to provide well construction standards and setbacks from water bodies so that they are "designed to minimize any short-term reductions of surface streamflows to the maximum extent feasible" as required by the Settlement Act. The requirement for wells to be designed to minimize short-term reductions of surface streamflows took effect with the signing of Settlement Act (PL 101-618) in 1990. Many wells constructed or planned for

construction after 1990 are specifically enumerated in TROA as being conclusively presumed to comply with the requirements of the Settlement Act.

Wells that are not enumerated in TROA and are constructed in the interim period between the enactment of the Settlement Act in 1990 and the effective date of TROA remain subject to the requirements of the Settlement Act, and are bound by the construction and location standards in TROA section 10.B.2 when it becomes effective. Those standards are specific for each of the defined "Special Zones". Wells constructed in this interim period that fail to comply with TROA section 10.B.2 are subject to court ordered repair or abandonment if they cannot be modified to comply with 10.B.2.

When TROA becomes effective, a "Notice of Intent" process will be implemented for the construction of new wells. After the filing of a Notice of Intent describing the location (including GPS coordinates and certain specified maps), setbacks, design parameters (including but not limited to depth, depth of the surface seal, and intended capacity), and owner information, construction of the well may be commenced upon compliance with regulations of the appropriate local jurisdiction.

The well location and design criteria in TROA section 10.B.2 are not onerous and do not significantly impact the drilling of wells in the Tahoe-Truckee Sanitation Agency Special Zone, the Truckee Donner Public Utility District/Martis Valley Special Zone and the Northstar/Placer County Special Zone, provided that the appropriate setbacks are maintained. The major design criterion listed in 10.B.2 is a well seal depth requirement that is present in some of the special zone standards. When present in a zone standard, the well sealing requirement is a specified depth or it is to the first aquitard. The imposition of a well sealing depth requirement may impact well capacity in some areas, but it is a convenient definition for a design that is intended to "minimize any short-term reductions of surface streamflows to the maximum extent feasible".

3.3.2.2. DISTRICT'S RIGHT TO WATER FROM THE MVGB

There are two issues associated with the District's right to export MVGB water to the Olympic Valley. These include limitations under California groundwater law and quantity limitations as set forth in TROA. A 2007 letter from attorney Janet Goldsmith to Mal Toy (PCWA) provided detailed explanations of these issues and is discussed below.

Under California water law the use of Martis Valley groundwater by the District as well as by TDPUD, PCWA and NCSD is considered an appropriation of groundwater (an export not directly serving overlying landowners in the basin of origin). As appropriators from the MVGB they may only take water in excess of that necessary to serve the overlying lands. The 2007 letter indicated that "the limitation of appropriable water to the surplus over the needs of overlyers and prior appropriators creates uncertainty about the long-term availability of water for export". Based on this uncertainty, it is recommended that the District work with NCSD and/or TDPUD to agree upon a long term allocation of potentially available water supplies from the MVGB.

TROA allows for the allocation of 32,000 AFY, of which not more than 10,000 AFY can be surface water, for water supply in the Truckee River basin. The California-Nevada and Watershed Assessment Section for the Central District of the Department of Water Resources (CNWAS), as part of the TROA EIS development and in preparation for their ongoing responsibility in tracking and reporting diversions and depletions under TROA, has identified water use estimates for the Basin. In June 2003, the CNWAS prepared a letter (Nelson, 2003) identifying the current water use in 2002 and the projected water use for the year 2033 in the Truckee River and Lake Tahoe Basins of California. The total groundwater and surface water demand projected for the Truckee River Basin in 2033 was estimated by CNWAS to be 22,700 acre feet. According to the chief engineer of the CNWAS, the Department of Water Resources does not expect the water demand in the Truckee River Basin to grow to the 32,000 acre foot allocation in the foreseeable future and that the demand projection contained in the 2003 letter remains valid (Sarna, 2008).

3.3.3. EXPORT WATER SUPPLY ALTERNATIVES

There are two reasonable alternatives for developing sources of groundwater in the MVGB that might be supplied to the Valley. One alternative entails obtaining water from the TDPUD, Zone 4, or NCSD, assuming of course, these water purveyors possess excess well capacity. The other is for District to construct a new well or wells in the MVGB expressly for this purpose.

A minimum redundant water supply capacity of 650 gpm should be sufficient, under conservation measures implemented by District and SVMWC. Farr West Engineering estimates that a redundant water supply of 776 AFY for the District and 87 AFY for the SVMWC should be sufficient to meet primary indoor uses at buildout under a conservation effort, assuming some or complete impairment of the Olympic Valley aquifer has occurred. The duration of use of the redundant water supply is unknown, but conceptually could be for several months to several years. Some annual discharge of water may be necessary through the redundant water supply system for maintenance. This maintenance flow is not known at this time, but an amount equaling 50 gpm+/-, or 80 AFY, could be reasonable and would be a small annual draw from the MVGB.

3.3.3.1. EXCESS CAPACITY FROM EXISTING RESOURCES

Truckee Donner Public Utility District

The TDPUD will require new wells to meet their buildout demand (Neil Kaufman, personal communication, 2015). Consequently, they do not have excess production capacity that might be supplied to the Valley. However, discussions are ongoing regarding potential use of TDPUD facilities as part of a water conveyance system.

Zone 4 Martis Valley Water System

The groundwater derived from the Zone 4 system (Martis Valley Water System) provides the supply for the Lahontan, Martis Camp, and Schaffer's Mill subdivisions. PCWA and NCSD executed a final agreement in October 2015 for NCSD to become the sole owner of the Zone 4 water system. Service areas are shown in Figure 3-1, and well locations for these two systems are shown in Figure 3-2.

In past communications, PCWA has indicated no available excess well capacity to provide a source of redundant water supply to the Valley. However, recent conversations with PCWA and NCSD indicate there may be excess capacity in the Zone 4 system.

Provisionally, there may be excess capacity in the Lahontan 1 and 2 wells which are both reported to produce 1250+ gpm, and the Schaffer's Mill Well (Well #3) which is reported to produce 200-235 gpm. Golf course irrigation wells in Zone 4 could also potentially become a source for redundant water supply, provided sufficient excess capacity exists.

Zone 4 water may be conveyed through the TDPUD system, either through an existing intertie at Sierra Meadows, or through a connection to the TDPUD 14-inch waterline at the Airport.

Northstar Community Services District

The NCSD's current water supply includes a surface water source and two existing groundwater wells, TH-1 and TH-2. The surface water treatment plant has a capacity of 700 gpm, with 1,206 AFY of spring and reservoir water rights and 560 AFY of drought year capacity (Stantec, 2015).

NCSD's two wells each have a reported capacity of 800 gpm, with a potential combined annual capacity of 2,581 AFY. NCSD's long term plans include potential construction of an additional well, TH-3, to meet buildout water demands. This well could potentially be a source to serve as a redundant water supply for the Valley. The expected capacity of the future well is 500 gpm.

Current water usage within NCSD is 538 AFY, with projected water use in 2034 at 1,204 AFY. Based on the recent Water Supply Assessment completed for the Martis Valley West Parcel (MVWP) (Stantec, 2015), it appears that NCSD has additional supply capacity, some of which may be allocated to the MVWP. Alternatively, MVWP has identified an on-site groundwater resource that may be developed to support the project.

3.3.3.2. NEW RESOURCES

Beyond the possible opportunities identified in the previous section, opportunities may exist for the development a new well, or wells, to provide the source of redundant water supply. Figure 3-2 shows four areas of interest, labeled A through D. Area A was identified by Dale Bugenig in the 2009 version of this memorandum. Areas B, C and D are new additions to this updated memorandum.

Area of Interest A

Area A was presented by Bugenig as an attractive location because of the potential for a single well in this area to meet Squaw Valley's full redundant water supply demand. TDPUD's "Airport Well" and "Martis Valley Well No. 1" (2,000 and 1,725 gpm respectively) are located in this area. Also completed nearby are PCWA's two "Lahontan" wells, the irrigation well for the Lahontan Golf Course, and the two Larwin-Joerger test wells drilled for Dart Industries. However, because the subsurface geology is relatively complex, there is no guarantee of high-well yields everywhere in this zone, as evidenced by the yields of test and production wells drilled for the Schaffer Mill

(Timilick) subdivision. These two production wells incorporated into the Zone 4 system are rated to yield approximately 300 to 400 gpm.

Two areas have been targeted for further consideration as production well sites. The sites can be seen in Figure 3-2. These include:

- A parcel of land owned by the Airport Authority located near the intersection of Schaffer Mill Road and State Route 267. This site is located approximately 1,500 feet southwest of TDPUD's Airport Well.
- The Sayers-Tong property located between Schaffer Mill Road and State Route 267.

Prospective well sites will need to be evaluated through a comprehensive exploratory drilling and testing program. In addition to addressing the probable yield of production wells, the testing program would be expected to yield information related to the potential for the new wells to interfere with the existing TDPUD and Zone 4 wells. Interference between wells can probably be examined using the new groundwater flow model for the basin completed by DRI (Rajagopal, et al., 2015). Interference with future wells can be minimized by careful placement of the well(s) constructed to meet the District's supply. Interference between wells may potentially be affected by the somewhat compartmentalized nature of the basin. The previous geologic investigations of the basin from a number of wells suggest the presence of multiple faults that impede, but not prevent, groundwater flow between adjacent aquifer "compartments." This helps to minimize interference between wells completed in different areas of the basin. The flip side is that drawdown in a particular compartment will be greater than if the boundaries did not exist.

The proposed wells sites are located in the Northstar / Placer zones identified in TROA. They appear to be located sufficiently far from streams, ephemeral streams, ponds and lakes to be presumed to be in compliance with TROA. Field investigations to pin down the precise well locations will include evaluations to confirm this assumption.

One possible concern is that a significant amount of water supply is presently derived from the Martis Creek watershed area, and geographic distribution of pumping may be desirable for long-term groundwater management.

Area of Interest B

In respect to proximity to a potential alignment corridor along Highway 89, a new well in the vicinity of Donner Creek and the "mouse hole" along Highway 89 may be desirable. But little is known about the specific geology and aquifer conditions in the area, although based on geologic interpretations, this area is considered within the Martis Valley groundwater basin (HydroSearch, 1995; Brown and Caldwell, 2013).

Only a few productions wells have been drilled in the vicinity. The TDPUD Northside Well was drilled in 1975, north of Donner Pass Road, and east of the Gateway area of Truckee (T17N R16E Section 15) (Figure 3-2). The Northside Well is 927 feet in depth with a static water level ranging from 103 to 191 ft. below land surface (HydroSearch, 1995).

The geologic log for the Northside Well indicates alternating layers of sand, gravel, and clay with several intervals of interbedded volcanic rock. The log indicates that an andesite layer was encountered at approximately 900 feet below ground. The well bore was terminated near this depth as locally, the andesite in the Truckee area is recognized as non-water producing bedrock.

The Northside Well has a reported capacity of 700 gpm (HydroSearch, 1995) to 810 gpm (TDPUD, 2005). The current Urban Water Management Plan (TDPUD, 2011) lists the capacity of the Northside Well at 575 gpm, in recognition of water treatment or blending requirements due to elevated arsenic at 38 ug/l (the current MCL is 10ug/l) (TDPUD, 2005). Radon is also reported at 990 pCi/L. Maximum radon levels are under review by USEPA, with proposed maximums ranging from 300 to 4,000 pCi/L.

The Donner Creek well is located near the Truckee McDonalds west of Highway 89 and north of Donner Creek. This well is shallow, and has been determined to be potentially under the influence of surface waters, therefore, subject to surface water treatment regulations if used as a municipal water supply. Currently the well is used as an irrigation water supply for the Coyote Moon golf course. The well has a reported capacity of 500 gpm (Neil Kauffman, personal 2015).

Potential locations for wells in Area of Interest B will require careful review of land ownership, infrastructure and site specific factors. TROA setbacks and well construction criteria may be applicable if a well is sited near the Truckee River or Donner Creek. It is possible that a well south of the mouse hole and railroad tracks may be possible. An exploration borehole or test well would need to be drilled in this identified area to determine potential for a redundant water supply acceptable in both water production and quality. Shallow alluvium may need to be sealed off, depending on proximity to the Truckee River or Donner Creek. Anticipated geology would be interbedded older alluvium and volcanic flow rocks, similar to those encountered at the Northside Well.

Area of Interest B has a potential advantage of having little concern over interference with existing wells, depletion of groundwater from compartments, or over-exploitation of resources within the Martis Creek watershed. However, any direct depletion of surface water resources of Donner Creek or the Truckee River will need to be avoided though well siting and well design.

Areas of Interest C and D

The Martis Valley groundwater basin extends west of the Zone 4 and NCSD systems all the way to the eastern edge of the Truckee River canyon. This geographic area has been included within the basin based on geologic interpretations (HydroSearch, 1995). While surface geology is volcanic rock (Figure 3-3), these volcanic rocks are some of the youngest in the basin, being deposited in the Quaternary. The Bald Mountain eruptive center and associated vents are approximately 1.2-1.4 million years old (Sylvester et al., 2012) and are much younger than the Pliocene and Miocene age volcanic rocks to the south. Geologic evidence indicates that prior to the eruption of the Bald Mountain lava flows, the Truckee River likely flowed northeast in the area underlying what is now Martis Camp. The eruption of the Bald Mountain flow was deposited through and over the Cabin Creek alluvium and shifted the Truckee River westward near its present location. Evidence of these gravel deposits, which pre-date the Prosser Creek Alluvium and Donner Till can be observed along the west wall of the Truckee River Canyon in Cabin Creek, the

type section of the informal Cabin Creek alluvium. The Cabin Creek alluvium is boulder and cobble rich, reaches a maximum thickness of 125 feet, and is described locally as containing weathered andesite (Birkeland, 1963).

Geotechincal investigations at the Eastern Regional Landfill indicate that monitoring wells intercepting the formation yield "moderate amounts of water", display hydraulic conductivity values around 1.4 ft/day and have an estimated 20% porosity (CRWQCB-LR, 2004). Geologic investigations at the Eastern Regional Landfill in Cabin Creek have identified the alluvium below Bald Mountain volcanic rocks, so it is likely that the alluvium may exist and underlie the Bald Mountain volcanic rocks east of the Truckee River in the southwest portion of the Martis Valley structural basin in areas C and D on Figure 3-3.

Areas C and D are separated by young volcanic vents or cinder cones which are suspected to limit the amount of Cabin Creek alluvium available as these vents displaced alluvium violently as the magma rose to the land surface. We suggest areas C and D because the locations may conceal underlying alluvium and may have favorably fractured young volcanic rocks that have not been hydrothermally altered like the older volcanic rocks around Silver Creek. The combination of thick accumulations of young volcanic rocks and saturated alluvium could provide an area that provides adequate redundant water supply. Area D extends into Martis Camp, where producing wells from interbedded alluvium and volcanic rocks have been built.

Areas of Interest C and D have to our knowledge not been explored to date, and will require more thorough inspection of geologic conditions, and exploration or test well drilling to confirm presence of interpreted aquifers and suitability of water quality. Potential well locations will need to take into account land ownership and potential infrastructure requirements.

Areas C and D have an added advantage of having little concern over interference with existing wells, depletion of groundwater from compartments, or over-exploitation of resources within the Martis Creek watershed.

3.4 ADDITIONAL REFERENCES

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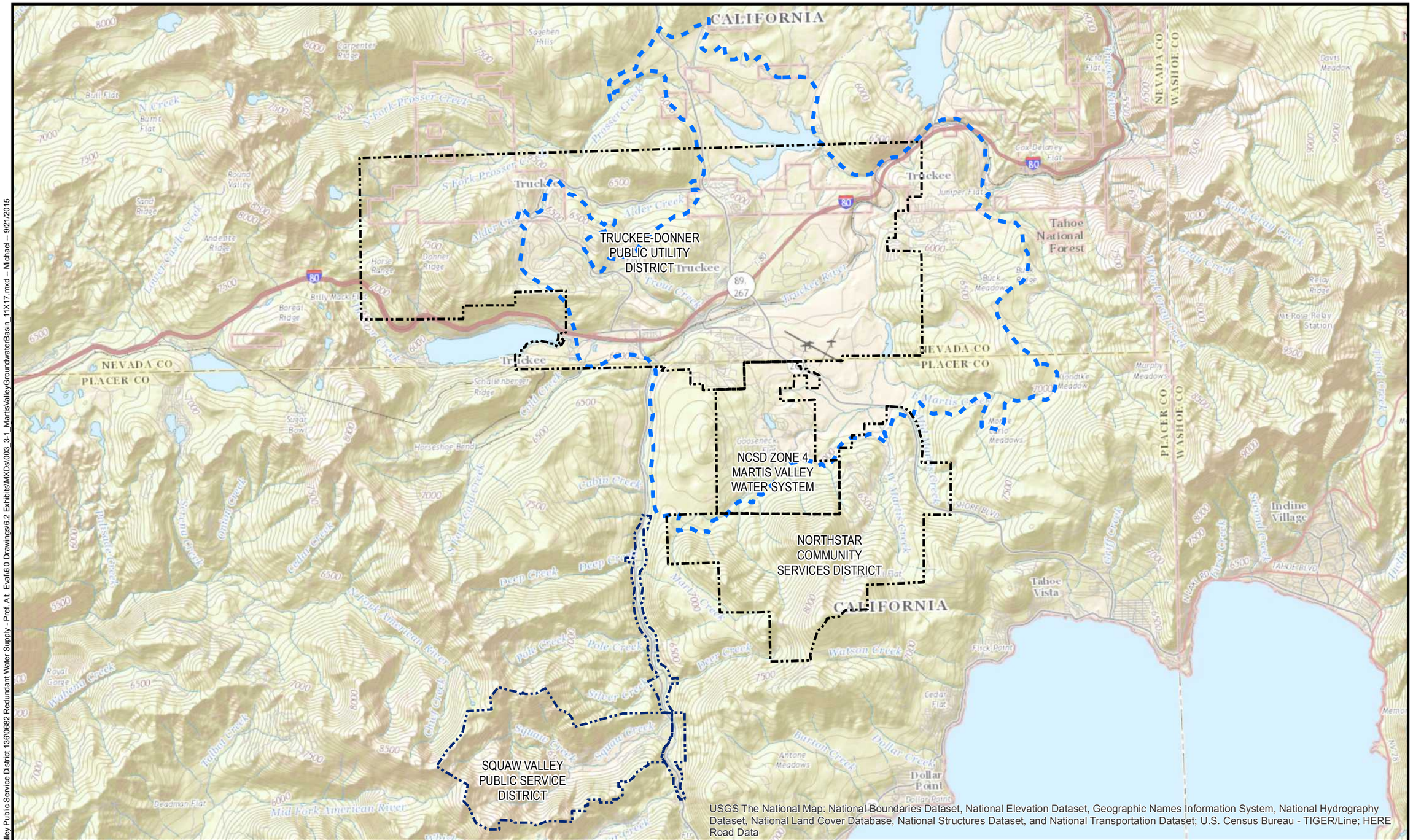

LEGEND

- SVPSD Service Boundary
- Water Purveyor Boundary
- Martis Valley Groundwater Basin

0 2,000 4,000 8,000 Feet

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SQUAW VALLEY PUBLIC SERVICE DISTRICT

REDUNDANT WATER SUPPLY - PREFERRED ALTERNATIVE EVALUATION PROJECT
PHASE 3 - FEASIBILITY STUDY UPDATE

SHEET TITLE: MARTIS VALLEY GROUNDWATER BASIN

FIGURE NUMBER: 3-1

P:\Client Projects\Squaw Valley Public Service District 1361\0682 Redundant Water Supply - Pref. Alt. Eval\6.0 Drawings\6.2 Exhibits\MXDs\003_3-1_MartisValleyGroundwaterBasin_11X17.mxd -- Michael -- 9/21/2015

P:\Client Projects\Squaw Valley Public Service District 136\0682 Redundant Water Supply - Pref. Alt. Eval\6.0 Drawings\6.2 Exhibits\MXDs\004_3-2_ExistingWells_PossibleLocations(ALT)_11X17.mxd -- Michael -- 10/19/2015

Trout Creek
Donner Creek
Cold Creek
Cabin Creek
Brush Creek
Rocky Wash
Martis Creek
East Martis Creek
West Martis Creek
Middle Martis Creek
Martis Camp Creek

80
89
267

Schaffer Mill #1
Schaffer Mill #4
Schaffer Mill #3
Lahontan Irrigation #1
Lahontan Irrigation #2
Lahontan #1
Lahontan #2
Martis Camp Irrigation #1
Siller Ranch #1
Martis Camp Irrigation #2

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

LEGEND

- Well Locations
- Water Purveyor Boundary
- Martis Valley Groundwater Basin

Potential Well Areas

- A
- B
- C
- D

0 1,000 2,000 Feet

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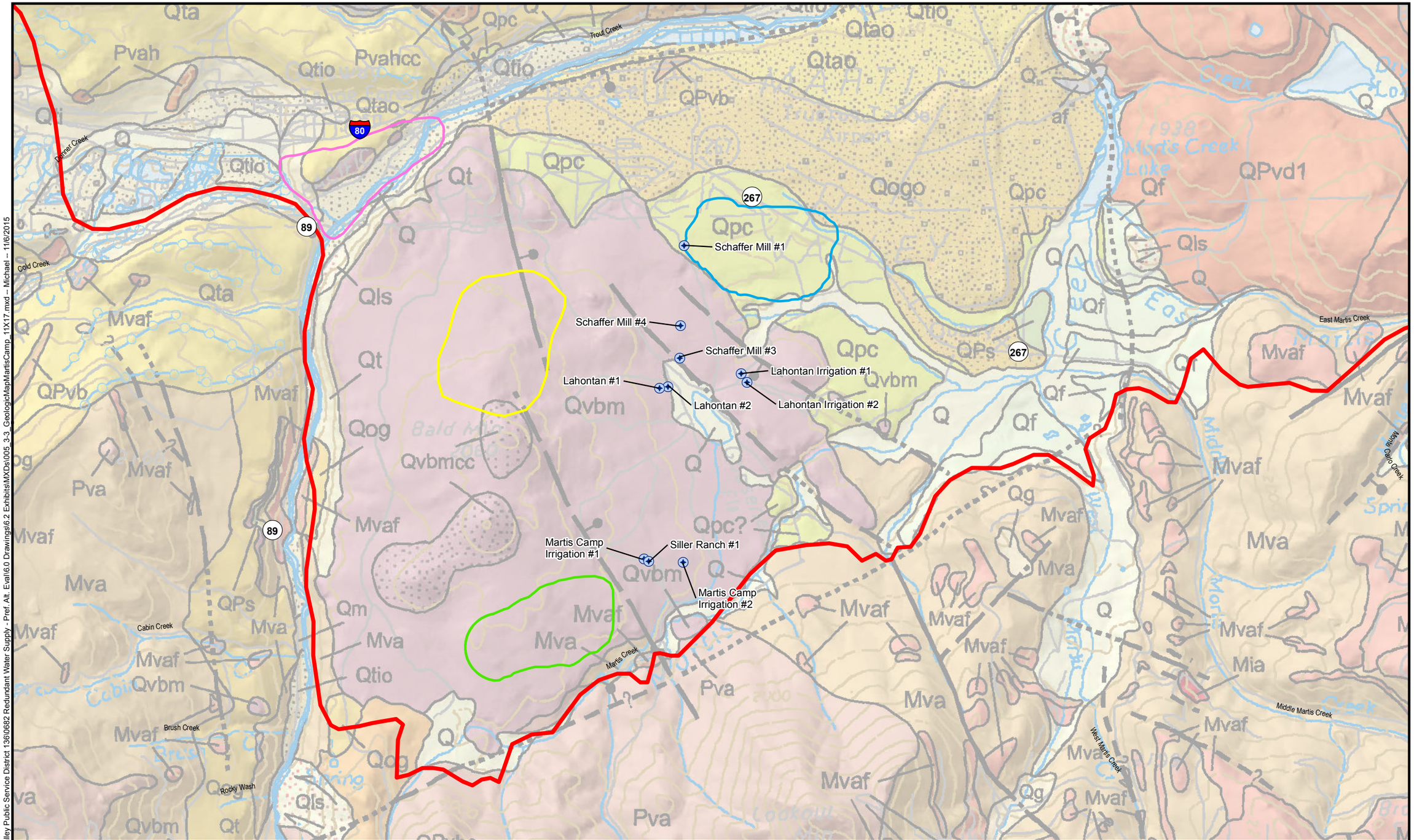
SHEET TITLE: EXISTING MVGB WELLS AND POSSIBLE PRODUCTION WELL LOCATIONS

FIGURE NUMBER: 3-2



LEGEND

- Well Locations
- Martis Valley Groundwater Basin

Potential Well Areas

- A
- B
- C
- D

USGS Rivers & Streams

NOTE:
THIS FIGURE IS FROM CALIFORNIA GEOLOGICAL SURVEY'S "GEOLOGIC MAP OF THE LAKE TAHOE BASIN CALIFORNIA AND NEVADA" 2005 VERSION 1.0.
LINK TO OBTAIN MAP FIGURE:
ftp://ftp.consrv.ca.gov/pub/dmg/pubs/rgm/RGM_004/RGM4_Lake_Tahoe_2005.pdf

0 1,600 3,200 Feet

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REDUNDANT WATER SUPPLY - PREFERRED ALTERNATIVE EVALUATION PROJECT
PHASE 3 - FEASIBILITY STUDY UPDATE

SHEET TITLE: GEOLOGIC MAP OF THE MARTIS CAMP AREA

FIGURE NUMBER: 3-3

P:\Client Projects\Squaw Valley Public Service District 1361\0682 Redundant Water Supply - Pref. Alt. Eval\6.0 Drawings\6.2 Exhibits\MXDs\005_3-3_GeologicMapMartisCamp_11X17.mxd -- Michael -- 11/6/2015

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TECHNICAL MEMORANDUM

SQUAW VALLEY PUBLIC SERVICE DISTRICT

REDUNDANT WATER SUPPLY – PREFERRED ALTERNATIVE EVALUATION PROJECT PHASE 3 - FEASIBILITY STUDY UPDATE

Prepared For: Mike Geary, P.E., General Manager

Prepared By: David Hunt, P.E.
Lucas Tipton, P.E.

Review By: David Hunt, P.E.

Date: November 10, 2015

Subject: **Technical Memorandum No. 4 – Transmission Main Alignment Evaluation**

4.1 PURPOSE

The purpose of this technical memorandum is twofold:

- Evaluate the feasibility of alternative alignment corridors for the redundant water supply, and
- Discuss other opportunities with local area utilities to assess their desire to participate in the project utilizing a joint trench.

The corridors and alignment alternatives presented are planning level at this time. There are a number of potential alternatives that will fall out of these corridor alternatives that will take into account water supply, pumping, and transmission to Squaw Valley. These detailed alternatives will be developed and evaluated during the Phase 3 – Preferred Alternative Evaluation phase of the project.

4.2 DISCUSSION

4.2.1 POTENTIAL ALIGNMENT CORRIDORS

In the 2009 Alternative/Supplemental Water Supply and Enhanced Utilities Feasibility Study planning level efforts grouped potential alignment alternatives into two corridors: the Highway 89

Corridor and the United States Forrest Service (USFS) 06 Corridor. Further study of the alignment corridors has yielded a total of five alternative alignments within these two corridors. These alignments are presented in Table 4-1:

Table 4-1 – Alternative Corridors and Alignments

Highway 89 Corridor	USFS 06 Corridor
• Highway 89 Alignment • Placer County Bike Path Alignment (Bike Path) • TTSA TRI Alignment	• USFS 06 Alignment • Liberty Energy Pole Line Alignment (Powerline)

These alternative alignments would require the District to partner with the NCSD, TDPUD, or a combination of both. In some cases, these alignments will have to traverse parallel to or across other utility alignments.

4.2.2 POTENTIAL WATER SUPPLY/ALIGNMENT OPTIONS

In order to move water from a source location in or near the Martis Valley to a destination of Squaw Valley, the alternatives examined include:

- Water wheeled through the TDPUD water system and a new transmission main along the Highway 89 Corridor;
- Water wheeled through the NCSD and/or Zone 4 water system and new transmission main along the USFS 06 Corridor.

As of October 1, 2015, the Placer County Water Authority (PCWA) Zone 4 water system will be owned and operated by the NCSD. Any reference in this study to the Zone 4 or NCSD Zone 4 system shall be congruous to a reference by others or previous studies, to the PCWA Zone 4 system. Figure 4-1 shows all five of the alternative alignments along with the Zone 4, NCSD, and TDPUD water system boundaries.

The feasible water supply options discussed with TDPUD, PCWA, and NCSD include the following:

- The District supplying water and conveying water through either the Zone 4 or TDPUD system.
- NCSD supplying water to the District and conveying water through the Zone 4 and/or TDPUD existing system existing infrastructure;
- Zone 4 supplying water to the District and conveying water through Zone 4 and/or TDPUD existing infrastructure.

Further details of these options are presented in Table 4-2.

Table 4-2 – Water Supply and Transmission Options

Source	System Wheeled Through	Booster Pump Location
NCSD	NCSD + Zone 4 + TDPUD	Highway 89 (6,170' pressure zone)
		Highway 89 (6,040' pressure zone)
	NCSD + Zone 4	Carson Range Tank (6,350' pressure zone)
		Olana Tank (6,520' pressure zone)
Zone 4	Zone 4 + TDPUD	Highway 89 (6,170' pressure zone)
		Highway 89 (6,040' pressure zone)
	TDPUD (@ Hwy. 267/Airport Rd.)	Highway 89 (6,170' pressure zone)
		Highway 89 (6,040' pressure zone)
	Zone 4	Carson Range Tank (6,350' pressure zone)
		Olana Tank (6,520' pressure zone)
New District Source	Zone 4 + TDPUD	Highway 89 (6,170' pressure zone)
		Highway 89 (6,040' pressure zone)
	TDPUD	Highway 89 (6,170' pressure zone)
		Highway 89 (6,040' pressure zone)
	Zone 4	Carson Range Tank (6,350' pressure zone)
		Olana Tank (6,520' pressure zone)

The potential District water source locations assessed in this memorandum can be found in more detail in Technical Memorandum No. 3 – Groundwater Availability in the Martis Valley. Any of the options would require the District to construct and potentially operate a number of new water supply facilities including a new water supply well, booster pump station, transmission main, and terminal water storage tank in Squaw Valley.

Highway 89 Corridor

In this alternative, the District redundant water supply would either come from a District owned well or via existing or new well(s) within the NCSD or Zone 4 water systems. If a well was drilled inside of NCSD service territory, water would be wheeled through NCSD, Zone 4, and TDPUD existing water system infrastructure to one of two connection points off of the TDPUD water system as shown on Figure 4-1:

- The intersection of Highway 80 and Highway 89 (TDPUD 6,170' pressure zone, near the intersection of Donner Pass Road);
- The intersection of Highway 89 and West River Road (TDPUD 6,140' pressure zone, south of the Mousehole).

If the well is drilled or developed inside of Zone 4, water would be wheeled through Zone 4 and TDPUD existing water system infrastructure to one of the two connection points. And if the well is drilled near Highway 267, water would be wheeled through only the TDPUD existing water system infrastructure to one of the two connection points.

The connection at the intersection of Highway 80 and Highway 89 would be within the TDPUD 6,170 foot pressure zone, whereas the connection at West River Street would be within TDPUD's 6,040 foot pressure zone. A booster pump station would be required at either one of these locations to supply water to the District's Zone 1A, a 6,350 foot pressure zone in Squaw Valley. The booster pump station would be equipped to pump a minimum of 600 gpm with approximately 100 horsepower pump(s).

From these locations, a new pipeline would be constructed along one of the Highway 89 corridor alignments for approximately 8-9 miles towards Squaw Valley Road. The pipeline would terminate at a new water storage tank north of Squaw Creek and the Painted Rock subdivision, or south of Squaw Valley Road in USFS property near the Placer County park property as shown on Figure 4-1.

Alignment alternatives along this corridor present several challenges including:

- Addressing concerns of the public and regulatory agencies;
- Determining if existing water systems can convey a flow up to 600 gpm to Squaw Valley;
- Obtaining utility easements with both public and private land owners;
- Construction access and material staging issues;
- Protecting existing utility infrastructure;
- River, bridge, and culvert crossings;
- Asphalt concrete paving, and
- Night work traffic control.

TDPUD and NCSD have indicated that their existing water infrastructure have enough capacity to wheel up to 600 gpm through their systems.

The TTSA TRI alignment transverses through approximately 68 privately owned parcels between West River Street and Squaw Valley Road. TTSA staff has indicated that their existing easements are 10-feet wide through private property and 20-feet wide through federal land. TTSA would also not be in favor of sharing their easement(s) with another underground utility. The Bike Path alignment is currently slated to route through federal land only and would involve acquiring easements from the USFS. The probability of acquiring an easement from the USFS is likely greater than that of from a private land owner. However, the potential for fire protection and the elimination of the need for a private well would provide benefits for the private land owners.

Much of the TTSA TRI and Bike Path alignments route along the east bank of the Truckee River and are only accessible via private bridge crossings and access roads which are not maintained. Construction along either of these alignments would require bridge reinforcement, restrictions on the size of construction equipment, and off-site staging at areas adjacent to Highway 89.

The TTSA TRI interceptor is a reinforced concrete gravity sewer main which averages 2 to 2.5 feet of cover from Tahoe City to Truckee. Along its length, the interceptor bisects 10 to 12-feet of previously cleared but not maintained access. TTSA indicated a concern for the integrity of the

TRI interceptor during construction and maintenance activities if a water pipeline is place within a 10-foot horizontal envelope. Also, to place a new water transmission main in such close parallel proximity to an existing sanitary sewer line does not meet the regulator requirement of the State Water Resources Control Board (SWRCB). The SWRCB does provide guidance documents for reduced horizontal clearance based on specialty construction materials and methods.

The Highway 89 alignment crosses approximately 60-70 culvers and creeks from Truckee to Squaw Valley with all crossings requiring a jack and bore construction method. The TTSA TRI and Bike Path Alignment appear to cross a fewer number of culverts, approximately 15 to 20. The TTSA TRI alignment would also require 4 jack and bore Truckee River crossings, while the Bike Path alignment has 8 Truckee River crossings by way of a bridge which would require special design and permitting considerations.

Farr West has met with the Caltrans permitting staff to discuss the west shoulder of Highway 89 alignment alternative. The discussion with the Caltrans representatives was positive. Caltrans does allow utilities within their right of way by way of long term maintenance agreements and not through a utility easement arrangement. The shoulders on both the west and east sides of Highway 89 provide significant room to install a transmission main with minimal impact to traveled lanes. The Caltrans representatives provided the following broad conditions that must be satisfied in order for the alignment to be acceptable to Caltrans. These conditions included:

- Prove that there is a significant benefit, through alternatives analysis, along the Highway 89 alignment versus alternate alignments before the project could be approved;
- Performing the required environmental documentation (CEQA);
- Meet all the requirements under the Caltrans "Special Funded Projects", and
- Coordinating with Caltrans to address traffic concerns.

The above requirements came out of multiple meetings with Caltrans, but ***should not*** be considered the only requirements necessary to gain approval. A project of this scope will be assigned a project development coordinator as soon as the encroachment permit is submitted to Caltrans. It is anticipated that this phase of the project would identify the remainder of all necessary requirements. In addition, Technical Memorandum No. 5 - Environmental Constraints Analysis provides an in-depth analysis on the environmental and permitting requirements that would be necessary for this alignment.

United States Forest Service (USFS) 06 Corridor

In this alternative, the District redundant water supply would either come from a District owned well or via existing or new well(s) within the NCSD or Zone 4 water systems. If the well was drilled inside of NCSD service territory, water would be wheeled through NCSD and Zone 4 existing water system infrastructure to one of two connection points as shown on Figure 4-1:

- Carson Range Tank (Zone 4 Westerly Tank);
- Olana Tank (Zone 4 Easterly Tank)

If the well is drilled or developed inside of Zone 4 or near Highway 267, water could be wheeled through the Zone 4 existing water system infrastructure alone to either of the two connection points.

A new booster pump station would be required adjacent to either the Carson Range or Olana water tanks to convey water to Squaw Valley. The Carson Range and Olana tanks have an operating hydraulic grade of approximately 6,350 and 6,520 feet, respectively. The terminal tank location in Squaw Valley has a hydraulic grade of 6,350 feet. The USFS 06 and Powerline alignments have elevation high points of approximately 7,200 and 7,100 feet, respectively. The booster pump station would therefore be larger than the Highway 89 corridor, with pumps sized in the 150 to 250 horsepower range required to provide a minimum redundant water supply flow of 600 gpm. The pipeline along this route would be a high pressure line with operating pressures up to 400 pounds per square inch (psi).

From the new Carson Range pump station, the USFS 06 alignment would follow a southeasterly course to connect with the USFS 06 Road. The pipeline would follow the USFS 06 Road, mostly along the existing dirt single lane roadway, until the beginning of Deer Creek. At this point the pipeline would wind down the ridge just south of Deer Creek following a series of existing dirt trails and end up south of Squaw Valley. The pipeline would then continue north along the east side of the Truckee River and cross the Truckee River in the vicinity of the Squaw Valley entrance. After crossing the Truckee River and Hwy 89, the pipeline would terminate at a new water storage tank location in Squaw Valley as shown on Figure 4-1.

Farr West staff has met the USFS District Ranger and staff to discuss potential alignment corridors within USFS rights of way, along with possible environmental constraints. The feedback from the USFS on both construction and environmental permitting issues was positive. Below are a number of the constraints that an alignment along the USFS 06 corridor would present to the project team:

- Determining if other utilities (Southwest Gas, SPPCo, SuddenLink fiber) would be interested in a joint utility project;
- Complying with the NEPA standards, and
- Attaining a special use permit from the USFS.

Additional discussions with USFS would be necessary to identify any further requirements at the time of preliminary planning and EIR preparation. In addition, Technical Memorandum No. 5 provides an in-depth analysis on the environmental and permitting requirements that would be necessary along the USFS 06 corridor.

With the Powerline alignment, the transmission main would commence at the Olana Tank booster station and would head due east until it connected to the existing Liberty Energy 132 powerline. The pipeline would follow the powerline, installed underground and inside of the existing cleared utility corridor in a southerly direction until a point 0.85 miles east of Big Chief. At this point the pipeline would head southwest until finally descending an extremely large and steep rock field. Boulders in this field can exceed 10-feet in diameter with an unknown material depth. This 0.75 mile section of alignment is a significant flaw for this alignment alternative and likely brands the alternative as not feasible. From this point it is still approximately 1 mile to Squaw Valley Road,

with the alignment following the TTSA TRI alignment for this entire stretch. After crossing the Truckee River and Hwy 89, the pipeline would terminate at a new water storage tank location in Squaw Valley.

It is currently unclear if Liberty Energy would allow for the installation and operation of a water main inside of their existing corridor. If Liberty Energy were to allow for the District to construct along this alignment, the District would still be required to obtain easements from private landowners for the 1-mile route from the rock field to Squaw Valley.

This corridor also presents the same concerns as the Highway 89 alternative with respect to the source well in the Martis Valley.

4.2.3 POTENTIAL JOINT TRENCH UTILITY PARTNERS

Suddenlink Communications

Farr West met with Suddenlink Communications in Truckee to discuss their interest in participating in the project as part of a joint utility corridor. Currently, Suddenlink has above ground fiber optic infrastructure along the Highway 267 Corridor to Kings Beach, along Highway 28 from Kings Beach to Tahoe City, and finally North along Highway 89 to Squaw Valley Road. While this route provides Suddenlink with the ability to serve the Olympic Valley with high speed data and cable service, it does not provide any redundancy in the case of an emergency or signal outage. Suddenlink also has fiber in the air along Liberty Energy Pole Line; however it cannot serve Squaw Valley due to the inability to acquire permission or easements with private landowners.

Suddenlink expressed their interest in an underground fiber optic conduit from Truckee to Squaw Valley, however they were steadfast in their inability to share any cost of construction for a joint utility trench or corridor. Suddenlink did express interest to lease conduit space if the District were to install empty conduit and pull boxes with the transmission main construction. Suddenlink also referred to other cellular and data providers (e.g. AT&T, Verizon, and Sprint) as potential partners for the district to pursue for conduit space rental post construction. At this point, it would be inappropriate to attribute any benefit to the Highway 89 Corridor or the USFS 06 Corridor by way of a cable/data provider as a joint trench partner.

Southwest Gas (SWG)

Farr West also met with SWG to discuss their interest in joining the project as part of a utility corridor. SWG made it clear that they will not pay out of pocket up front expenses for new infrastructure. Their company policy requires a third party to fund the necessary infrastructure to get natural gas to new customers. Only after new customer's sign up for service will SWG provide a reimbursement check to the third party. The reimbursement program will only occur for a ten year period, after which SWG would not provide any further reimbursement to the third party.

SWG has communicated with KSL (VSVSP project developer) regarding natural gas supply to the VSVSP project. SWG provided planning level cost estimates for natural gas feed from both Tahoe City and Truckee. KSL would be the only viable third party currently that could facilitate construction of a high pressure natural gas main to Squaw Valley. KSL recently indicated to Farr

West that the cost of bringing natural gas to the Valley was likely too high to consider for the VSVSP project. Their current planning efforts use propane as a gas supply.

Farr West also discussed construction criteria with SWG. The natural gas line between Truckee and Squaw Valley would be considered a high pressure supply, and thus could not share a trench with any water or sewer utility. There would be a minimum 5 foot separation between the gas main and water main, with separate trenches being required. This situation does not benefit the District as far as cost sharing, but continues to provide the benefit of natural gas feed to Squaw Valley and the potential elimination of propane as the primary gas source.

SWG representatives said there could be enormous costs in trenching residential neighborhoods because of the geological conditions. The cost could be equal to or exceed the cost of the trench to get a natural gas stub from Truckee to the entrance of Squaw Valley at Highway 89. In addition, many residential customers in Squaw Valley would have to spend thousands of dollars to retrofit their existing propane piping in order to receive natural gas. SWG suggested that new construction in Squaw Valley have piping installed for natural gas. Natural gas requires larger pipe diameters than propane. Therefore, natural gas piping systems are capable of delivering propane to the residents while giving flexibility to the residents in the future to switch over to natural gas.

East Martis Creek
Martis Creek
Middle Martis Creek
West Martis Creek
267
Dollar Creek
Watson Creek
NORTHSTAR
COMMUNITY SERVICES
DISTRICT
NCSD ZONE 4
MARTIS VALLEY
WATER SYSTEM
SCHAFFER MILL RD
Burton Creek
TRUCKEE-DONNER
PUBLIC UTILITY
DISTRICT
Carson
Range
Tank
Olana
Tank
Dear Creek
Tie In To
SVPSD System
Trout Creek
W RIVER ST
Donner Creek
89
Tie In And Booster Pump
Statiion. TDPUD 6,040' Zone
Tie In And Booster Pump
Station. TDPUD 6,170' Zone
Brush Creek
Rocky Wash
Deep Creek
Silver Creek
Terminal Storage
Reservoir #1
Bear Creek
Squaw Creek
SQUAW VALLEY RD
Terminal Storage
Reservoir #2
Cabin Creek
Cold Creek
Pole Creek
SQUAW VALLEY
PUBLIC SERVICE
DISTRICT
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, GIS User Community

LEGEND

- Storage Reservoir
- Booster Pump Station
- Bike Path Alignment
- Powerline Alignment
- USFS 06 Alignment
- Highway 89 Alignment
- TTSA TRI Alignment
- Water Purveyor Boundary

0 2,000 4,000 Feet

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SQUAW VALLEY PUBLIC SERVICE DISTRICT

REDUNDANT WATER SUPPLY - PREFERRED ALTERNATIVE EVALUATION PROJECT
PHASE 3 - FEASIBILITY STUDY UPDATE

SHEET TITLE: ALTERNATIVE ALIGNMENT CORRIDORS

FIGURE NUMBER: 4-1

P:\Client Projects\Squaw Valley Public Service District 13\0682 Redundant Water Supply - Pref. Alt. Eval\6.0 Drawings\6.2 Exhibits\MXDs\006_4-1_AlternativeAlignmentCorridors_11X17.mxd – Michael – 9/21/2015

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Stantec

TECHNICAL MEMORANDUM

SQUAW VALLEY PUBLIC SERVICE DISTRICT

REDUNDANT WATER SUPPLY – PREFERRED ALTERNATIVE EVALUATION PROJECT PHASE 3 - FEASIBILITY STUDY UPDATE

Prepared For: Mike Geary, P.E., General Manager

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Reviewed By: Bernadette Bezy - Regulatory Compliance Specialist/Senior Biologist

Date: November 10, 2015

Subject: **Technical Memorandum No. 5 – Environmental Constraints Analysis**

5.1 PURPOSE

The purpose of this environmental constraints analysis is to determine whether there are any major liabilities or fatal flaws that would severely constrain the intended use of the potential redundant water supply pipeline alignments and to assess the feasibility of the identified routes from an environmental permitting and compliance perspective. The goal of this Technical Memorandum is to assist in identifying the most efficient pipeline alignment from an environmental perspective.

In general, there appears to be no outstanding environmental compliance "fatal flaws" associated with any of the alignments studied for the redundant water supply pipeline. The installation of pipelines along any of the alignments would require compliance with the California Environmental Quality Act (CEQA), Clean Water Act (CWA) Section 401 and 404, Federal Endangered Species Act (FESA) Section 7, California Endangered Species Act (CESA), California Fish and Game Code Section 1600, and potentially Placer County's General Plan. Placer County would be considered a "responsible agency" under CEQA (Public Resource Code section 21069; 14 California Code of Regulations section 15381). Four of the five alignments would cross US Forest Service (USFS) land, which triggers National Environmental Policy Act (NEPA) compliance and would require a special use permit from USFS. Additionally, the storage reservoir tank site south of Squaw Valley Road would require a USFS special use permit also. Three of the alignments are also located partially in the Town of Truckee and Nevada County, which would potentially trigger

compliance with the Town of Truckee's and Nevada County's General Plans and both jurisdictions would also be considered "responsible agencies" under CEQA. Below is a summary of the findings.

5.2 OBJECTIVE

The specific objectives of the environmental constraints analysis were to (1) identify any documented constraints and permit compliance requirements through literature surveys and (2) define any additional site-specific constraints through local area knowledge to assist in determining the best potential alignment.

The intention of this technical memorandum is to assess the potential environmental constraints and permit compliance requirements associated with the development of a potential redundant water supply pipeline along the five potential alignments: (A) the USFS 06 Road Alignment (B) the Liberty Energy Powerline Alignment (Powerline Alignment) (C) the Highway 89 Alignment (D) Placer County Bike Path Alignment (Bike Path Alignment) and (E) the Truckee Tahoe Sanitation Agency TRI Alignment (TTSA TRI Alignment). The USFS 06 Road Alignment and the Powerline Alignment begin in the Martis Valley Community Area of unincorporated Placer County. The USFS 06 Road Alignment would be constructed in the roadway of the existing dirt USFS road. The Powerline Alignment would be built in the already disturbed corridor of the Liberty Energy powerlines that take power from Truckee to Squaw. The Highway 89 Alignment, the Bike Path Alignment, and the TTSA TRI Alignment begin at the intersection of West River Street and Highway 89 in Truckee. The Highway 89 Alignment would be placed in the shoulder of the highway and continue to Squaw Valley Road. The TTSA TRI Alignment would be placed in the previously disturbed area of the TTSA sewer pipeline that runs from Truckee to Squaw Valley. The Bike Path Alignment would follow Placer County's proposed Truckee River Access Trail. All alignments are shown in Figure 5-1.

Environmental constraints are defined as any issue that could complicate or severely delay the project. Examples include wetlands and other waters of the US, state or federal endangered species habitat, land use designations in conflict with the proposed use, and key archeological or cultural resources. This environmental constraints analysis/feasibility study is (a) a tool for defining the development potential and environmental suitability of the potential project and (b) an advanced planning document to facilitate project preparation and environmental permit streamlining.

5.3 POTENTIAL WATER SUPPLY PIPELINE ALIGNMENTS

Due to the similar nature and proximity of the alignments, the analysis groups environmental constraints relating to the alignments as two corridors when there is no difference between individual alignments and as separate alignments where distinguishing factors apply. All alignments would require a storage reservoir tank located at a specific elevation within Squaw Valley.

5.3.1 UNITED STATES FOREST SERVICE 06 ROAD CORRIDOR

USFS 06 Road Alignment

The USFS 06 Road Alignment is located in the Sierra Nevada Mountain Range at an elevation of approximately 6,200 feet. It is located near State Routes 267 (to the east), 89 (to the west), 28 (to the south), and Interstate 80 (to the north) in the unincorporated area of Placer County south of the Town of Truckee (Figure 5-1). The potential pipeline route begins at the Carson Range Tank in the Northstar Community Services District (NCSD) Zone 4 water system, where a booster pump station would be placed on the southwest side of the existing Timilick development within the Zone 4 water system along Valhalla Drive, just north of Bald Mountain. The potential pipeline would then follow a southeasterly course along a USFS spur road to connect with the main alignment of the USFS 06 Road. The pipeline would follow the USFS 06 Road, mostly along the existing dirt roadway, until reaching Deer Creek. At this point the pipeline would wind down the ridge just south of Deer Creek following a series of existing dirt trails/narrow roads and end up immediately south of Squaw Valley Road. The pipeline would then continue north along the east side of the Truckee River and cross at either one of the existing bridge crossings in the vicinity of the Squaw Valley Road or be bored directionally under the Truckee River to meet Squaw Valley Road. The new pipeline would connect to the existing District water system at the intersection of Squaw Valley Road and Highway 89. Ultimately, water would be supplied to a new water storage tank at an elevation of approximately 6,300 feet within the District service boundary.

The USFS 06 Road Alignment under consideration encompasses a corridor approximately 15 feet wide and 14.5 miles long from the Carson Range Tank to the intersection of Highway 89 and Squaw Valley Road.

Liberty Energy Powerline Alignment

The Powerline Alignment is roughly parallel to the USFS 06 Road. The alignment begins at the Olana Tank in the Zone 4 water system and follows a straighter but parallel course to the USFS 06 Road following the existing Liberty Energy powerline through the USFS land at the same approximate elevation of 6,200 feet. It is located near State Routes 267 (to the east), 89 (to the west), 28 (to the south), and Interstate 80 (to the north) in the unincorporated area south of the Town of Truckee in Placer County (Figure 5-1). The Powerline Alignment runs parallel to the USFS 06 Road until north of Deer Creek where the power lines run down the northern edge of the Deer Creek canyon directly east of the entrance to Squaw Valley at Squaw Valley Road. The new pipeline would connect to the existing District water system at the intersection of Squaw Valley Road and Highway 89. Ultimately, water would be supplied to a new water storage tank at an elevation of approximately 6,300 feet within the District service boundary.

5.3.2 HIGHWAY 89 CORRIDOR

Highway 89 Alignment

The Highway 89 Alignment is also located in the Sierra Nevada Mountain Range at an elevation of approximately 6,000 feet. It is located along State Highway 89 from the Town of Truckee south to the Squaw Valley Road/Highway 89 intersection. Nearby roadways include Interstate 80 (to

the north), State Routes 267 (to the east) and 28 (to the south) (Figure 5-1). The Highway 89 Alignment would use Truckee Donner Public Utility District (TDPUD) infrastructure to route the water supply from the NCSD and/or Zone 4 water system, or a new District owned water supply facility, to Highway 89 south at the intersection of West River Street where a booster pump station will be placed. From this booster pump station, the pipeline would be placed along the shoulder of Highway 89 for approximately eight miles, and connect to the existing District water system at the intersection of Highway 89 and Squaw Valley Road. Ultimately, water would be supplied to a new water storage tank at an elevation of approximately 6,300 feet within the District service boundary

The Highway 89 Alignment under consideration encompasses a corridor approximately 15 to 20 feet wide and eight miles long from a booster pump station at the intersection of Highway 89 and West River Street to the mouth of Squaw Valley along Highway 89. The surrounding land uses along the Alignment includes Timberland, Low Density Residential, and Highway 89 Right-of-Way. The entire Highway 89 Alignment would be along the wide western shoulder of the highway.

TTSA TRI Alignment

The TTSA sewer interceptor runs parallel to the Truckee River between North Lake Tahoe and the TTSA wastewater treatment plant of off Highway 267. The sewer interceptor is located within an easement that ranges in width from 10 to 20 feet. The TTSA TRI Alignment would follow the easement of the sewer interceptor for the portion parallel to the Highway 89 Alignment. The TTSA TRI Alignment will also require a booster pump station at the intersection of Highway 89 and West River Street and will follow the Highway 89/TTSA corridor to the entrance of Squaw Valley Road where it will connect to a new storage tank and the existing District infrastructure.

Bike Path Alignment

The Bike Path Alignment would follow the proposed alignment for the Placer County Bike Trail that is planned to connect the existing Class I bike trail that currently ends at Squaw Valley to Truckee. Presently, the existing bike trail extends from Tahoe City north to Squaw Valley. Placer County is in the process of developing plans to extend the Class I trail from Squaw Valley along the Truckee River and parallel to Highway 89 to the Town of Truckee where it will follow the Truckee River adjacent to West River Street. The bike trail is currently in pre-construction planning phase and if timing of construction and permitting lines up with construction of the District' s redundant water supply facilities there is an opportunity for shared costs. The proposed bike trail will be almost entirely on USFS land and partially within the Caltrans Right-of-Way (Figure 5-1).

5.4 METHODS

Stantec staff reviewed existing environmental documentation covering the potential alignment areas (Figure 5-1). Stantec staff then conducted a more refined analysis of the possible environmental constraints/permit streamlining options associated with the potential water supply pipeline routes. The resource-specific methods and documents reviewed are described and cited below.

5.4.1 BIOLOGICAL RESOURCES

Stantec biologists conducted a desktop survey of the potential project area. The following biological resource documents and sources were reviewed to assess possible biological constraints along the water supply pipeline routes:

- California Department of Fish and Wildlife's (CDFW) California Natural Diversity Database (CNDDB) (2015) records search within five miles of all alternative alignments.
- The U.S. Fish and Wildlife Service (USFWS) list of endangered, threatened, and proposed species for Placer and Nevada counties including critical habitat for these species 2015.
- National Wetlands Inventory 2015.
- Previously prepared environmental documents in the area including:
  - Sierra Nevada Forest Plan Amendment and Supplemental Environmental Impact Statement, Northern Sierra Nevada, California (USFS, 2008);
  - Martis Valley Community Plan, Martis Valley, Placer County, California (May 2003);
  - Martis Valley Community Plan Environmental Impact Report, Nevada County, California (May 2003);
  - Nevada County General Plan, Nevada County, California (1996);
  - Placer County General Plan Environmental Impact Report, Placer County, California (1995);
  - Sierra Nevada Forest Plan Biological Assessment (USDA Forest Service, 2008);
  - Squaw Valley Public Service District Aquifer Storage Recovery Program, Squaw Valley (ECO:LOGIC, 2005);
  - Squaw Valley Public Service District Well No.2 Replacement and Water Supply Reliability Project (ECO:LOGIC 2007);
  - Town of Truckee 2025 General Plan, Truckee, California (1996);
- Personal Communications with Joann Roubique from the USFS (2009, 2015).
- USFS Land Management Plan.
- Placer County General Plan Tree Ordinance.
- Aerial photographs of the potential routes.
- A review of the California Native Plant Society plant list database (2015).

5.4.2 LAND USE RESOURCES

Stantec environmental specialists conducted a desktop survey of the potential project area. The following land use documents and sources were reviewed to assess possible land use constraints along the water supply pipeline route:

- USFS Land Management Plan.
- Placer County Code.
- Placer County General Plan Land Use Element.
- Placer County Planning Department website.

- Nevada County General Plan, Nevada County, California (2014).
- Martis Valley Community Plan, Martis Valley, Placer County, California (May 2003).
- Martis Valley Community Plan EIR, September 2003, Land Use Area Map.
- Truckee 2025 General Plan, Land Use Element, Community Element, 2006.
- Truckee Land Use Maps.
- Squaw Valley General Plan and Land Use Ordinance, 1983 (Amended 1997).

5.4.3 CULTURAL RESOURCES

A desktop survey of the potential project area was conducted by Stantec environmental specialists and archaeologists. The following cultural resource documents and sources were reviewed to assess possible cultural constraints along the water supply pipeline route:

- USFS Land Management Plan.
- Placer County General Plan Cultural Resources Element.
- Martis Valley Community Plan EIR, September 2003.
- Truckee General Plan EIR, Cultural Resources Chapter, May 2006.

5.5 POTENTIAL DEVELOPMENT CONSTRAINTS

This section addresses the potential biological, land use, and cultural resource associated constraints that may exist within the USFS 06 Road Corridor and the Highway 89 Corridor. Based on our literature review and knowledge of the area, fatal flaws or severe constraints to development that would render the project infeasible appear absent. However, given the past public involvement and interest in development projects in Martis Valley and the Village at Squaw Valley Specific Plan, public participation in the CEQA/NEPA process is expected to be involved. Environmental concerns are expected to revolve around water supply issues in Martis Valley, growth accommodation of the Squaw Valley Specific Plan development, and potential water level draw down impacts to Lahontan cutthroat trout, a federally threatened species. Permit streamlining strategies to ensure environmental compliance are presented in later in this memorandum.

5.5.1 BIOLOGICAL CONSTRAINTS

Potential constraints regarding environmental compliance and permitting are often related to biological resources and jurisdictional waters of the United States because crossing such resources triggers compliance with the CWA Sections 404 and 401, California Department of Fish and Game Code 1600 *et. Seq*., and the California and/or FESA. Potential biological resources (special status species) and jurisdictional waters of the U.S. within the alignments are discussed below.

5.5.1.1 REGULATORY FRAMEWORK

The following describes federal, state, and local environmental laws and policies that are relevant to the CEQA review process for all potential pipeline alignments.

Wetlands and Waters of the United States

Waters of the United States (U.S.) include a range of wet environments such as lakes, rivers, streams (including intermittent streams), mudflats, sand flats, wetlands, sloughs, and wet meadows. The Corps regulates discharge of dredged or fill material into waters of the United States under Section 404 of the CWA. "Discharges of fill material" is defined as the addition of fill material into waters of the U.S., including, but not limited to the following: placement of fill that is necessary for the construction of any structure or impoundment requiring rock, sand, dirt, or other material for its construction; site-development fills for recreational, industrial, commercial, residential, and other uses; causeway or road fills; and fill for intake and outfall pipes and subaqueous utility lines (33 California Code of Regulations section 328.2(f)). Section 401 of the CWA (33 United States Code section 1341) requires any applicant for a federal license or permit to conduct any activity that may result in a discharge of a pollutant into waters of the United States to obtain a certification that the discharge will comply with the applicable effluent limitations and water quality standards.

Federal Endangered Species Act

The United States Congress passed the FESA in 1973 to protect those species that are endangered or threatened with extinction. FESA is intended to operate in conjunction with the NEPA to help protect the ecosystems upon which federally endangered and threatened species depend.

The FESA prohibits the "take" of endangered or threatened wildlife species. "Take" is defined to include harassing, harming (including significantly modifying or degrading habitat), pursuing, hunting, shooting, wounding, killing, trapping, capturing, or collecting wildlife species or any attempt to engage in such conduct (16 United States Code 1532, 50 Code of Federal Regulations 17.3). Actions that result in take can result in civil or criminal penalties.

The FESA and EPA Section 404 guidelines prohibit the issuance of wetland permits for projects that would jeopardize the existence of threatened or endangered wildlife or plant species. The Corps must consult with the USFWS and National Marine Fisheries Service (NMFS) when threatened or endangered species may be affected by a proposed project to determine whether issuance of a Section 404 permit would jeopardize the species. A "jeopardy determination" from the USFWS is considered a fatal flaw. In the context of the study site, the federal ESA would be triggered if development resulted in take of a threatened or endangered species (e.g., Lahontan cutthroat salmon) or if issuance of a Section 404 permit or other federal agency action could adversely affect or jeopardize a threatened or endangered species.

Federal Policies on Californian Riparian Communities

Riparian communities have a variety of functions, including providing high-quality habitat for resident and migrant wildlife, stream bank stabilization, and runoff water filtration. Throughout the U.S., riparian habitats have declined substantially in extent and quality compared with their historical distribution and condition. These declines have increased concerns about dependent plant and wildlife species, leading federal agencies to adopt policies to arrest further loss. USFWS

Mitigation Policy identifies California's riparian habitats as belonging to resource Category 2, for which "no net loss" of existing habitat value is recommended.

California Department of Fish and Game Code 1600 et. Seq.

CDFW has jurisdiction under Section 1600 et seq. of the California Fish and Game Code over fish and wildlife resources of the state. Under Section 1603, a private party must notify the CDFW if a proposed project will "substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake designated by the department, or use any material from the streambeds except when the department has been notified pursuant to Section 1601." If an existing fish or wildlife resource may be substantially adversely affected by the activity, the CDFW may propose reasonable measures that will allow protection of those resources. If these measures are agreeable to the party, they may enter into an agreement with the CDFW identifying the approved activities and associated mitigation measures.

California Endangered Species Act

The State of California enacted the CESA in 1984. The CESA is similar to the FESA but pertains to state-listed endangered and threatened species. It requires state agencies to consult with the CDFW when preparing CEQA documents to ensure that the state lead agency actions do not jeopardize the existence of listed species. It directs agencies to consult with CDFW on projects or actions that could affect listed species, directs CDFW to determine whether jeopardy would occur, and allows CDFW to identify "reasonable and prudent alternatives" to the project consistent with conserving the species. Agencies can approve a project that affects a listed species if they determine that there are "overriding considerations"; however, the agencies are prohibited from approving projects that would result in the extinction of a listed species.

The state ESA prohibits the taking of state-listed endangered or threatened plant and wildlife species. CDFW exercises authority over mitigation projects involving state-listed species, including those resulting from CEQA mitigation requirements. CDFW may authorize taking if an approved habitat management plan or management agreement that avoids or compensates for possible jeopardy is implemented. CDFW requires preparation of mitigation plans in accordance with published guidelines.

Porter Cologne Water Quality Control Act: Fish and Game Code Section 1601-1607

The Porter-Cologne Water Quality Act, Fish and Game Code section 1601-1607, is administered by the California State Water Resources Control Board (SWRCB). This act and associated codes pertain to projects with potential impacts to water quality or waterways (State Board 2015). Under the Porter-Cologne Water Quality Control Act, "waters of the state" fall under the jurisdiction of the SWRCB and the Regional Water Resource Control Boards (RWQCBs). RWQCBs must prepare and periodically update water quality control basin plans. Each basin plan sets forth water quality standards for surface water and groundwater, as well as actions to control non-point and point sources of pollution to achieve and maintain these standards. In most cases, the RWQCBs seek to protect these beneficial uses by requiring the integration of water quality control measures into projects that would result in discharge into waters of the state. Projects that affect wetlands or waters of the state must meet waste discharge requirements (WDR) of the RWQCBs, which may

be issued in addition to a water quality certification under Section 401 of the CWA. This jurisdiction includes waters (including wetlands and isolated wetlands) that Corps deems to be isolated or non-jurisdictional with respect to the Solid Waste Association of Northern Cook Counties (SWANCC) decision (see discussion above under Sections 401 and 404 of the CWA). For waters of the state not subject to Section 404, the SWRCB and the RWQCB would authorize impacts by issuing a WDR or in some cases, a waiver of WDR.

Other Statues, Codes, and Policies Affording Species' Protection

CDFW Species of Special Concern

In addition to formal listing under FESA and CESA, plant and wildlife species receive additional consideration during the CEQA process. Species that may be considered for review are included on a list of "Species of Special Concern," developed by the CDFW. It tracks species in California whose numbers, reproductive success, or habitat may be threatened.

California Native Plant Society – Native Plant Species List

The California Native Plant Society (CNPS) maintains a list of plant species native to California that have low numbers, limited distribution, or are otherwise threatened with extinction. This information is published in the Inventory of Rare and Endangered Vascular Plants of California (Skinner and Pavlik, 1994). Potential impacts to populations of CNPS-listed plants receive consideration under CEQA review. The following identifies the definitions of the CNPS listings:

- List 1A: Plants believed extinct.
- List 1B: Plants rare, threatened, or endangered in California and elsewhere.
- List 2: Plants rare, threatened, or endangered in California, but more numerous elsewhere.
- List 3: Plants about which we need more information - a review list.
- List 4: Plants of limited distribution - a watch list.

Migratory Bird Regulations

Raptors (birds of prey) and migratory birds are protected by a number of state and federal laws. The federal Migratory Bird Treaty Act (MBTA) prohibits the killing, possessing, or trading of migratory birds except in accordance with regulations prescribed by the Secretary of Interior. Section 3503.5 of the California Fish and Game Code states that it is "unlawful to take, possess, or destroy any birds in the order Falconiformes or Strigiformes or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto."

General Plan and Local Community Plan Policies

Placer County

The following is a list of policies within the Natural Resources Section of the Placer County General Plan that provide protection to the biological and water resources within Placer County

and depending on the need for a County discretionary action, may apply to all potential pipeline alignments.

Water Resources

- **Policy 6.A.1:** The County shall require the provisions of sensitive habitat buffers which shall, at a minimum, be measured as follows: 100 feet from the centerline of perennial streams, 50 feet from centerline of intermittent streams, and 50 feet from the edge of sensitive habitats to be protected including riparian zones, wetlands, old growth woodlands, and the habitat of rare, threatened or endangered. Based on more detailed information supplied as a part of the review for a specific project, the County may determine that such setbacks are not applicable in a particular instance or should be modified based on the new information provided. The County may, however, allow exceptions, such as in the following cases:

    - Reasonable use of the property would otherwise be denied;
    - The location is necessary to avoid or mitigate hazards to the public;
    - The location is necessary for the repair of roads, bridges, trails, or similar infrastructure; or
    - The location is necessary for the construction of new roads, bridges, trails, or similar infrastructure where the County determines there are no feasible alternatives and the project has minimized environmental impacts through project design and infrastructure placement.

- **Policy 6.A.3**: The County shall require development projects proposing to encroach into a stream zone or stream setback to do one or more of the following, in descending order of desirability:
    - Avoid the disturbance of riparian vegetation;
    - Replace all functions of the existing riparian vegetation (on-site, in-kind);
    - Restore another section of stream (in-kind); and/or
    - Pay a mitigation fee for in-kind restoration elsewhere (e.g., mitigation banks).

- **Policy 6.A.10**: The County shall discourage grading activities during the rainy season, unless adequately mitigated, to avoid sedimentation of creeks and damage to riparian habitat.
- **Policy 6.A.15**: The County shall encourage the protection of floodplain lands and where appropriate acquire public easements for purposes of flood protection, public safety, wildlife preservation, groundwater recharge, access and recreation.

Wetland and Riparian Areas

- **Policy 6.B.1:** The County shall support the "no net loss" policy for wetland areas regulated by the Corps, the USFWS, and the California Department of Fish and Game. Coordination

with these agencies at all levels of project review shall continue to ensure that appropriate mitigation measures and the concerns of these agencies are adequately addressed.

- **Policy 6.B.2:** The County shall require new development to mitigate wetland loss in both regulated and non-regulated wetlands to achieve "no net loss" through any combination of the following, in descending order of desirability: (1) avoidance of riparian habitat; (2) where avoidance is not possible, minimization of impacts on the resource; or (3) compensation, including use of a mitigation banking program that provides the opportunity to mitigate impacts to rare, threatened, and endangered species and/or the habitat which supports these species in wetland and riparian areas.
- **Policy 6.B.4:** The County shall strive to identify and conserve remaining upland habitat areas adjacent to wetlands and riparian areas that are critical to the survival and nesting of wetland and riparian species.

Fish and Wildlife Habitat

- **Policy 6.C.1:** The County shall identify and protect significant ecological resource areas and other unique wildlife habitats critical to protecting and sustaining wildlife populations. Significant ecological resource areas include the following:

  - Wetland areas including vernal pools.
  - Stream environment zones.
  - Any habitat for rare, threatened or endangered animals or plants.
  - Critical deer winter ranges (winter and summer), migratory routes and fawning habitat.
  - Large areas of non-fragmented natural habitat, including Blue Oak Woodlands, Valley Foothill Riparian, vernal pool habitat.
  - Identifiable wildlife movement zones, including but not limited to, non-fragmented stream environment zones, avian and mammalian migratory routes, and known concentration areas of waterfowl within the Pacific Flyway.
  - Important spawning areas for anadromous fish.

- **Policy 6.C.2**: The County shall require development in areas known to have particular value for wildlife to be carefully planned and, where possible, located so that the reasonable value of the habitat for wildlife is maintained.
- **Policy 6.C.3**: The County shall encourage the control of residual pesticides to prevent potential damage to water quality, vegetation, fish, and wildlife.
- **Policy 6.C.6**: The County shall support preservation of the habitats of rare, threatened, endangered, and/or other special status species. Federal and state agencies, as well as other resource conservation organizations, shall be encouraged to acquire and manage endangered species' habitats.
- **Policy 6.C.7:** The County shall support the maintenance of suitable habitats for all indigenous species of wildlife, without preference to game or non-game species, through maintenance of habitat diversity.

- **Policy 6.C.9:** The County shall require new private or public developments to preserve and enhance existing riparian habitat unless public safety concerns require removal of habitat for flood control or other essential public purposes (See Policy 6.A.1.). In cases where new private or public development results in modification or destruction of riparian habitat the developers shall be responsible for acquiring, restoring, and enhancing at least an equivalent amount of like habitat within or near the project area.
- **Policy 6.C.11:** Prior to approval of discretionary development permits involving parcels within a significant ecological resource area, the County shall require, as part of the environmental review process, a biotic resources evaluation of the sites by a wildlife biologist, the evaluation shall be based upon field reconnaissance performed at the appropriate time of year to determine the presence or absence of special-status, threatened, or endangered species of plants or animals. Such evaluation would consider the potential for significant impact on these resources, and would identify feasible measures to mitigate such impacts or indicate why mitigation is not feasible. In approving any such discretionary development permit, the decision-making body shall determine the feasibility of the identified mitigation measures.

  Significant ecological resource areas shall, at a minimum, include the following:

  - Wetland areas including vernal pools;
  - Stream zones;
  - Any habitat for special-status, threatened or endangered animals or plants;
  - Critical deer winter ranges (winter and summer), migratory routes and fawning habitat;
  - Large areas of non-fragmented natural habitat, including blue oak woodlands, valley foothill and montane riparian, valley oak woodlands, annual grasslands, vernal pool/grassland complexes habitat;
  - Identifiable wildlife movement zones, including but not limited to, non-fragmented stream environment zones, avian and mammalian migratory routes, and known concentration areas of waterfowl within the Pacific Flyway; and
  - Important spawning and rearing areas for anadromous fish.

- **Policy 6.C.12:** The County shall cooperate with, encourage, and support the plans of other public agencies to acquire fee title or conservation easements to privately-owned lands in order to preserve important wildlife corridors and to provide habitat protection of California Species of Concern and state or federally listed threatened, or endangered plant and animal species, or any species listed in an implementing agreement for a habitat conservation plan and natural communities conservation plan.
- **Policy 6.C.13:** The County shall support and cooperate with efforts of other local, state, and federal agencies and private entities engaged in the preservation and protection of significant biological-terrestrial resources from incompatible land uses and development. Significant biological-terrestrial resources include endangered or threatened species and their habitats, wetland habitats, wildlife migration corridors, and locally important species/communities.
- **Policy 6.C.14:** The County shall support the management efforts of the CDFW to maintain and enhance the productivity of important fish and game species (such as the Blue Canyon

and Loyalton Truckee deer herds) by protecting important natural communities for these species from incompatible urban/suburban, rural residential, agricultural, or recreational development.

Vegetation

- **Policy 6.D.4**: The County shall ensure that landmark trees and major groves of native trees are preserved and protected. In order to maintain these areas in perpetuity, protected areas shall also include younger vegetation with suitable space for growth and reproduction.
- **Policy 6.D.5**: The County shall establish procedures for identifying and preserving special-status, threatened, and endangered plant species that may be adversely affected by public or private development projects.
- **Policy 6.D.6**: The County shall ensure the conservation of sufficiently large, continuous expanses of native vegetation to provide suitable habitat for maintaining abundant and diverse wildlife.
- **Policy 6.D.7**: The County shall support the management of wetland and riparian plant communities for passive recreation, groundwater recharge, nutrient catchment, and wildlife habitats. Such communities shall be restored or expanded, where possible.
- **Policy 6.D.8**: The County shall require that new development preserve natural woodlands to the maximum extent possible.
- **Policy 6.D.9:** The County shall require that development on hillsides be limited to maintain valuable natural vegetation, especially forests and open grasslands, and to control erosion.
- **Policy 6.D.10:** The County shall encourage the planting of native trees, shrubs, and grasslands in order to preserve the visual integrity of the landscape, provide habitat conditions suitable for native wildlife, and ensure that a maximum number and variety of well adapted plants are maintained.
- **Policy 6.D.14:** The County shall require that new development avoid ecologically-fragile areas (e.g., areas of special-status, threatened, or endangered species of plants, and riparian areas). Where feasible, these areas should be protected through public or private acquisition of fee title or conservation easements to ensure protection.
- **Policy 6.E.1:** The County shall support the preservation and enhancement of natural land forms, natural vegetation, and natural resources as open space to the maximum extent feasible. The County shall permanently protect, as open space, areas of natural resource value, including wetlands, riparian corridors, un-fragmented woodlands, and floodplains.
- **Policy 6.E.2:** The County shall require that new development be designated and constructed to preserve the following types of areas and features as open space to the maximum extent feasible:

    - High erosion hazard areas,
    - Scenic and trail corridors,
    - Streams, riparian vegetation,
    - Wetlands,
    - Significant stands of vegetation,

- Wildlife corridors, and
- Any areas of species ecological significance.

- **Policy 6.E.3:** The County shall support the maintenance of open space and natural areas that are interconnected and of sufficient size to protect biodiversity, sustain viable populations, accommodate wildlife movement, and sustain ecosystems.

Placer County Tree Ordinance

Placer County has a tree ordinance that mandates a permit be obtained for the removal or disturbance of any tree over six inches dbh (diameter at breast height) (PCGP, 1994). According to the Placer County Code Tree Ordinance (Section 12.16.050), a tree permit is not required for the removal of a protected tree under the following circumstances:

- D. When compliance would interfere with activities of a public utility necessary to comply with applicable safety regulations and/or necessary to repair or avoid the interruption of services provided by such a utility. Routine repair and maintenance of utilities would be exempt, new construction projects (i.e., the installation of high power, transmission line corridor) are subject to review.

Nevada County General Plan

The following is a list of policies within the Resource Conservation and Development Section of the Nevada County General Plan. These policies provide protection to the biological and water resources within Nevada County and if a County discretionary action were necessary for project approval, these policies would apply to all potential alignments.

Water

- **Policy 11.5:** Maintain the operation of the Nevada County Water Agency Advisory Council in order to promote continuing communication and cooperation between public water purveyors and other public agencies in protecting and enhancing the County's water resources.

Soils

- **Policy 12.1:** Enforce Grading Ordinance provisions for erosion control on all new development projects by adopting provisions for ongoing monitoring of project grading. Project site inspection shall be required prior to initial site disturbance and grading to ensure all necessary control measures, including proper staking and tree protection measures, are in place. The installation, maintenance, and performance of erosion and sedimentation control measures shall be monitored by County or District staff (or their designee) and completely funded by a project applicant. All County projects shall comply with this policy.
- **Policy 12.3:** Cooperate and encourage those activities dealing with techniques and practices to minimize erosion in cooperation with Nevada County Resource Conservation

District, including provision of educational materials for the general public regarding techniques and practices to minimize erosion from construction activities.

Wildlife and Vegetation

- **Policy 13.8:** As part of the Comprehensive Site Development Standards, include measures applicable to all discretionary and ministerial projects to minimize disturbance of heritage and landmark trees and groves. These measures shall include, but are not limited to, requirements for on-site vegetation inventories and mandatory clustering of development in areas likely to support such vegetation or habitat.

Martis Valley Community Plan

The following policies were established in the 2003 Martis Valley Community Plan (MVCP) to give additional protection, above that offered in federal, state, and county regulations, to natural resources in the Martis Valley. Depending on the need for a County discretionary action, the MVCP policies would apply to all pipeline alignments.

Soils

- **Policy 9.C.2:** The County shall require topographic and slope analysis maps during the environmental review process or at the first available opportunity of project review to evaluate future grading activity, building location impacts, and road construction impacts.

Water Resources

- **Policy 9.D.1**: The County shall require the provision of sensitive habitat buffers which shall, at a minimum, be measured as follows: 100 feet from the centerline of perennial streams, 50 feet from centerline of intermittent streams, and 50 feet from the edge of sensitive habitats to be protected including riparian zones, wetlands, old growth woodlands, and the habitat of rare, threatened or endangered species (see discussion of sensitive habitat buffers in Part 1 of the PCGP).

  In some cases, buffers shall be required which are substantially larger than noted above. Conversely, based on more detailed information supplied as a part of the review for a specific project, the County may determine that such setbacks are not applicable in a particular instance or should be modified based on the new information provided. In addition, the County may allow exceptions, such as in the following cases:

  - Reasonable use of the property would otherwise be denied;
  - The location is necessary to avoid or mitigate hazards to the public.
  - The location is necessary for the repair of roads, bridges, trails or similar infrastructure; or
  - The location is necessary for the construction of new roads, bridges, trails, or similar infrastructure where the County determines there is no feasible alternative and the project has minimized environmental impacts through project design and infrastructure placement.

- **Policy 9.D.2:** The County shall require that any permitted disturbance in the 100-year floodplain comply with the provisions of the Placer County Flood Damage Prevention Ordinance and any other existing regulations.

- **Policy 9.D.3:** The County shall require development projects proposing to encroach (where it has been determined to be appropriate) into a creek corridor or creek setback to do one or more of the following, in descending order of desirability:

  - Avoid the disturbance of riparian vegetation;
  - Replace riparian vegetation (on-site, in-kind);
  - Restore another section of creek (in-kind) and/or;
  - Pay a mitigation fee for restoration elsewhere (e.g. wetland mitigation banking program).

- **Policy 9.D.4:** The County shall require public and private development to address creeks and riparian corridors as follows:

  - Preserve creek corridors and creek setback areas through easements or dedications. Parcel lines (in the case of a subdivision) or easements (in the case of a subdivision or other development) shall be located to optimize resource protection. If a creek is proposed to be included within an open space parcel or easement, allowed uses and maintenance responsibilities within that parcel or easement should be clearly defined and conditioned prior to map or project approval;
  - Designate such easement or dedication areas (as described in a. above) as open space;
  - Protect creek corridors and their habitat value by actions such as: 1) providing an adequate creek setback, 2) maintaining creek corridors in an essentially natural state, 3) employing creek restoration techniques where restoration is needed to achieve a natural creek corridor, 4) utilizing riparian vegetation within creek corridors, and where possible, within creek setback areas, 5) prohibiting the planting of invasive, non-native plants within creek corridors or creek setbacks, and 6) avoiding tree removal within creek corridors;
  - Provide recreation and public access near creeks consistent with other General Plan policies;
  - Use design, construction, and maintenance techniques that ensure development near a creek will not cause or worsen natural hazards (such as erosion, sedimentation, flooding, or water pollution) and will include erosion and sediment control practices such as: 1)turbidity screens and other management practices, which shall be used as necessary to minimize siltation, sedimentation, and erosion, and shall be left in place until disturbed areas are stabilized with permanent vegetation that will prevent the transport of sediment off site; and/or 2) temporary vegetation is established sufficient to stabilize disturbed areas, and;
  - Provide for long-term creek corridor maintenance.

- **Policy 9.D.7:** The County shall prohibit grading activities during the rainy season, unless adequately mitigated, to avoid sedimentation of creeks and damage to riparian habitat.
- **Policy 9.D.10:** The County shall encourage the protection of flood plain lands and where appropriate, acquire public easements for purposes of flood protection, public safety, wildlife preservation, groundwater recharge, access and recreation.

Vegetation

- **Policy 9.E.3:** The County shall support the conservation of a healthy forest including outstanding areas of native vegetation, including, but not limited to, open meadows, riparian areas, Great Basin Sage Scrub, Mixed Coniferous Forest, Montane Chaparral, Montane Meadow, and Red Fir Forest.
- **Policy 9.E.4:** The County shall encourage the preservation of landmark trees and major groves of native trees which have special characteristics or serve an important function such as historical interest, visual screening, shading of creeks or slope stability. In order to maintain these areas in perpetuity, protected areas shall also include younger vegetation with suitable space for growth and reproduction.
- **Policy 9.E.5:** The County shall seek to preserve areas where rare, threatened, and endangered plant species have been identified as potentially occurring and that may be adversely affected by public or private development projects. 9.E.10. The County shall require that new development avoid ecologically-fragile areas (e.g., areas of rare or endangered species of plants, riparian areas). Where feasible, these areas and heritage trees should be protected through public acquisition of fee title or conservation easements to ensure protection.

Wetland and Riparian Areas

- **Policy 9.F.2:** The County shall require that natural open space buffers be maintained in non-riparian areas adjacent to drainage swales and creeks to reduce erosion and to aid in the natural filtration of runoff waters flowing into these waterways. The buffers shall meet the standards contained in the PCGP unless a larger buffer is warranted based on site-specific fieldwork.
- **Policy 9.F.3:** The County shall support the "no net loss" policy for wetland areas regulated by the Corps, the USFWS, and the CDFW. Coordination with these agencies at all levels of project review shall continue to ensure that appropriate mitigation measures and the concerns of these agencies are adequately addressed.
- **Policy 9.F.4:** The County shall require new development to mitigate wetland and riparian loss in both federal jurisdictional and non-jurisdictional wetlands to achieve "no net loss" through any combination of the following, in descending order of desirability; (1) avoidance; (2) where avoidance is not possible, minimization of impacts on the resource; or (3) compensation, including use of a mitigation and conservation banking program that provides the opportunity to mitigate impacts to special status, threatened, and endangered species and/or the habitat which supports these species in wetland and riparian areas. Non-jurisdictional wetlands may include riparian areas that are not federal "waters of the United States" as defined by the CWA.

Fish and Wildlife Habitat

- **Policy 9.G.1:** The County shall identify and protect significant ecological resource areas and other unique wildlife habitats critical to protecting and sustaining wildlife populations. Significant ecological resource areas include the following:

  - Wetland areas;
  - Stream corridors and associated riparian areas;
  - Identified habitat of special status threatened or endangered animals;
  - Critical deer winter ranges, migratory routes and fawning habitat;
  - Large areas of non-fragmented natural habitat, including all habitat types in the Martis Valley Plan area;
  - Identifiable wildlife movement zones, including but not limited to, non-fragmented stream environment zones, avian and mammalian migratory routes, and known concentration areas of waterfowl within the Pacific Flyway; and
  - Martis Lake, Martis Creek and its tributaries.

- **Policy 9.G.10:** Prior to approval of discretionary development permits involving parcels within a significant ecological resource area, the County shall require, as part of the environmental review process, a biotic resources evaluation of the sites, prepared by a wildlife biologist or other qualified professional. The evaluation shall be based upon field reconnaissance performed at the appropriate time of year, (if necessary) to determine the presence or absence of special status, threatened, or endangered species of plants or animals. Such evaluation will consider the potential for significant impact on these resources, and will identify feasible measures to mitigate such impacts.

Air Quality

- **Policy 9.H.6:** The County shall require project-level environmental review to include identification of potential air quality impacts and designation of design and other appropriate mitigation measures or offset fees to reduce impacts. The County shall dedicate staff to work with project proponents and other agencies in identifying, ensuring the implementation of, and monitoring the success of mitigation measures.
- **Policy 9.H.7:** The County shall work with the Placer County Air Pollution Control District (PCAPCD) to reduce particulate emissions from construction, grading, excavation, and demolition to the maximum extent feasible. The County should include PM10 control measures as conditions of approval of subdivision maps, site plans, and grading permits. The County should inform developers of the requirements of the District's PM10 mitigation requirements when they apply for a grading permit.

Squaw Valley General Plan

The following policies were established in the 1983 Squaw Valley General Plan & Land Use Ordinance (SVGP) to give additional protection, above that offered in federal, state, and county

regulations, to natural resources in the Squaw Valley. The SVGP will apply to all pipeline alignments.

Drainage/Water Quality

- **115.10:** A development's internal drainage system shall be so designed that the carrying and retention capacities of all downstream systems are preserved, or that the rate, flow, location, and size of that natural drainage systems downstream are unaffected. Any necessary downstream improvements are the responsibility of the applicant.
- **115.12:** Acquisition of any and all permits required by State and Federal authorities for work to be done within and/or around an established waterway or drainage system is the sole responsibility of the applicant.
- **115.14:** All internal drainage systems shall be designed so as not to increase turbidity, sediment yield, or the discharge of any harmful substances which will degrade the quality of water.
- **115.18:** The stream environment zone, here defined as the 100-year flood plain of any year-round watercourse, shall not be affected by development activities except as permitted by section 115.20 and 115.22 and 115.23 below.
- **115.20:** Where the stream environment zone has previously been modified by channelization, fill, or other human activity, such areas shall be restored by means of landscaping, revegetation, or similar stabilization techniques as a part of development activities on adjoining properties.
- **115.22:** Any crossings of a natural streambed by road, trail or other transportation facility shall be accomplished so that the natural stream characteristics are not impaired. Such crossings shall be considered development activities with respect to Section 115.20 above.
- **115.23:** Where development is proposed with in a stream environment zone that has previously been disturbed, as described in 115.20, above, it may be approved only if the decision-making body finds that it will:

    - Not increase the obstruction on flood waters
    - to increase the potential for flood damage to other properties either up or down stream
    - Result in an overall improvement in water quality protection
    - An overall improvement to the stream environment zone

Erosion Control

- **118.10:** All developments shall be planned, designed, constructed and maintained so that existing healthy trees and native vegetation on the site are preserved to the maximum extent feasible and are protected by adequate means during construction.
- **118.12:** A sedimentation and erosion control plan is required when grading is proposed which disturbs either:

    - a. An area greater than 1,000 square feet

- b. Slopes steeper than 25 percent
- c. A stream environment zone

- **118.14:** Sedimentation and erosion control plans address both construction related and long-term erosion control measures and shall be submitted for review and approval to the Department of Public Works. These plans may be a part of grading; drainage, or improvement plans.
- **118.16:** The control of sedimentation and erosion may include any combination of mechanical or vegetative measures approved by the county, including but not limited to those identified in "Erosion and Sediment Control Guidelines for Developing Areas of the Sierra Foothills and Mountains" prepared by the High Sierra RC&D Council, November, 1981.
- **118.18:** All surfaces disturbed by vegetation removal, grading, haul roads, or other construction activity that alters the natural vegetative cover, are to be revegetated to control erosion, unless covered with impervious surfaces authorized by approved plans. Such revegetation work must be complete prior to October 15th of each year.

Town of Truckee 2025 General Plan

The following is a list of policies within the Conservation and Open Space Section of the Town of Truckee 2025 General Plan that provides protection to the biological resources within town limits and that would apply to the potential USFS Road 06 and the Highway 89 pipeline alignments.

Biological Resources

- **Policy 4.1:** Provide for the integrity and continuity of biological resources open space, habitat and wildlife movement corridors and support the permanent protection and restoration of these areas, particularly those identified as sensitive resources.

Wildlife

- **Policy 5.1:** Require biological resource assessments for all development in areas where special status species may be present.
- **Policy 5.3:** Protect to the extent possible federal or State-designated endangered, threatened, special status or candidate species.

Water Quality

- **Policy 11.1:** Minimize excessive paving that negatively impacts surface water runoff and groundwater recharge rates.

Air Quality

- **Policy 13.3:** Require all construction projects to implement dust control measures to reduce particulate matter emissions due to disturbance of exposed top-soils. Such measures would

include watering of active areas where disturbance occurs, covering haul loads, maintaining clean access roads, and cleaning the wheels of construction vehicles accessing disturbed areas of the site.

5.5.1.2 BIOLOGICAL SETTING

USFS 06 Road Corridor

The vegetative characteristics of the potential USFS 06 Road Corridor is best described as Montane Forest. In addition to developed and residential areas, the pipeline route consists of four main habitats:

- **Mixed Coniferous** with eastside pine (south end of Schaffer Mill Road near the Zone 4 tank sites and a small section along USFS 06) and mixed conifer (majority of USFS 06).
- **Montane Meadow** consisting of mixed meadow plants (small undercrossing of Schaffer Mill Rd and small section along USFS 06).
- **Great Basin Sage** with basin sagebrush (Schaffer Mill Rd).
- **Red Fir Forest** consisting of red fir trees (southern section of USFS 06 across Highway 89 from Squaw Valley).

The USFS 06 Road Corridor would begin at Carson Range tank site and follow it south where surrounding habitat changes from mixed meadow to basin sagebrush to eastside pine. The majority of the pipeline alignment would extend through mixed conifer forest as it follows the USFS 06 Road and/or Powerline easement, passing patches of eastside pine, mixed meadow, and red fir.

Highway 89 Pipeline Corridor

The Highway 89 Corridor has similar vegetative characteristics to the USFS 06 Road Corridor, however distribution and occurrence of habitat type varies. The vegetative characteristics of the potential Highway 89 corridor are best described as Montane Forest. In addition to rural residential areas, the corridor consists of four main habitats:

- **Red Fir Forest** consisting of red fir trees (majority of Highway 89).
- **Montane Meadow** consisting of mixed meadow plants (along Truckee River).
- **Mixed Coniferous** with eastside pine (Highway 89) and mixed conifer (Highway 89).
- **Riparian Scrub** containing willow and quaking aspen (along Truckee River).

The Highway 89 Corridor would begin at the intersection of West River Street and Highway 89. Surrounding habitat is mostly red fir forest, riparian scrub, and montane meadow. The Truckee River parallels the highway providing a moist climate to support riparian scrubs and meadows. The Highway 89 alignment would be designed to stay in the west shoulder of the highway to minimize impacts to river habitats. There are several wetland habitats along the west shoulder of the highway due to drainage culverts or ground seeps. The TTSA TRI Alignment would have a few river crossing locations and the Bike Path Alignment would have several river crossings; mitigation would need to occur to minimize impacts to river habitats.

Table 5-1 shows each of the four main habitats the associated plant and animal species and geographic distribution.

Table 5-1 – Biological Communities Found within the Potential Pipeline Alignments

Biological Communities	Location	Vegetation Type	Common Wildlife	Common Vegetation
Mixed Coniferous Forest	**USFS Corridor:** south Schaffer Mill Road and USFS Road **HWY 89 Corridor:** intermittent along Hwy 89	1. Eastside pine 2. Lodgepole pine 3. Mixed conifer 4. Subalpine conifer 5. White fir	**Avian species:** western tanager (*Piranga ludoviciana*), western wood peewee (*Contopus sordidulus*), hairy woodpecker (*Picoides villosus*), mountain chickadee (*Poecile gambeli*), white-breasted nuthatch (*Sitta carolinensis*), brown-headed cowbird (*Molothrus ater*), chipping sparrow (*Spizella passerina*), Oregon junco (*Junco hyemalis thurberi*), yellow-rumped warbler *Dendroica coronata*), northern flicker (*Colaptes auratus*), and Steller's jay (*Cyanocitta telleri*). **Mammalian species:** lodgepole chipmunk (*Tamias speciosus*), mule deer (*Odocoileus hemionus*), montane vole (*Microtus montanus*), fisher (*Martes pennanti*), California vole (*Microtus californicus*), black bear (*Ursus americanus*), raccoon (*Procyon lotor*), mountain lion (*Felis concolor*), and western gray squirrel (*Sciurus griseus*).	**Tree species:** Jeffrey pine (*Pinus jeffreyi*), white fir (*Abies concolor*), sugar pine (*Pinus lambertiana*), ponderosa pine (*Pinus ponderosa*), lodgepole pine (*Pinus contorta* ssp. *murrayana*), and western white pine (*Pinus monticola*). **Plant species:** Indian paintbrush (*Castilleja pinetorum*), snowberry (*Symphoricarpos mollis*), mule ears (*Wyethia mollis*), Sierra currant (*Ribes nevadense*), and mountain pride (*Penstemon newberryi*)
Red Fir Forest	**USFS Corridor:** south end of USFS 06 Road and Squaw Valley **HWY 89 Corridor:** majority of Hwy 89	Red fir trees	(See above discussion, species similar to mixed coniferous forest species).	These habitats within the project areas are characterized by **dense stands of red fir** (*Abies magnifica*). Because the canopy associated with this habitat is extremely dense and relatively impermeable to sunlight, the understory supports sparse vegetation.

Biological Communities	Location	Vegetation Type	Common Wildlife	Common Vegetation
Montane Meadow	**USFS Corridor:** Schaffer Mill Road USFS Road and Truckee River **HWY 89 Corridor:** Truckee River	1. Annual grass/forbs 2. Wet meadow 3. Perennial grass 4. Mixed meadow	**Species include:** American robin, mountain chickadee, cliff swallow (*Petrochelidon pyrrhonota*), killdeer (*Charadrius vociferus*), mourning dove, northern flicker, California mule deer, western bluebird (*Sialia mexicana*), and green-tailed towhee (*Pipilo chlorurus*)	**Shrubs:** various willows (*Salix* spp.), **Grass and forbs Species:** meadow barley (*Hordeum brachyantherum*), common monkeyflower (*Mimulus guttatus*), clover (*Trifolium* spp.), Indian paintbrush, mint (*Mentha* sp.), shooting star (*Dodecatheon jeffreyi*), and yarrow (*Achillea millefolium*) **Herbaceous species:** fireweed (*Epilobium angustifolium*.), cinquefoil (*Potentilla* sp.), and primrose (*Primula* sp.).
Riparian Scrub	**USFS Corridor:** Truckee River crossing **HWY 89 Corridor:** Along the Truckee River	1. Willow 2. Quaking aspen 3. Willow-aspen.	**Species include:** raccoon, western gray squirrel, California mule deer, northern flicker, mountain chickadee, and lodgepole chipmunk.	**Species include:** willow (*Salix* sp.), alder (*Alnus tenuifolia*), cottonwood (*Populus* sp.), and quaking aspen (*Populus tremuloides*)

5.5.1.3 PIPELINE ALIGNMENT ANALYSIS

USFS 06 Road Corridor and Highway 89 Corridor

Due to the close proximity of the two potential pipeline corridors, a majority of the flora and fauna for the two corridors overlap. Both pipeline corridors transverse mixed coniferous and red fir forests. Mixed coniferous and red fir forests provide cover, foraging, and breeding habitat for high diversity of resident and migratory wildlife, including listed and special status species.

Listed and Special-Status Species

Special-status species are plant and animal species that have been afforded special recognition by federal, state, or local resource agencies or organizations. Listed and special-status species are of relatively limited distribution and may require specialized habitat conditions. Listed and special-status species are defined as plants and animals that are: Legally protected under CESA and FESA or under other regulations; considered sufficiently rare by the scientific community to qualify for such listing; or considered sensitive because they are unique, declining regionally or locally, or at the extent of their natural range.

Figure 5-2 identifies the vegetation species and Figure 5-3 identifies the wildlife species listed in the CNDDB for the Truckee, Martis Peak, Tahoe City, and Kings Beach 7.5-minute USGS quadrangles. The species identified in the list are known to occur within five miles of both potential pipeline corridors.

Discussed in Table 5-2 and in further detail in Appendix A are the special-status wildlife species that have the potential to occur within either possible pipeline alignment corridor. The CNDDB lists 22 special-status wildlife species and 18 special status botanical species as occurring within a five-mile radius of the potential alignments.

These species are protected by state and/or federal resource agencies and are discussed in Table 5-2.

For each of these species the "potential for occurrence" along both corridors was evaluated as follows:

- **Unlikely:** The pipeline alignment and/or immediate area do not support suitable habitat for a particular species. Project is outside the species known range.
- **Low Potential:** The alignment and/or immediate area only provide limited habitat for a particular species. In addition, the known range for a particular species may be outside the immediate project area.
- **Medium Potential:** The alignment and/or immediate area provide suitable habitat for a particular species, and habitat for the species may be impacted.
- **High Potential:** The alignment and/or immediate area provide ideal habitat conditions for a particular species and/or known populations occur in the immediate area and within the potential area of impact.

Table 5-2 – Special-Status Species That Are Known to Occur or Have Potential in the Region around the Project Site (CNDDB/CNPS, 2015)

Common Name Scientific Name	Legal Status[a]			Geographic Distribution/Floristic Province (project site elevation ~2000 meters)	Preferred Habitat	Known Occurrences	Level of Potential for Occurrence
	Federal	State	CNPS				
Plants							
Rorippa subumbellata Tahoe yellow-cress	FSC	CE	1B	Known only from the Lake Tahoe shoreline	Shorelines supporting decomposed granitic soils	Lake Tahoe	**Unlikely**, only known on the sandy shores of Lake Tahoe.
Eriogonum umbellatum var. torreyanum Donner Pass buckwheat			1B	1840-2620 meters, steep slopes and ridge tops	Volcanic soils in rocky meadows and upper montane coniferous forests	Historically known to occur near the intersection of Highway 89 and Squaw Valley Road. Also, in the upper reaches of Squaw Creek	**Medium**, according to CNDDB (2008), the population located near the alignment "was probably destroyed by widening Hwy 89. The west side of Hwy 89 was searched by Kan in 1991 and no plants were observed." Therefore the population mapped and registered in the CNDDB at the project site is presumed extant.
Ivesia sericoleuca Plumas ivesia			1B	1400-2000 Meters, Martis Valley	Occurs in vernally mesic conditions within Great Basin sage scrub, lower coniferous forest, meadow, seep, and vernal pool habitats	Truckee Airport, Martis Valley along Hwy 267.	**Medium**, suitable habitat and known occurrence near all alignments. Habitat may exist along USFS 06 Road.
Arabis rigidissima* var. *demota Galena rock cress			1B		Broadleaved upland forest and upper montane coniferous forest within rocky well drained soil conditions		**Low**, not within 5 miles of either alignment. Potential for habitat along USFS 06 Road.

Common Name Scientific Name	Legal Status[a]			Geographic Distribution/Floristic Province (project site elevation ~2000 meters)	Preferred Habitat	Known Occurrences	Level of Potential for Occurrence
	Federal	State	CNPS				
Scutellaria galericulata Marsh skullcap			2.2	0-2100 Meters	Marshes and swamps throughout lower montane coniferous forest, meadows, and seeps	Near Truckee	**Medium,** habitat around the Truckee River and its tributaries is suitable. Possible impacts could occur from both species.
Ergeron nevadaincola Nevada Daisy			2.3	1400-2900 Meters	Great basin scrub, found in lower montane coniferous forest and pinyon-juniper woodland	Deer Park above the summit of "The Craggs"	**Low,** potential habitat exists along all alignments; however, there are no known occurrences near the alignments.
Glyceria grandis American manna grass			2	15-1980 Meters	Wet meadows, ditches, streams, and ponds	Truckee River near Squaw Creek	**Medium**, potential habitat is known to occur near all alignments.
Sphaeralcea munroana Munroe's desert mallow			2	2000 Meters	Dry, open habitats	On the slopes above Squaw Creek	**Low,** unsuitable habitat near Squaw Creek, no population occurrence along the rest of the alignment.
Rhamnus alnifolia Alder buckhorn			2B.2	1300-2200 Meters	Coniferous forests, meadows, seeps, and riparian scrub vegetation communities	Donner Lake; corner of Highway 89 and Squaw Valley Road; on Highway 89, eight miles south of Truckee	**Medium;** potential habitat is known to occur near the alignments.
Astragalus austiniae Austin's astragalus (Austin's milkvetch)			1B.3	2000 to 3000 Meters	Alpine boulder fields or subalpine coniferous forest vegetation communities	South of Donner Summit	**Medium;** potential habitat is known to occur within the project area.

Common Name Scientific Name	Legal Status[a]			Geographic Distribution/Floristic Province (project site elevation ~2000 meters)	Preferred Habitat	Known Occurrences	Level of Potential for Occurrence
	Federal	State	CNPS				
Meesia uliginosa Broad-nerved hump moss			2B.2	2000 Meters	Bogs, feds, meadows, seeps, coniferous forests	Tributary to Prosser Creek, Tahoe National Forest	**Medium;** potential habitat known to occur near alignments.
Botrychium lunaria Common moonwort			2B.3	2000 to 3000 Meters	Meadows, seeps, and coniferous forests	Sagehen Creek, north of Truckee	**Low;** no population occurrence within the project area.
Carex davyi Davy's sedge			1B.3	1900-3300 Meters	Meadows adjacent to freshwater streams	Truckee River Basin	**Medium;** potential habitat known to occur near alignments
Lewisia longipetala Long-petaled lewisia			1B.3	1500 to 3300 Meters	Coniferous forests	Granite Chief Peak; Pole Creek Watershed	**Medium;** potential habitat known to occur with project area.
Potamogeton epihydrus Nuttall's ribbon-leaved pondweed			2B.2	700 to 2600 Meters	Ponds, lakes, and slow-moving streams	Tahoe Tavern – Lake Tahoe Watershed	**Low;** no population occurrence within the project area.
Potamogeton robbinsii Robbin's pondweed			2B.3	1500 to 3500 Meters	Shallow water	East shore of Donner Lake	**Medium;** potential habitat and known occurrences adjacent to the project area
Juncus luciensis Santa Lucia dwarf rush			1B.2	300 – 2000 Meters	Chaparral, meadows, seeps, coniferous forests	Martis Valley	**Low;** no known occurrences within the project area
Botrychium crenulatum Scalloped moonwort			2B.2	1800 to 3100 Meters	Bogs, fens, marshes, swamps, and coniferous forests	Ward Creek	**Low;** no known occurrences within the project area
Artemisia tripartite ssp. Tripartite Threetip sagebrush			2B.3	900 – 2800 Meters	Dry, loamy soils	Sawtooth Ridge; Ward Peak	**Low;** no known occurrences within the project area

Invertebrates							
Capnia lacustra Lake Tahoe benthic stonefly	FSC			Endemic to Lake Tahoe; found at depths of 95-400 feet	Open water	Lake Tahoe	**Unlikely;** Endemic to Lake Tahoe.
Helisoma newberryi Great Basin rams-horn				Soft mud in freshwater streams and lakes	Open water and slow creeks	Lake Tahoe	**Low;** no known occurrences within the project area and no potential habitat within the project area.
Stygobromus lacicolus Lake Tahoe amphipod				Endemic to Lake Tahoe;	Open water	Lake Tahoe	**Unlikely,** Endemic to Lake Tahoe
Stygobromus tahoensis Lake Tahoe stygobromid				Deep lake	Open water	Lake Tahoe	**Unlikely;** endemic to Lake Tahoe
Margaritifera falcate Western pearlshell				Freshwater streams and rivers in western North America	Cold, clean creeks	Truckee River	**High;** Western pearlshell is known to occur in the Truckee River
Fish							
Oncorhynchus clarkii henshawi Lahontan cutthroat trout	FT			In eastern California	Freshwater lakes and streams	Pole Creek (CNDDB, presence reconfirmed 1993).	**Low**, the prevalence of Rainbow and Brown Trout in the Truckee River has rendered Lahontan cutthroat basically absent from the River. **High,** Lahontan cutthroat trout is known to occur in Martis Creek.
Amphibians							
Rana muscosa Sierra Nevada yellow-legged frog	FSC	CT	FSS	In elevations ranging from 1,200 to 7,500 feet	Lakes, streams, and ponds	Historically found along Squaw Creek and in Squaw Meadow.	**Low,** last registered area sighting was in the 1960's. Populations are not known to occur within the area of either alignment.

Birds							
Accipiter gentillis Northern goshawk			FSS	Middle to high elevation	Mixed coniferous forest habitats. Uses old nests and maintains alternate nest sites on north slopes near water.	Sawtooth Ridge	**Medium,** potential habitat exists along all alignments.
Haliaeetus leucocephalus Bald eagle	DE	CE		Nests in the northernmost counties of California	Within dense conifer stands and woodlands	South shore of Donner Lake	**Medium,** potential habitat exists along all alignments.
Dendroica petechia brewsteri Yellow warbler				Up to 8,000 feet (in Sierra Nevada)	Open canopy coniferous forests	South of Mt. Watson and East end of Donner Lake	**Medium,** potential habitat exists along all alignments
Empidonax traillii brewsteri Willow flycatcher		CE		In the Sierra from May to September in elevations from 2000-8000 feet	Open wet meadows and riparian habitat; nests in dense willow thickets	Truckee	**Medium,** potential habitat exists along the Truckee and Deer Creek
Pandion haliaetus Osprey			FSS	California	Commonly nests within the forested habitats adjacent or near to rivers or large water bodies	Donner Lake	**Medium,** potential habitat exists along the Truckee River
Mammals							
Lepus americanus tahoensis Sierra Nevada snowshoe hare				Found only in the Sierra Nevada	In young growth mixed conifer, subalpine conifer, red fir, Jeffrey pine, lodgepole pine, and aspen forests. In dense understory along the edge of forests close to meadows.	Truckee	**Low,** potential habitat exists along all alignments; however, since Highway 89 and USFS 06 Road alignments follow existing roads, habitat is limited for those alignments.
Myotis volans Long-legged myotis bat				Generally over 4,000 feet	Occurs in woodlands and forest habitats; roosts in rock crevices, under bark, in tree snags, and cliffs	Watson Creek	**Medium,** potential habitat exists along all alignments.

Gulo gulo luteus California wolverine		CT	FSS	4300-7300 feet, known to travel up to 100 miles	Mixed conifer, red fir, and lodgepole forests. Needs a water source and logs to burrow for cover and den sites.	Sagehen (2008) and Squaw Valley (1953)	**Medium,** potential habitat exists along all alignments; however, disturbance from human activity along all routes makes the alignments less than optimal for this species.
Aplodontia rufa californica Sierra Nevada mountain beaver				Within the Sierra Nevada mountain range	Dense growths of small deciduous trees and shrubs, wet soil, and abundance of forbs. Needs dense understory for food and cover, burrows in soft soil and needs an abundant supply of water.	Cabin Creek and Pole Creek, tributaries to the Truckee River.	**Medium**, potential habitat is present along the Highway 89 alignment since it will cross multiple tributaries of the Truckee River.
Martes caurina sierrae Sierra pine marten			FSS	Along the north coast and within the Sierra Nevada, Klamath, and Cascades mountain ranges	Various habitats	Carnelian Bay, Lake Tahoe	**Low,** known range for the species is outside of all alignment corridors.
Lepus townsendii Western white-tailed jackrabbit				Sagebrush, subalpine conifer, juniper, alpine dwarf shrub, and perennial grasslands.	Open areas with scattered shrubs and exposed flat-topped hills with open stands of trees, brush, and herbaceous understory	Near Tahoe City (1920)	**Low,** known range is outside of both alignment corridors.

Vulpes vulpes necator Sierra Nevada red fox		CT	FSS	Above 7000 feet but has been seen as low as 3900.	Various habitats, including lodgepole pine, mixed conifer, montane riparian, and ponderosa pine. Requires dense vegetation for cover and prefers habitats adjacent to meadows for hunting. Dens are located in rock outcrops and hollow logs and are known to burrow in friable soils.	Along Highway 89 between Alder Creek Road and Truckee	**Medium**, potential habitat is present along all alignments.
Ochotona princeps schisticeps Gray-headed pika				1,800 meters to peaks	Rocky, mountainous habitat.	Alpine Meadows Ski Area	**High;** habitat is present along all alignments and known occurrences occur.

A description of the special-status plants and wildlife species identified during the pre-survey screening as known to occur or having a potential to occur within the project region is provided below.

Wildlife

Potential habitat for all 22 wildlife species exists near all alignments. Willow flycatcher (*Empidonax trailli brewsteri*) is known from the Lake Tahoe basin and is listed in the USFWS species list for this region. Two additional special-status species recorded in the USFWS species lists for the Truckee, Martis Peak, Tahoe City, and Kings Beach quadrangles are unlikely to occur within the vicinity of either potential pipeline alignment and include the Sierra pine marten (*Martes americana*) and the Lake Tahoe benthic stonefly (*Capnia lacustra*).

Raptors and other migratory birds are also protected by state and/or federal resource agencies. Numerous raptor species, including red-tailed hawk (*Buteo jamaicensis*), Northern goshawk, Coopers hawk (*Accipiter cooperii*), and sharp-shinned hawk (*Accipiter striatus*), forage and nest in the Sierra Nevada. Raptor nests are protected under the Migratory Bird Treaty Act (MBTA) and Section 3503.5 of the California Fish and Game Code. The montane riparian, red fir, and mixed coniferous forest habitats across either potential pipeline corridor support potential nesting habitat for numerous raptor species. Sharp-shinned hawk and Cooper's hawks were observed on the Siller Ranch site in 1999 and 2000 (Jones & Stokes, 2001). Consequently, raptor species likely forage and nest within either potential corridor.

Other Migratory birds forage and nest in multiple habitats such as oak woodlands, grasslands, riparian woodlands, and coniferous forests. The nests of all migratory birds are protected under the MBTA, which makes it illegal to destroy any active migratory bird nest. Numerous migratory bird species have the potential to nest within either potential pipeline corridor.

Potential impacts or lack thereof to all species listed above would need to be addressed in detail. However, given their listing status and high profile it is expected that the Lahontan cutthroat trout and Northern goshawk would require extensive documentation and study.

Plants

According to the Martis Valley Community Plan EIR and preliminary site evaluation by a Stantec biologist, mixed coniferous forest is the dominant habitat found within both the USFS 06 Road Corridor and the Highway 89 Corridor. As shown in Table 1 there are four biological community types along the potential Corridors.

A CNDDB search of special status species known to occur within five miles of the potential alignments lists 18 known special status plant species. Eight of these plant species are known to occur within five miles of the project location (Figure 5-2). Two other special status species found in the five-mile search were the Carson Range rock cress (*Arabis rigidissima var. demote*) and Oregon fireweed (*Epilobium oreganum*); however, there is no suitable habitat for the species within either pipeline corridor. Table 5-2 and Appendix A provide an analysis of potential impacts (from each corridor) on the listed/special status species.

Placer County Tree Ordinance

The potential redundant water supply pipeline alignments are surrounded by red fir forest, mixed coniferous forest, and riparian scrub. Construction of the potential pipeline may require the removal of certain trees for site development. According to Placer County tree ordinance, a permit be obtained for the removal or disturbance of any tree over six inches dbh (diameter at breast height) (PCGP, 1994). Since the District is a public utility, they may be exempt from the county ordinance under California Government Code Section 53091(d)(e) (Placer County Code Tree Ordinance, Section 12.16.050)**.**

The goal is to minimize tree loss by following existing the USFS 06 Road Corridor and Highway 89 Corridor indicating that tree loss is not expected to be substantial. Therefore, mitigation for loss of coniferous trees either by on-site plantings or payment of in-lieu fees to Placer County may be required for tree removal.

Summary of Special Status Species

At a minimum, surveys for nesting raptors (i.e. northern goshawks) and migratory birds, special-status botanical species, Lahontan cutthroat trout, and mountain yellow-legged frog habitat would need to be conducted along the Highway 89 Corridor and the USFS 06 Road Corridor. Potential direct (project construction) and indirect (growth inducing and water drawdown) impacts to the species and habitat would need to be addressed in the CEQA/NEPA document and through Section 7 consultations.

Although compliance with FESA and CESA would be necessary and Section 7 FESA consultations and potential permitting can be time consuming and costly, there do not appear to be any fatal flaws (i.e. species impacts that could result in a USFWS "jeopardy finding" that precludes project implementation). Therefore, based on our knowledge of the area and a literature review, there appear to be no fatal flaws with respect to special-status wildlife species habitat within either of the potential pipeline corridors.

To expedite the environmental permitting process, where feasible the pipeline should be designed to avoid special status species' habitat such as goshawk and spotted owl nesting areas and wetlands or stream banks that could support mountain yellow-legged frogs.

5.5.1.4 GENERAL PLAN BIOLOGICAL RESOURCE POLICY COMPLIANCE

The Highway 89 Corridor alignments cross multiple local jurisdictions. Each local agency, as a responsible agency under CEQA would review the project EIR for compliance with their local general plan policies and provide comments. In addition, if a local agency takes a discretionary action, such as the issuance of a grading or encroachment permit, that agency must ensure the project complies with general/community plan policies. As a special water district with equal jurisdictional authority the proposed project may be exempt from County discretionary actions under Government Code Section 53091. The USFS 06 Road Corridor alignments are entirely within Placer County and would potentially require compliance with Placer County general plan policies if not exempt under Government Code Section 53091.

Compliance with most of the general and community plan policies listed in Section 3.1.1 would occur through the state and federal permitting process and the implementation of BMPs. However, it should be noted that the County considers Martis Creek and its tributaries significant ecological resources and if a County action is required for the project, the County is required to protect such significant ecological resources (Policy 9.G.1). Therefore, studies regarding potential water- level draw down on Martis Creek would likely be required.

5.5.2 WETLANDS AND WATERS OF THE U.S.

The potential pipeline Corridors project passes near several-mapped National Wetlands Inventory identified wetlands and other waters of the US, and would need to cross the Truckee River, a water of the US (National Wetlands Inventory, 2015) (Figure 5-5). The National Wetland Inventory wetland locations are based on aerial surveys; therefore, in some cases wetlands may be mapped that are not considered Jurisdictional by the Corps under the CWA Section 404. This is because they would not meet the "three-prong" soils/hydrology/vegetation criteria. In addition, the National Wetland Inventory mapping is not a field survey-based map; some site-specific jurisdictional wetlands may be absent from this database. As such, official wetland delineation along the potential alignments would be required to assess the exact extent of wetlands in the area.

5.5.2.1 NATIONAL FOREST CORRIDOR

The northern and southern sections of the USFS 06 Road Corridor only pass through mapped wetlands at the Truckee River; however, there are also wetlands near other portions of the alignment there is a slight potential wetlands may exist in any of the undisturbed areas of the corridor. These National Wetland Inventory mapped jurisdictional waters include Freshwater Emergent Wetland (palustrine temporarily flooded emergent wetland (PEMA)), Freshwater Forested/Shrub Wetland (palustrine seasonally flooded scrub-shrub wetland (PSSC)), and Riverine (riverine permanently flooded unconsolidated bottom (R3UBH)).

The potential USFS 06 Road Corridor follows existing roads or utility corridor for the majority of the alignment. Based on a review of the National Wetlands Inventory, there are freshwater - forested/ shrub wetlands exist immediately south of the USFS 06 Road Alignment route as it parallels Deer Creek (see Figure 5-5). The pipeline USFS 06 Road Corridors would cross Deer Creek, which is a tributary to the Truckee River. Since Deer Creek has a defined bed and bank and is a tributary to the Truckee, it would likely be considered a Water of the US. Drilling the south end of the potential pipeline either potential USFS 06 Road Corridors under the Truckee River, a perennial riverine Water of the US, would avoid Corps jurisdiction in this area; however, either a Nationwide 12 (utilities lines) or more likely an individual permit would likely be required for the project.

5.5.2.2 HIGHWAY 89 CORRIDOR

The Highway 89 Pipeline Alignment follows the Truckee River from the Town of Truckee all the way to the entrance of the Squaw Valley. Mapped jurisdictional waters along the River Highway 89 Corridor include Freshwater Emergent Wetland (palustrine temporarily/seasonally flooded emergent wetland (PEMA/C)), Freshwater Forested/Shrub Wetland (palustrine seasonally/temporarily flooded scrub-shrub wetland (PSSC/A), palustrine temporarily flooded

forested wetland (PFOA), and palustrine permanently flooded unconsolidated bottom (PUBH)), and Riverine (riverine permanently/temporarily flooded unconsolidated bottom (R3UBH/A)).

The potential Highway 89 alignment follows the existing Highway 89 shoulder. Based on a review of the National Wetlands Inventory, there are palustrine temporarily flooded wetlands near the airport at the northern section of the alignment; however, the potential project does not intersect them and passes through existing TDPUD infrastructure until it reaches Highway 89. Along Highway 89 the alignment does not cross any mapped wetlands; however, it does cross several tributaries to the Truckee River and would be require a site assessment. All mapped wetlands are adjacent to the Truckee River and not intersected by the project. A Nationwide 12 (utilities lines) or more likely an individual permit would most likely be required for the project, since it crosses multiple tributaries.

The Bike Path Alignment and TTSA TRI Alignment would cross riparian areas because the alignment crosses the river several times. Attention would have to be paid during design to minimize impacts to wetlands and riparian areas near the Truckee River and Deer Creek.

5.5.2.3 SUMMARY OF WETLANDS AND WATERS OF THE U.S. FINDINGS

Since the USFS 06 Road Corridor would cross Deer Creek, the Truckee River, and possibly unidentified wetlands and the Highway 89 Corridor would cross multiple tributaries to the Truckee River and possibly unidentified wetlands, a wetland delineation and CWA Section 404 permit would be required. Avoidance, mitigation, or compensatory measures would need to be employed to ensure the project is the least environmentally damaging option and to obtain permits as necessary from the Corps.

5.5.3 LAND USE CONSTRAINTS

Land Use constraints often are in the form of zoning issues, incompatible use issues relative to neighboring properties, and general planning issues related to growth moratoriums. The potential water supply pipeline would be consistent with surrounding forest, open space, and residential land uses.

The five potential pipeline alignments would be located in Placer and Nevada Counties. Several planning documents discuss land uses in the region. Literature reviewed for this land use constraints analysis is included in section 2.2 of this report.

5.5.3.1 REGULATORY FRAMEWORK

Federal

United States Forest Service

Divisions of the United States Forest Service that operate in the Truckee-Tahoe Region include the Tahoe National Forest, the El Dorado National Forest, and the Lake Tahoe Basin Management Unit. Although individual activities consistent with the National Forest Management Act of 1976 exist in each district, long-range comprehensive management plans were developed for the Sierra

Nevada National Forests in 1998. This management plan, encompassing 10 Sierra Nevada USFS districts and the Lake Tahoe Basin Management Unit, is known as the Sierra Nevada Framework for Conservation and Collaboration. The plan incorporates the latest scientific information into national forest management through broad public and intergovernmental participation in natural resource planning (USFS, 2000). The USFS is responsible for managing its land holdings within the Plan area.

State

California Department of Forestry

The California Forest Practice Act was adopted in 1973, resulting in a comprehensive forest regulation process. The California Department of Forestry (CDF) oversees enforcement of California's forest practice regulations. Under the Forest Practice Act, Timber Harvesting Plans (THPs) are submitted to CDF for commercial timber harvesting on all non-federal timberlands. The plans are reviewed for compliance with the Forest Practice Act and rules adopted by the State Board of Forestry and Fire Protection as well as other state and federal laws that protect watersheds and wildlife. CDF foresters also do on-site inspections of proposed logging sites. CDF has jurisdiction over all timber and forestlands, regardless of whether the land is zoned TPZ. Future development within the Plan area in timber areas would be required to obtain a Timberland Conversion Permit from CDF.

California Streets and Highways Code

Under the California Streets and Highways Code, Division 2, Chapter 5.5, Sections 1460-1470, an encroachment permit is required if there is an opening or excavation for any purpose in any county highway or city street.

Local

Placer County General Plan and Zoning Code (Updated May 2013)

General Land Use

- **Policy 1.A.1** The County will promote the efficient use of land and natural resources.
- **Policy 1.A.3:** The County shall distinguish among urban, suburban, and rural areas to identify where development will be accommodated and where public infrastructure and services will be provided. This pattern shall promote the maintenance of separate and distinct communities.
- **Policy 1.A.4:** The County shall promote patterns of development that facilitate the efficient and timely provision of urban infrastructure and services.

Public and Quasi-Public Facilities, Infrastructure

- **Policy 1.F.3** The County shall require public facilities, such as wells, pumps, tanks, and yards, to be located and designed so that noise, light, odors, and appearance do not adversely affect nearby land uses.

Open Space, Habitat, and Wildlife Resources

- **Policy 1.I.1** The County shall require that significant natural, open space, and cultural resources be identified in advance of development and incorporated into site-specific development project design. The Planned Residential Developments (PDs) and the Commercial Planned Development (CPD) provisions of the Zoning Ordinance can be used to allow flexibility for this integration with valuable site features.
- **Policy 1.I.2** The County shall require that development be planned and designed to avoid areas rich in wildlife or of a fragile ecological nature (e.g., areas of rare or endangered plant species, riparian areas). Alternatively, where avoidance is infeasible or where equal or greater ecological benefits can be obtained through off-site mitigation, the County shall allow project proponents to contribute to off-site mitigation efforts in lieu of on-site mitigation.

Martis Valley Community Plan (Updated December 2003)

The Martis Valley Community Plan (MVCP) defines the various land use designations and sets the goals and policies to implement the plan. It incorporates policy from both the 1975 Martis Valley General Plan and the 1994 Placer County General Plan (PCGP). The land use designations set forth in the land-use map for the MVCP are consistent with, and are designed to implement, the goals, policies, and programs set forth in the PCGP. The following project specific policies are set forth to examine potential land use and zoning changes required by the potential alignment.

General Land Use

- **Policy 1.A.1** The County will promote the efficient use of land and natural resources and will encourage "in-fill" development.
- **Policy 1.A.2** The County shall permit only low-intensity forms of development in areas with sensitive environmental resources or where natural or human-caused hazards are likely to pose a significant threat to health, safety, or property.
- **Policy 1.A.4** The County shall promote patterns of development that facilitate the efficient and timely provision of urban infrastructure and services.

Public and Quasi-Public Facilities, Infrastructure

- **Policy 1.D.3** The County shall require public facilities, such as wells, pumps, tanks, and storage yards, to be located and designed so that noise, light, odors, and appearance do not adversely affect nearby land uses.
- **Policy 1.D 4** The County shall require new public facilities, which serve localized needs such as schools, be located within or near Martis Valley.

Forestry Land Use

- **Policy 1.F.2** The County shall recognize and acknowledge the multi-use management strategy adopted by the United States Forest Service for the Martis Valley/Tahoe National Forest area.
- **Policy 1.F.3** The County shall discourage development that conflicts with timberland management.

- **Policy 1.F.4** The County shall review development plans for all lands adjoining USFS lands for compatibility with the long-term maintenance and use of the forestlands.

Open Space, Habitat, and Wildlife Resources

- **Policy 1.G.1** The County shall support the preservation and enhancement of natural landforms, native vegetation, and natural resources as open space. The County shall permanently protect, as open space, areas of natural resource value, including open meadows, mixed conifer forests, high montane meadows, riparian corridors, and floodplains. In this Plan, those areas affected by this policy have been included in the Open Space or Forest designations in the land use diagram.
- **Policy 1.G.2** The County shall require that significant natural, open space, and cultural resources be identified in advance of development and incorporated into site-specific development project design. The Planned Residential Development (PD) provisions of the Zoning Ordinance can be used to allow flexibility for this integration with valuable site features.
- **Policy 1.G.3** The County shall require that development be planned and designed to avoid areas rich in wildlife or of a fragile ecological nature (e.g., areas of rare or endangered plant species, riparian areas).

Squaw Valley General Plan (1983)

The following policies were established in the 1984 Squaw Valley General Plan (SVGP) to give additional protection, above that offered in federal, state, and county regulations, to natural resources in the Squaw Valley. The SVGP will apply to all of the potential pipeline alignments.

Public Services

- **145.10 Water:** All developments must be served with adequate water in accordance with requirements of the Placer County Health Department. Fire flow requirements as determined by the Squaw Valley Fire Department and the Uniform Fore Code must be provided without reducing the level of service to existing development.

5.5.3.2 PIPELINE ALIGNMENT ANALYSIS

USFS 06 Road Corridor

The USFS 06 Road pipeline alternative is located almost entirely on an existing unimproved Forest Service road in an unincorporated area of Placer County characterized by undeveloped forestland and open space. The remainder of the route is characterized by open forestland until the Highway 89 undercrossing at Squaw Valley.

The Powerline Alignment is in close proximity to the USFS 06 Road Alignment. Similar to the USFS 06 Road Alignment the Powerline Alignment is in a previously disturbed corridor. The Powerline Alignment meets the USFS 06 Road Alignment after 2.2 miles and then begins to run adjacent to the road for approximately three miles. After that point it starts to head southwest and drops down a rocky hillside and meets the TTSA TRI Alignment.

The USFS 06 Road Alignment and the Powerline Alignment have been grouped because of similarities in location and because the designated land use and zoning coincide for both potential alignments. General land use designations and policies for the project vicinity are discussed in the previous section. Specific land use designations for these two routes are addressed by the applicable land use documents discussed in the sections below (**Figure 5-4**).

United States Forest Service

The majority of the USFS 06 Road Corridor is under jurisdiction of the Tahoe National Forest's management plan. The USFS is responsible for managing its land holdings within the Plan area. For placement of a pipeline within National Forest property coordination and approval from USFS would be required.

Placer County General Plan and Zoning Code

The entire USFS 06 Road Corridor lies within the Placer County General Plan planning area. The middle section of the Corridor is designated Forest and Open Space by the 1994 Placer County General Plan and is zoned for Agriculture/Forestry by the Placer County Zoning Code.

Based on a review of the Placer County General Plan Land Use element, the lands on which the pipeline would be located are zoned Forest, Residential/Agriculture and Single Family Residential. The zoning for these designations allows a public utility agency to install necessary facilities with a minor use permit. In addition, the California Government Code, section 53091, exempts local agencies from conforming to building and zoning regulations when the project facility is intended for the production, generation, storage, or transmission of water. The only exceptions to the water operations facilities exemption are structures that would function solely as equipment storage yards or buildings, or administrative centers such as an office building or "call center." Therefore, the District would not be required to obtain a minor use permit from the County to construct raw water storage, water treatment plant, or finished water storage facilities on any lands that have been zoned by Placer County, including Forest, Residential Agriculture, and Single Family Residential-zoned lands. Therefore, the construction and operation of a water supply pipeline by the District would be consistent with the Placer County General Plan and no General Plan amendment would be required for the proposed use.

Martis Valley Community Plan (MVCP)

Martis Valley is characterized by a broad range of land uses, including timber and forest, public and private recreation areas, residential development, much of which is comprised of second homes, a multi-season resort, an airport and some commercial and industrial development.

The Forestry, Timberland Production, and Open Space land use designations provide for the preservation and production of natural resources. Residential development is not an allowed use within these districts. Land designated as Open Space would remain open for scenic, recreational or other open space purposes and/or for resource preservation (MVCP, 2003).

These land use designations all support the installation of "necessary public utility" such as a water supply pipeline (MVCP, 2003). The northeastern portion of the pipeline alignment, at Schaffer

Mill Road and the Timilick subdivision is located within the MVCP. Therefore, there are no apparent land use constraints that would restrict the District from installing the water supply pipeline within Martis Valley.

Squaw Valley General Plan

Based on our literature reviews, there appear to be no outstanding issues regarding conflicting land uses in the Squaw Valley General Plan Area (SVGP). The USFS 06 Road Corridor involves a pipeline connecting to the District system near the intersection of Squaw Valley Road and Highway 89 in the community of Squaw Valley. Land Uses adjacent to this connecting point include High and Low Density residential. These land use designations permit the development of "structures and uses required for the operation for a public utility or performance of a government function" (SVGP, 1983). Therefore, this corridor would not conflict with the SVGP land use designations.

Summary of USFS 06 Road Corridor Land Use Constraints

Based on our literature reviews of the aforementioned planning documents and sources, there appear to be no land use constraints associated with the development of the USFS 06 Road Corridor Alignments of the District redundant water supply pipeline.

Highway 89 Corridor

The three alternatives making up the Highway 89 Corridor begin at the West River Street/Highway 89 intersection and continue along Highway 89 adjacent to the Truckee River for approximately eight miles before connecting with the District water system near the intersection of Squaw Valley Road and Highway 89 in Squaw Valley. Specific land use designations for this route are addressed by the applicable land use documents discussed in the sections below.

Placer County General Plan and Zoning Code

The Highway 89 Corridor alignments cross the Nevada/Placer County Line about two miles south of the Interstate 80/Highway 89 South intersections. The majority of the corridor is located in Placer County under the jurisdiction of the Placer County General Plan. Based on a review of the PCGP Land Use element, the lands on which the pipeline would be located are zoned Forest, Agriculture/Timberland and Low Density Family Residential. The zoning for these designations allows a public utility agency to install necessary facilities with a minor use permit. However, the California Government Code, Section 53091, exempts local agencies from conforming to building and zoning regulations when the project facility is intended for the production, generation, storage, or transmission of water. The development of the District pipeline is expected to receive an exemption under this provision of the California Code.

Nevada County General Plan

Based on a review of the Nevada County General Plan, there appear to be no constraints on the Highway 89 Corridor alignments with respect to allowable land uses. A small portion of the Highway 89 Corridor alignments are located in Nevada County. Within the Nevada County section the proposed alignments are entirely within the Truckee City limits. Land use in the

incorporated area of Truckee is under the jurisdiction of the Truckee General Plan and is discussed in the following section. As discussed for the Placer County General Plan Government Code Section 53091 will likely apply and the proposed project would be exempt from local plans and ordinances.

Truckee General Plan 2025

The Highway 89 Corridor Alignments would begin within the city limits of the Town of Truckee, at the intersection of West River Street and Highway 89. The Truckee General Plan (TGP) specifies land uses in the proposed area include Low Density Residential (LDR). Development and operation of a public utility is compatible with this land use designation.

Squaw Valley General Plan

Land Uses in the Squaw Valley community adjacent to Highway 89 include Single Family, Low Density Residential, and Agricultural/Timberland. According to the SVGP, these zoning designations allow certain permitted principle uses and structures. These land use designations allow the development of "structures and uses required for the operation of a public utility" (SVGP, 1983). Therefore, pipeline installation in the Highway 89 corridor adjacent to Squaw Valley community is compatible with the surrounding land uses.

Summary of Highway 89 Corridor Land Use Constraints

Based on our literature reviews of the aforementioned Planning documents and sources, there appear to be no land use constraints against the development of the Highway 89 Alternative of the District water supply pipeline.

5.5.4 CULTURAL RESOURCES CONSTRAINTS

Cultural resources constraints are typically a result of unavoidable significant cultural resources or human remains within the Project Area. Such finds can result in lengthy permitting delays or costly avoidance measures. The cultural resources regulatory framework and the potential cultural resources constraints, and cultural resources study requirements associated with the two corridors being considered by the District are discussed in the section below.

5.5.4.1 REGULATORY FRAMEWORK

Federal

National Historic Preservation Act

The National Historic Preservation Act (NHPA) requires federal agencies, or those they fund or permit, to consider the effects of their actions on historic properties. Historic properties are defined by the Advisory Council on Historic Preservation (ACHP) regulations (36 Code of Federal Regulations (CFR) Part 800) for implementing Section 106 as follows:

- Historic property means any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places

(NRHP) maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization that meet the National Register criteria (36 CFR Part 800.16[l]).

To determine whether an undertaking could affect NRHP-eligible properties, cultural resources (including archaeological, historical, and architectural properties) must be inventoried and evaluated for listing in the NRHP. For projects involving a federal agency, cultural resource significance is evaluated in terms of eligibility for listing in the NRHP. For a property to be considered for inclusion in the NRHP, it must be at least 50 years old and meet the criteria for evaluation set forth in 36 CFR Part 60.4.

The quality of significance in American history, architecture, archaeology, engineering, and culture is present in districts, sites, buildings, structures, and objects that possess integrity of design, setting, materials, workmanship, feeling, and association. Additionally, these districts, sites, buildings, structures, and objects may possess a quality of significance if they:

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

If a particular resource meets one of these criteria, it is considered as an eligible historic property for listing in the NRHP. Among other criteria considerations, a property that has achieved significance within the last 50 years is not considered eligible for inclusion in the NRHP unless certain exceptional conditions are met.

State Regulations

California Environmental Quality Act

CEQA requires public agencies to evaluate the implications of their project(s) on the environment and includes significant historical resources as part of the environment. According to CEQA, a project that causes a substantial adverse change in the significance of an historical resource has a significant effect on the environment (California Code of Regulations 14 section 15064.5; California Public Resources Code section 21098.1). CEQA defines a substantial adverse change as follows:

- Physical demolition, destruction, relocation, or alteration of the resource or its immediate surroundings such that the significance of a historical resource would be materially impaired (California Code of Regulations 14 section 15064.5(b)(1)).

CEQA guidelines state that the significance of an historical resource is materially impaired when a project results in one of the following:

- Demolishes or materially alters in an adverse manner those physical characteristics of an historical resource that convey its historical significance and that justify its inclusion in, or eligibility for, inclusion in the CRHR
- Demolishes or materially alters in an adverse manner those physical characteristics that account for its inclusion in a local register of historical resources pursuant to Public Resources Code section 5020.1(k) or its identification in an historical resources survey meeting the requirements of Public Resources Code section 5024.1(g), unless the public agency reviewing the effects of the project establishes by a preponderance of evidence that the resource is not historically or culturally significant
- Demolishes or materially alters in an adverse manner those physical characteristics of a historical resource that convey its historical significance and that justify its eligibility for inclusion in the CRHR as determined by a lead agency for purposes of CEQA (California Code of Regulations 14 Section 15064.5(b)(2))

California Register of Historical Resources: Public Resources Code Section 5024

The term historical resource includes, but is not limited to any object, building, structure, site, area, place, record, or manuscript which is historically or archaeologically significant, or is significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of Public Resources Code (section 5020.1[j]). Historical resources may be designated as such through three different processes:

- Official designation or recognition by a local government pursuant to local ordinance or resolution (Public Resources Code section 5020.1[k])
- A local survey conducted pursuant to Public Resources Code section 5024.1(g)
- The property is listed in or eligible for listing in the NRHP (Public Resources Code section 5024.1(d)(1))

The process for identifying historical resources is typically accomplished by applying the criteria for listing in the CRHR, which states that a historical resource must be significant at the local, state, or national level under one or more of the following four criteria:

It is associated with events that have made a significant contribution to the broad patterns of:

- California's history and cultural heritage
- It is associated with the lives of persons important in our past
- It embodies the distinctive characteristics of a type, period, region, or method of construction, or represents the work of a master or possesses high artistic values
- It has yielded, or may be likely to yield, information important in prehistory or history. (California Code of Regulations 14 section 4852)

To be considered a historical resource for the purpose of CEQA, the resource must also have integrity, which is the authenticity of a resource's physical identity evidenced by the survival of characteristics that existed during the resource's period of significance. Resources, therefore, must retain enough of their historic character or appearance to be recognizable as historical resources and to convey the reasons for their significance. Integrity is evaluated with regard to the retention of location, design, setting, materials, workmanship, feeling, and association. It must also be judged with reference to the particular criteria under which a resource is eligible for listing in the CRHR (California Code of Regulations 14 section 4852(c)).

Unique Archeological Resources

The Public Resources Code also requires the lead agency to determine whether or not the project will have a significant effect on unique archaeological resources (Public Resources Code section 21083.2(a)).

The Public Resources Code defines a unique archaeological resource as follows:

- An archaeological artifact, object, or site about which it can be clearly demonstrated that, without merely adding to the current body of knowledge, there is a high probability that it meets any of the following criteria:

    - Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information.
    - Has a special and particular quality such as being the oldest of its type or the best available example of its type.
    - Is directly associated with a scientifically recognized important prehistoric or historic event or person (Public Resources Code Section 21083.2).

In most situations, resources that meet the definition of a unique archaeological resource also meet the definition of historical resource. As a result, it is current professional practice to evaluate cultural resources for significance based on their eligibility for listing in the CRHR.

Discovery of Human Remains

Section 7050.5 of the California Health and Safety Code (CHSC) states the following in regard to the discovery of human remains.

- Every person who knowingly mutilates or disinters, wantonly disturbs, or willfully removes any human remains in or from any location other than a dedicated cemetery without authority of law is guilty of a misdemeanor, except as provided in Section 5097.99 of the California Public Resources Code. The provisions of this subdivision shall not apply to any person carrying out an agreement developed pursuant to subdivision (l) of Section 5097.94 of the Public Resources Code or to any person authorized to implement section 5097.98 of the Public Resources Code.

- In the event of discovery or recognition of any human remains in any location other than a dedicated cemetery, there shall be no further excavation or disturbance of the site or any nearby area reasonably suspected to overlie adjacent remains until the coroner of the county in which the human remains are discovered has determined, in accordance with Chapter 10 (commencing with Section 27460) of Part 3 of Division 2 of Title 3 of the California Government Code, that the remains are not subject to the provisions of Section 27491 of the California Government Code or any other related provisions of law concerning investigation of the circumstances, manner and cause of any death, and the recommendations concerning the treatment and disposition of the human remains have been made to the person responsible for the excavation, or to his or her authorized representative, in the manner provided in Section 5097.98 of the Public Resources Code. The coroner shall make his or her determination within two working days from the time the person responsible for the excavation, or his or her authorized representative, notifies the coroner of the discovery or recognition of the human remains.
- If the coroner determines that the remains are not subject to his or her authority and if the coroner recognizes the human remains to be those of a Native American, or has reason to believe that they are those of a Native American, he or she shall contact, by telephone within 24 hours, the Native American Heritage Commission (NAHC) (CHSC section 7050.5).

Of particular note to cultural resources is subsection (c), requiring the coroner to contact the NAHC within 24 hours if discovered human remains are determined to be Native American in origin. After notification, NAHC will follow the procedures outlined in Public Resources Code section 5097.98, which include notification of most likely descendants (MLDs), if possible, and recommendations for treatment of the remains. The MLD will have 24 hours after notification by the NAHC to make their recommendation (Public Resources Code section 5097.98). In addition, knowing or willful possession of Native American human remains or artifacts taken from a grave or cairn is a felony under State law (Public Resources Code section 5097.99).

5.5.4.2 PIPELINE CORRIDOR ANALYSIS

Previous cultural resources study findings are often addressed in the environmental impact reports of County General Plans and local Community Plans. For this analysis, the Truckee General Plan, Martis Valley Community Plan, and the Lake Tahoe National Forest Management Plan Forest Service Tribal Relations were reviewed for any areas of particular concern regarding the presence of cultural resources in either pipeline corridor and the importance of Native American consultations during the planning process. The findings are summarized below.

Truckee General Plan

According to the TGP, documentation of the presence of historic and prehistoric archaeological resources in Truckee is relatively limited, and much of the Town's area remains unsurveyed. In 1996, it was estimated that only eight to twenty percent of the Town had been inventoried for cultural resources. Cultural resources studies associated with these surveys indicate more than 100 historic, prehistoric, and historic-prehistoric sites within the Town limits. Historic and prehistoric archaeological sites scattered throughout Truckee include elements as diverse as Native American

artifacts and sites, 19th century charcoal production sites, Chinese work camps, sections of the Overland Emigrant Trail, and the Transcontinental Railroad. Almost the entire town is considered moderately to highly sensitive for the potential of cultural resources, with areas of moderate terrain, close to water sources. (TGP, 2006)

Martis Valley Community Plan

Martis Valley has been surveyed for cultural resources. The findings of these surveys have been published in several environmental documents. The Martis Valley area is generally considered rich in cultural resources. While several prehistoric sites and resources have been identified, there is a high probability that many significant cultural resources remain undiscovered within the project region. A comprehensive cultural resources inventory was completed by the Placer County Department of Museums. Phase III of the Placer County Cultural Resources Inventory focused on unincorporated areas of the County, including Martis Valley. While this survey did not indicate that prehistoric resources had been located in the planning area, the Martis Valley area falls within the center of historic Washoe territory, with primary use by the northern Washoe. The Washoe regard all "prehistoric" remains and sites within the Truckee Basin as being associated with their history. Washoe settlements, prehistoric campsites, lithic scatters, and bedrock milling stations are known occur throughout the planning area. Many sensitive resource sites are adjacent to waterways and meadow areas. (MVCP, 2003)

Lake Tahoe National Forest Management Plan Forest Service and Tribal Relations

The relationships of the Forest Service with American Indian tribal governments, communities, and organizations are important in the management and restoration of ecosystems in the Sierra Nevada and Modoc Plateau. Tribal representatives participated in the Sierra Nevada Framework Management Review and Supplemental Environmental Impact Statement process through interagency team meetings, workshops, field trips, and presentations. The Forest Service continues to work with tribal governments through forest level government-to-government consultation to seek increased opportunities to implement the nine commitments of the SNFPA that were included in the Record of Decision (pages 52-3). At the regional level, annual Sierra Nevada tribal summits are co-hosted, on a rotating basis, by local tribes and USFS Districts. At these tribal summits, relationships and communication networks are strengthened through local examples of SNFPA commitment accomplishments and updates of works-in-progress.

The Forest Service goals are to honor the trust relationship with the Tribal governments, to encourage the participation of American Indians in national forest management, and to build on the progress made to date are met by implementing the following Record of Decision commitments:

- Work with tribal governments and tribal communities to develop mutually acceptable protocols for government-to-government and tribal community consultations. These protocols would emphasize line officers' and tribal officials' roles and responsibilities.
- We would maintain appropriate access to sacred and ceremonial sites and to tribal traditional use areas. We would consult with affected tribes and tribal communities to address access to culturally important resources and culturally important areas when

proposing management that may alter existing access. After appropriate assessment and consultation, we would consider proposing mineral withdrawals and other protection of inventoried sacred sites.

- We would protect all sensitive and proprietary information to the greatest extent permitted by law. We would secure permission to release information from the tribe, tribal community, or individual who provided it prior to release to others.

Summary of Highway 89 Corridor Cultural Resources Constraints

The Highway 89 Alignment and TTSA TRI Alignment are located within the easements of Highway 89 and the TTSA sewer interceptor line. The Bike Path Alignment follows USFS lands along the Truckee River. While the Highway 89 Corridor is in areas that have been previously disturbed by roadway construction and the TTSA sewer interceptor line construction in the 1970s, the proximity of this corridor to the Truckee River means that this corridor is in areas typically considered to have a higher sensitivity for the potential for cultural resources. The pipeline would be located within the compacted shoulder of the Highway, minimizing the likelihood of uncovering previously unknown cultural resources.

Based on Stantec's review of publically available information, no specific cultural resources constraints could be identified along any of the potential alignments. However, records searches at the North Central Information Center (NCIC) and USFS, field surveys by a qualified archaeologist, and Native American consultations should be completed once a proposed alignment is defined and the Area of Potential Effects is developed and approved to ensure minimal to no impacts to cultural resources as a result of the Project. If during the cultural resources inventory level study, cultural resources are identified that cannot be avoided, California Register of Historical Resources (CRHR) and National Register of Historical Places (NRHP) evaluations must be completed. Any unavoidable CRHR/NRHP eligible cultural resources would require the development of a treatment plan and approval by State Historic Preservation Officer (SHPO) and any other federal agencies involved in the Project.

Summary of USFS 06 Road Corridor Cultural Resources Constraints

The majority of the USFS 06 Road Corridor would be placed in an existing USFS access road and/or previously disturbed utility easement and is farther away from waterways. Therefore, the corridor is considered moderately sensitive for the potential for cultural resources.

Based on Stantec's review of publically available information, no specific cultural resources constraints could be identified along any of the potential alignments. However, records searches at the NCIC and USFS, field surveys by a qualified archaeologist, and Native American consultations should be completed once a proposed alignment is defined and the Area of Potential Effects is developed and approved to ensure minimal to no impacts to cultural resources as a result of the Project. If during the cultural resources inventory level study, cultural resources are identified that cannot be avoided, CRHR and NRHP evaluations must be completed. Any unavoidable CRHR/NRHP eligible cultural resources would require the development of a treatment plan and approval by SHPO and any other federal agencies involved in the Project.

5.6 ENVIRONMENTAL APPROVALS AND PERMITTING ISSUES

The potential project would require compliance with several environmental laws and acquisition of several environmental permits and approvals. This section provides a brief description of these permits and approvals and provides a proposed strategy to efficiently obtain them to meet the District's desired schedule. This section assumes the pipeline would follow 1 of 2 alignments extending from the Truckee Airport well site to the entrance of Squaw Valley along Highway 89. Crossing federal lands as well as jurisdictional tributaries to the Truckee River would trigger compliance with all federal environmental regulations, including NEPA, the Sections 401 and 404 of the CWA, Section 7 of the FESA, Section 106 of the National Historic Preservation Act, and the Clean Air Act. In addition, state regulations must be adhered to including CEQA, CESA, and the California Fish and Game Code Section 1600. Furthermore, compliance with local regulations would be reviewed by the County acting as a "responsible agency" under CEQA and also if a county action is required.

5.6.1 CALIFORNIA ENVIRONMENTAL QUALITY ACT COMPLIANCE

CEQA is the primary state environmental impact disclosure law that requires the significant impacts from proposed development projects. The intent of CEQA is to inform the public and governmental decision makers about the potential environmental effects of a proposed action and for agencies to consider environmental issues during the planning process. Section 21067 of CEQA defines a lead agency as "the public agency, which has the principal responsibility for carrying out or approving a project which may have a significant effect on the environment. If the District develops and owns the project the District would serve as lead agency under CEQA. The project may also be jointly sponsored by both NCSD and the District with each agency having jurisdiction over specific areas of the project. This issue would require more discussion between the agencies as to how the CEQA disclosure requirements would be met. The due to the potential for controversy, environmental issues surrounding water supply, the number of stream crossings, and the sensitive location of the proposed project an Environmental Impact Report would likely be the best approach for the District to comply with CEQA.

5.6.2 NATIONAL ENVIRONMENTAL POLICY ACT COMPLIANCE

NEPA is the primary national environmental impact disclosure law, requiring the significant impacts from proposed development projects be addressed and mitigated, as well as requiring project alternatives at an equal level of detail to be considered. The NEPA process is designed to foster in depth project planning that gives consideration to environmental impacts in the initial phases of a project. Allowing the District's pipe to cross National Forest land would require a Special Use Permit from the Forest Service and compliance with NEPA. Depending upon the federal issues that arise with the project, a joint Environmental Impact Report/Environmental Impact Statement (EIS) or an Environmental Impact Report/ Environmental Assessment would be completed to assess and disclose environmental impacts in compliance with NEPA. The lead agency under NEPA would be the USFS.

5.6.3 CLEAN WATER ACT SECTION 404

The U.S. Army Corps of Engineers (Corps) and the Environmental Protection Agency (EPA) regulate the discharge of dredge or fill material into waters of the United States under Section 404 of the CWA ("waters of the United States" include wetlands and lakes, rivers, streams, and their tributaries). Wetlands are defined for regulatory purposes as areas "…inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated solid conditions" (333 CFR 328.3, 40 CFR 230.3). Project proponents must obtain a permit from the Corps for all discharges of fill material into waters of the United States, including wetlands, before proceeding with a proposed action. Prerequisites for the issuance of CWA Section 404 permits (nationwide or individual) is proof of compliance with the FESA through Section 7 Consultations, the State Historic Preservation Act, and Section 401 of the CWA with a water quality certification. The potential USFS 06 Road Alignment crossing the Truckee River and Deer Creek or the potential Highway 89 Alignment crossing the tributaries on the west bank of the Truckee could require a Section 404 permit if wetlands or waters of the US would be impacted. This process can be streamlined by minimizing impacts to jurisdictional waters of the US such that Individual Permit impact area thresholds are not triggered. As such, if impact to waters of the US are limited to less than 0.5 acres, then the District could apply for a Nationwide 12 (linear utilities) permit, thereby substantially reducing the permit timeline. If the project triggers more than 0.5 acres of impacts to waters of the US, an Individual Permit would be required and an alternatives analysis would be necessary. Under such a scenario, the project proponent would need to demonstrate that the project is the least environmentally damaging and prudent alternative (LEDPA) with respect to direct (construction) and indirect (growth inducing) impacts to waters of the US. Stantec suggests the CWA Section 404 permits applications be initiated early on in the process to ensure biological surveys can be conducted during appropriate seasons.

The potential USFS 06 Road Corridor would be require drill (horizontal directional drill (HDD) or jack and bore) below the Truckee River, thereby likely avoiding Corps jurisdiction (and impacts to aquatic species) for that site; however, the project would cross Deer Creek and may cross wetlands or other jurisdictional waters of the US. Additionally, the potential Highway 89 Alignment would cross multiple tributaries to the Truckee River and possibly unidentified wetlands. Specifically, the bike path alignment along Hwy 89 could entail the installation of 10 bridges, the TTSA alignment along Hwy 89 would entail possibly four HDD crossings of the Truckee River. And the Highway 89 Alignment could entail tunneling under over 30 tributaries to the Truckee River. Wetland delineations should be the first steps once the pipeline route is defined. If impacts to wetlands/waters of the US can be reduced to less than 0.5 acres, the DISTRICT may qualify for coverage under a Nationwide Permit #12 for Utility lines. If the impact area is larger than 0.5 acres, the District would need to apply for an individual permit. The Corps would require avoidance, mitigation, or compensation for any proposed activities that would entail fill in jurisdictional waters of the US.

5.6.4 CLEAN WATER ACT SECTION 401 WATER QUALITY CERTIFICATION

Section 401 of the Federal CWA provides for states to have approval authority in CWA Section 404 permits issued by the Corps for projects affecting wetlands and "waters of the U.S." The certification process must result in a finding that the project would not impair water quality or

beneficial uses of the receiving water. Either project alternative would require obtaining this certification from the Lahontan Regional Water Quality Control Board for potential impacts to Truckee River (USFS 06 Road Alignment) or the nine streams that would be crossed along the Highway 89 Pipeline Alignment. Pipeline crossing of the Truckee River and other local streams and construction-related water quality issues associated with those crossings requires a CWA 404 permit and as part of that permit issuance process, the CWA 401 certification from LRWQCB. The LRWQCB 401 unit staff was contacted as part of this constraints analysis to obtain their input on the project. They have indicated their primary concerns are soil erosion and potential increases in turbidity and suspended solids, fugitive oil and grease from heavy equipment operations near the river, potential spills of hazardous materials and others (Miller pers. comm., 2008). The tributaries to Truckee River are considered important habitat for the Lahontan Cutthroat Trout as discussed in section 3.1.1. LCT have been planted in Pole Creek and other area streams in an attempt to restore local populations. Ensuring water quality controls and BMPs are implemented and maintained, and defining construction windows would be critical in minimizing water quality impacts as it relates to LCT and other Listed and Special Status Species mentioned in section 3.1.1 of this document. The 401 application requires payment of a one-time fee and copies of the applicant's CWA 404 permit application and related certified CEQA documents and Notice of Determination. The CWA 401 certification process can take up to six months depending on staff workloads at the Regional Board and various information requests.

5.6.5 NATIONAL HISTORIC PRESERVATION ACT SECTION 106

The National Historic Preservation Act (NHPA) requires federal agencies, or those they fund or permit, to consider the effects of their actions on historic properties. Historic properties are defined by the Advisory Council on Historic Preservation (ACHP) regulations (36 CFR Part 800) for implementing Section 106 as follows:

> *Historic property means any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the National Register of Historic Places (NRHP) maintained by the Secretary of the Interior. This term includes artifacts, records, and remains that are related to and located within such properties. The term includes properties of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization that meet the National Register criteria (36 CFR Part 800.16[l]).*

To determine whether an undertaking could affect NRHP-eligible properties, cultural resources (including archaeological, historical, and architectural properties) must be inventoried and evaluated for listing in the NRHP. For projects involving a federal agency, cultural resource significance is evaluated in terms of eligibility for listing in the NRHP.

Based on Stantec's review of publically available information, no specific cultural resources constraints could be identified along any of the potential alignments. However, records searches at the NCIC and USFS, field surveys by a qualified archaeologist, and Native American consultations should be completed once a proposed alignment is defined and the Area of Potential Effects is developed and approved to ensure minimal to no impacts to cultural resources as a result of the Project. If during the cultural resources inventory level study, cultural resources are identified that cannot be avoided, CRHR and NRHP evaluations must be completed. Any

unavoidable CRHR/NRHP eligible cultural resources would require the development of a treatment plan and approval SHPO and any other federal agencies involved in the Project.

5.6.6 ENDANGERED SPECIES ACT COMPLIANCE CONSULTATIONS

FESA was passed by Congress in 1973 to protect and recover imperiled species and the habitat upon which they depend. FESA is administered by the USFWS. Under FESA, protected species are either listed as "endangered", in danger of extinction throughout all or a significant region of the species range; or as "threatened", likely to become endangered within the foreseeable future (USFWS 1973). "'Take' is to hunt, pursue, catch, capture, or kill; or attempt to hunt, pursue, catch, capture, or kill" an endangered or threatened species.

FESA also designates "candidate" species as those plants and animals that the USFWS has sufficient data on their biological status to propose them to be listed under FESA (USFWS 1973). The FESA mandates the protection of federally listed species and the habitats which they depend (BLM 2010) (50 CFR 17.12 for listed plants, 50 CFR 17.11 for listed animals, and various notices in the Federal Register for proposed species).

Consultation with the USFWS would be necessary if a proposed action of a project has the potential to affect federally listed species as well as suitable habitat for those species. This consultation would proceed under Section 7 of the FESA if a federal action is part of the proposed action, or proceed through Section 10 of the ESA if no such nexus were available (USFWS 1973).

5.6.6.1 PLANT SPECIES

A desktop analysis of potential special status plant species within either pipeline alignment indicates a low to medium potential of listed status plant species being present. There is a medium potential for occurrence of Donner Pass buckwheat, Plumas ivesia, Marsh skullcap, and American manna grass. Three other species that have a low potential of impact from the proposed project are the Carson Range rock cress, the Nevada daisy, and Munroe's desert mallow because the project alignments are outside of the range of known populations of these species. The County would need to be consulted to determine if a tree removal permit is needed, if so, the timeline takes approximately one month to complete. Potential impacts and mitigation measures would need to be addressed in the CEQA/NEPA document.

5.6.6.2 FISH AND AMPHIBIANS

The Lahontan cutthroat trout and mountain yellow-legged frog are known to occur in tributaries to the Truckee River. Both species have a low potential for occurrence within the area of either alignment. The Lahontan cutthroat is limited to Pole Creek upstream of a natural barrier where it cannot be harmed by predators; however, populations have been encountered in Martis Creek within in the past 8 years (CNDDB, 2008). The mountain yellow-legged frog federal listing only applies to San Gabriel, San Jacinto, and San Bernardino Mountain populations. The frog was historically found along Squaw Creek and in Squaw Meadow upstream from the end of all alignments. The last registered sighting of the frog in the project area was in the 1960s. Federally listed species and their habitat are protected under the FESA. Therefore potential impacts to these species' habitat would require USFWS consultations.

5.6.6.3 NESTING RAPTORS AND MIGRATORY BIRDS

Our review of the potential for special-status animal species to inhabit the either potential pipeline alignment indicates that nesting raptors and other migratory birds (northern goshawk, spotted owl, bald eagle, yellow warbler, willow flycatcher, and the osprey) would be protected and impacts to these species, should they nest on site, could be avoided by construction windows and/or nest buffer planning. There is known northern goshawk habitat along the USFS 06 Road Alignment indicating a greater lever for occurrence than along the Highway 89 Alignment. Protocol-level spotted owl surveys may be required along the USFS 06 Road Pipeline Alignment (pers. com. USFS, 2008). Other nesting raptor surveys may be required as well.

5.6.6.4 MAMMALS

The long-legged myotis, California wolverine, Sierra Nevada mountain beaver, and the Sierra Nevada red fox have a medium potential to be impacted by either alignment. There is suitable habitat along all alignments and the species range is known to cover all or part of the project area. The Sierra Nevada Mountain Beaver has a greater chance of potential impact from the Highway 89 Alignment, since it is known to occur in several of the tributaries to the Truckee that the alignment would cross. Other mammals that could possibly be impacted by either alignment (low potential) are the Sierra Nevada snowshoe hare, the Sierra pine marten, and the western white-tailed jackrabbit.

5.6.6.5 SUMMARY

Based on our literature review, the Corps would likely need to conduct FESA Section 7 consultations with the USFWS for the federal species mentioned above. If there is a potential to "kill, harm or harass" a federally listed species or disturb its habitat, formal consultations and an incidental take permit would be required. This permit process can take over one year to complete; therefore, it is recommended the permit process begin early in the project design phase.

5.6.7 LAHONTAN REGIONAL WATER QUALITY CONTROL BOARD - RESOLUTION NO. 6-93-08

The Water Quality Control Plan for the North Lahontan Basin (North Lahontan Basin Plan), as amended, prohibits the discharge or threatened discharge attributable to human activities of solid or liquid waste materials including soil, silt, clay, sand, and other organic materials below the high-water rim of Lake Tahoe or within the 100 year floodplain of the Truckee River or any tributary to Lake Tahoe or the Truckee River. All potential alignments entail earth-moving activities crossing tributaries to the Truckee River and the Truckee River, itself. The Lahontan Board's Resolution No. 6-93-08 delegates authority to the Executive Officer to grant exceptions to the Basin Plan prohibitions regarding discharges of earthen materials to floodplains and stream environment zones. Exceptions are granted for specific discharges where "the projects are necessary to protect public health or safety or to provide essential public services". Exceptions for public services are allowed only when the Board makes ALL of the following findings:

- There is no reasonable alternative to locating the project or portions of the project within the 100-year floodplain

- The project by its very nature must be located within the 100-year flood plain
- The project incorporates measures that would insure that any erosion and surface runoff problems caused by the project are mitigated to levels of insignificance
- The project would not, individually or cumulatively with other projects, directly or indirectly, degrade water quality or impair beneficial uses of water
- All 100-year flood plain areas and volumes lost as a result of the project would be completely mitigation by restoration of the previously disturbed flood plain within or as close as practical to the project site

All potential project alignments would trigger the need a Discharge Prohibition Exception under Resolution No. 6-93-08. The exception process typically follows the same timeline as the 401 Certification. Therefore, it is estimated that the 401 Certification and Discharge Prohibition Exception process could take six to eight months. A beneficial use assessment may be required to verify the project does not "directly or indirectly degrade water quality or impair beneficial uses of water" in the Martis Creek basin. Such studies can add a year or more to the permitting processes.

5.6.8 CDFW STREAMBED ALTERATION AGREEMENT

Section 1602 of CDFW's Fish and Game Code requires any person, state or local government agency, or public utility to notify the CDFW, before beginning any activity that would do one or more of the following actions:

- Substantially obstruct or divert the natural flow of a river, stream or lake
- Substantially change the bed, channel, or bank of a river, stream or lake
- Use any material from the bed, channel, or bank of a river, stream or lake
- Deposit or dispose of debris, waste, or other material containing crumbled, flaked or ground pavement where it can pass into a river, stream or lake

Section 1602 applies to all perennial, intermittent, and ephemeral river, streams and lakes in the state. The District project would require acquisition of a Streambed Alteration Agreement from CDFW due to installation of the water supply pipeline across the Truckee River or due to the crossing of many tributaries. In addition, the pipeline may cross other water features regulated by CDFW, such as minor streams and drainages. The legal timeline for CDFW review and issuance of a Streambed Alteration Agreement is 90 days; however, in practice the permit timeline is often much longer.

5.6.9 GENERAL PLAN COMPLIANCE

According to California Government Code sections 53091(d) and (e), "zoning and building ordinances of a county or city shall not apply to the location or construction of facilities for the production, generation, storage, treatment or transmission of water". However, as a "responsible agency" under CEQA, the County would review the project for local land use plan compliance and provide comments to the lead agency.

5.6.10 PRELIMINARY PERMITTING STRATEGY

We recommend that once the team identifies the preferred pipeline alternative, the District initiate the CEQA process and discuss with the Tahoe National Forest if they are amenable to preparing a joint environmental document (if an alignment on USFS lands is chosen). The goal of preparing a joint document is to streamline the state and federal environmental review process in one step. If they agree, a Notice of Preparation/Notice of Intent would be prepared for the joint document. We believe at this juncture, with a project of this magnitude and complexity that preparation of an EIR would be required given the ongoing Martis Valley groundwater debate and Squaw Valley Specific Plan adoption, it is in the best interest of the District to document an open and transparent process. The EIR process would most likely take up to 12-16 months to complete. Of all the permits and approvals required for this project, the CWA 404 permit (with its associated NHPA, FESA, and CWA Section 401 compliance/certification) are the most problematic and require the most time to obtain. In a parallel effort with CEQA, we suggest the District begin preparing permit applications and developing the required information for CWA 404 compliance. Section 404 permits can take up to a year or more to obtain. This would include formal wetland delineation of the project areas and submittal to the Corps.

5.6.11 FUNDING CONSIDERATIONS

Our recent experience with other public infrastructure projects has revealed that if municipal bonds are used for funding, some bond underwriters require that all environmental permits and approvals be secured prior to the issuance of the bond offering for public sale. This requirement is not unique and should be considered by the District in the overall project schedule. Therefore, a detailed schedule of the project would be prepared by Stantec to ensure that financing requirements are incorporated with linkages to other permits and approvals.

5.6.12 LAND USE

Based on our literature reviews of the relevant planning documents and sources, there appear to be no land use constraints associated with the development of the USFS 06 Road Corridor or the Highway 89 Corridor of the District water supply pipeline. All alignments except for the Highway 89 Alignment will require a USFS 299 Special Use permit.

5.6.13 ADDITIONAL ENVIRONMENTAL CONSIDERATIONS

In general, all alignments would require Best Management Practices (BMPs) and possible mitigation measures to minimize potential environmental impacts to less than significant with regards to CEQA. Many of these standard BMPs can be included in the project description as environmental commitments the District is willing to make upfront in the process. Potential impacts on air quality, water quality, hydrology, geology, traffic, recreation, and climate change would need to be addressed in the CEQA/NEPA document for either alignment.

5.6.14 PERMITS AND APPROVALS

The potential project would likely trigger the following permit/environmental compliance requirements:

- California Environmental Quality Act Compliance
- National Environmental Policy Act Compliance (USFS lands – 299 Special Use Permit)
- Clean Water Act Sections 404 and 401 Permits/Certifications
- National Historic Preservation Act Section 106 Compliance
- USFWS FESA Section 7 consultations
- Lahontan Regional Board Discharge Prohibition Exception under Resolution No. 6-93-08
- California Fish and Game Code 1602 Permits
- Placer County Grading Permit
- Placer County Tree Permit

The timeline for these permits ranges from several weeks to over one year. Several of these permits, such as the Clean Water Act Section 404 permit can be streamlined by designing the project to avoid (to the extent feasible) and minimize impacts to jurisdictional waters of the United States. Such measures would enable the District to apply for coverage under existing nationwide permits rather than go through the longer process of obtaining and individual permit. Table 5-3 illustrates the necessary permits and required timeline for each.

Table 5-3 – Permit Timeline

Permit Name	Trigger	Estimated Timeline*
CEQA Compliance	Discretionary Action by a the District	12-18 months
NEPA Compliance	Special Use Permit from USFS	12-16 months
CWA 401 Certification (and Board - Resolution No. 6-93-08)	Surface Waters of the US	4-5 months
Wetland Delineation Verification	Waters of U.S. (ordinary high water mark) and wetlands	6-8 months
CWA 404 Permit	Waters of US wetlands/vernal pools (ordinary high water mark)	12-18 months
USFWS ESA Section 7 Consultations	Federally listed species of potential habitat for federally listed	7-8 months (assuming formal consultations)
SHPO NHPA Section 106 Consultations	Cultural Resources	2-3 months
Fish and Game Code 1602 Permits	Impacts to Bed/Bank and floodplain	4-5 months
Placer County Tree Permit**	Removal of trees 6-inch dbh or greater	1-2 months
Encroachment Permits (Caltrans and local agency**)	Placement of pipeline within Caltrans or County Easements	2-6 months
Grading Permit** and Stormwater Pollution Prevention Plan (SWPPP)	County grading permit and State SWPPP for grading areas > 1-acre	2-6 months

* Estimated Timeline includes APPROXIMATIONS for Stantec's time to prepare an application and the agency's review period.

** Special District Water Utilities may be exempt.

APPENDIX A LISTED AND SPECIAL STATUS SPECIES

A.1 Animal Species

A.1.1 Lahontan cutthroat trout

Federally Threatened Lahontan cutthroat trout (*Oncorhynchus clarkia henshawi*) is known to exist within five miles of all potential pipeline routes (CNDDB, 2008). The Lahontan cutthroat trout is found in cold waters of the Lahontan Basin. The trout cannot tolerate the presence of other salmonids and require gravel riffles in streams for spawning (CNDDB, 2008). The Lahontan cutthroat trout typically spawn from April to July. According to CDFW, populations historically were found in Martis Creek, Independence Creek, Independence Lake, the Truckee River, and Pole Creek (USFWS, 1995; CNDDB, 2008). Truckee River populations have been historically monitored and stocked by the USFWS and CDFW (John Hiscox, Pers. Com.); however, stocked populations with no barrier to passage are typically rapidly depredated by brown trout. Currently known populations occur in Pole Creek and Martis Creek (CNDDB, 2008). This species tolerates varying stream conditions; however, it does not typically occur in streams utilized by other salmonids (CNDDB, 2001). The USFS 06 Road Pipeline Alignment would intersect the Truckee River upstream of Pole Creek and Martis creeks. The potential Highway 89 Alignment runs adjacent to the Truckee River and would cross Pole Creek. Impacts to Lahontan cutthroat trout would need to be analyzed in the CEQA/NEPA document and through Section 7 consultations with the USFWS. Jack and bore operations with stringent erosion control BMPs would serve to minimize impacts to LCT and facilitate USFWS ESA consultations.

A.1.2 Spotted Owl

The spotted owl (*Strix occidentalis*); is a species of concern to state and federal resource agencies and is a USFS "sensitive" species. According to the US Forest Service, spotted owls are present within five miles of all potential pipeline alignments and special precautions to avoid impact should be taken (Roubique, pers comm. 4/14/08). Critical habitat for the spotted owl is considered mixed-coniferous forest. Spotted owls are nocturnal and have yearlong activities. Spotted Owl's reside in dense, old growth, multi-layered mixed conifer, redwood, and Douglas-fir habitats, from sea level up to approximately 2300 m (0-7600 ft.). The Spotted owl requires blocks of 40-240 ha (100-600 ac) of mature forest with permanent water and suitable nesting trees and snags (Forsman 1976). In northern California the spotted owl prefers narrow, steep-sided canyons with north-facing slopes. There is potential for spotted owls within either pipeline alignment, either along the west facing cliffs along the Truckee River or along the USFS 06 Road. Surveys would need to be conducted and active spotted owl nests would require a year round no-construction a buffer of 500 feet (USFS, 2004).

A.1.3 Northern Goshawk

Another species of concern is the Northern goshawk (*Accipiter gentiles*), listed as a State species of Special Concern (CNDDB, 2008). The Northern goshawk is found within and near coniferous forest. It uses old nests, and maintains alternate nest sites on north slopes near water in red fir, lodge pole pine, Jeffrey pine, and aspens. There is a potential for disturbance to northern goshawk nesting habitat along the USFS 06 Road Pipeline Alignment. As is it possible, but unlikely, that

the potential Highway 89 Pipeline would disturb the northern goshawk nests. The northern goshawk is known to inhabit Sawtooth Ridge, an area 4 miles southwest of the Truckee airport and adjacent to the USFS06 Road where the USFS 06 Road Alignment would be located (CNDDB, 2008). Goshawk nests located near the pipeline would likely require a 500 foot buffer, if they are found to be active immediately prior and during the time of construction.

A.1.4 Sierra Nevada mountain beaver

The Sierra Nevada mountain beaver (*Aplodontia rufa californica*) is listed as a State species of Special Concern (CNDDB 2008). The Sierra Nevada Mountain Beaver is known to inhabit dense growths of small deciduous trees and shrubs, wet soil, and abundance of forbs in the Sierra Nevada and the East slope. The mountain beaver needs dense understory for food and cover, since it burrows into soft soil and needs an abundant supply of water (CNDDB, 2008). Cabin Creek and Pole Creek are tributaries to the Truckee River and are known locations of the Sierra Nevada mountain beaver. Since the first potential alignment follows the USFS Road, and is not near an abundance of water the Sierra Nevada mountain beaver is not likely to be affected by the potential project activities. The potential USFS 06 Road Alignment would be drilled under the Truckee River creating a potential disturbance to mountain beaver habitat. The second potential alignment, the Highway 89 pipeline alignment, would be parallel to the Truckee River and cross over both tributary creeks, creating a potential disturbance to mountain beaver habitat. Potential Impacts to mountain beaver from either alternative would need to be mitigated under CEQA.

A.1.5 Willow flycatcher

The willow flycatcher (*Empidonax traillii*) is listed as a California Endangered species (CNDDB, 2008). This species breeds in the Sierra Nevada from May to September in elevations ranging from 2,000-8,000 feet above MSL. The willow flycatcher inhabits extensive thickets of low dense willows on the edge of wet meadows, ponds, or backwaters. Potential willow flycatcher habitat within five miles of either potential alignment is along the Truckee River, along Deer Creek, and along Martis Creek (CNDDB, 2008). Surveys for willow flycatcher would need to be conducted as a part of the CEQA process and if found, impacts to nesting birds would need to be mitigated.

A.1.6 Sierra Nevada snowshoe hare

The Sierra Nevada snowshoe hare (*Lepus americanus tahoensis*) is listed as a CDFW species of Special Concern (CNDDB, 2008). This species, a subspecies of Lepus americanus, is restricted to the Sierra Nevada mountain range and population numbers are thought to be low (Zeiner et. al., 1990b). Sierra Nevada snowshoe hares occupy young growth mixed conifer, subalpine conifer, red fir, Jeffrey pine, lodgepole pine, and aspen forests and often utilize habitats characterized with dense understory growth located along forest edges in close proximity to meadows (Zeiner et. al., 1990b). The open road nature of both the potential USFS 06 Pipeline Alignment and the Highway 89 Pipeline Alignment are unlikely habitats for the snowshoe hare. However, the Truckee River and its tributaries are potential habitat for the Sierra Nevada snowshoe hare. Therefore, potential impacts to snowshoe hare would need to be mitigated under CEQA.

A.1.7 Yellow warbler

The yellow warbler (*Dendroica petechia brewsteri*), a California species of Special Concern is known east of all potential alignments south of Mt. Watson and west of all alignments at the east end of Donner Lake (CNDDB, 2008). This migratory species arrives in California in April and typically leaves the northern California region by October. In the Sierra Nevada, this species occurs in open canopy coniferous forests up to 8,000 feet above MSL. Habitat is vegetation mostly a mosaic of quaking aspen stands, mixed conifer forest, and small areas of montane chaparral sagebrush scrub. The yellow warbler is also known to exist in close proximity to streams. The lack of water and high disturbance along the USFS 06 Road Pipeline Alignment indicates that warbler habitat is unlikely, however is possible and mitigation would be required if present. The Highway 89 Pipeline has available water adjacent to the alignment, therefore, warbler habitat is possible and mitigation would be required if present.

A.1.8 California wolverine

The State Threatened California wolverine (*Gulo gulo*) was seen one-quarter mile inside the entrance to Squaw Valley in 1953 and just recently documented on camera in the area 8.4 miles north of Truckee on Highway 89 near the Forest Service Sagehen monitoring station (CNDDB, 2008). The wolverine is found in the north Coast Mountains and the Sierra Nevada in a variety of high elevation habitats. In the northern Sierra Nevada, wolverines occur in mixed conifer, red fir, and lodgepole forests ranging from 4,300-7,300 feet above mean sea level (MSL) (CNDDB, 2008). The wolverine needs a water source and uses caves and logs to burrow for cover and den sites. Wolverines hunt in more open areas and are known to travel long distances (CNDDB, 2008). Wolverines are known to avoid human inhabited areas, so it is unlikely the Highway 89 Pipeline Alignment would impact wolverine habitat. It is more plausible for the wolverine to be present near the USFS 06 Road Pipeline Alignment, since it is relatively uninhabited by people. Potential impacts would need to be addressed and mitigated in the CEQA document.

A.1.9 Western white-tailed jackrabbit

The western white-tailed jackrabbit (*Lepus townsendii*) is, according to CDFW, a state species of Special Concern. The jackrabbit was seen in 1920 near Tahoe City, California. Jackrabbit habitat consists of sagebrush, subalpine conifer, juniper, alpine dwarf shrub, and perennial grasslands. The jackrabbit prefers open areas with scattered shrubs and exposed flat-topped hills with open stands of trees, brush, and herbaceous understory (CNDDB, 2008). Potential Impacts western white-tailed jackrabbit would need to be mitigated under CEQA/NEPA.

A.1.10 Mountain yellow-legged frog

The mountain yellow-legged frog (*Rana muscosa*) is a Federally Endangered species, a State species of Special Concern and a USFS sensitive species; however, the Federal listing refers to populations in the San Gabriel, San Jacinto, and San Bernardino mountains only (CNDDB, 2008). This species is found associated with lakes, streams, and ponds in elevations ranging from 1,200 feet to 7,500 feet above mean sea level (MSL) (Zeiner et. al., 1988). Known populations of frogs occur in the Granite Chief wilderness area west of Squaw Valley, in the Squaw Valley meadow, and in Grey Creek a Truckee River tributary approximately 11miles east of the Town of Truckee. Surveys for mountain yellow-legged frog habitat would need to be conducted along the route.

Potential impacts to the species and habitat would need to be addressed in the CEQA/NEPA document and through Section 7 consultations.

A.1.11 Osprey

The osprey (*Pandion haliaetus*) is listed by the California Board of Forestry as a "Listed species" and "Sensitive Species". It also designated as a "Sensitive Species" by the U.S. Forest Service. The Department of Fish and Game listed the osprey as a second priority Species of Special Concern in 1978. The Osprey commonly nests within the forested habitats of California adjacent or near to rivers or large water bodies. Known populations of the osprey are known to occur on the southern side of Donner Lake on the west side of the Town of Truckee. Osprey habitat is possible along the Truckee River. Potential Impacts associated with either alignment would need to be mitigated under CEQA.

A.1.12 Sierra Nevada red fox

The Sierra Nevada red fox (*Vulpes necator*) is known to occur within five miles of the project location. The fox is listed by the state of California as a Threatened species. This species is also a USFS "sensitive" species. This species is typically found in higher elevations (>7,000 feet above MSL) but is known to occur in elevations as low as 3,900 feet above MSL. Sierra Nevada red fox occurs in a variety of habitats, including lodgepole pine, mixed conifer, montane riparian, and ponderosa pine forests within the Sierra Nevada mountain range. This species requires dense vegetation for cover and prefers habitats adjacent to meadows for hunting. The Sierra Nevada red fox dens in rock outcrops and hollow logs and is known to burrow in friable soils. Population numbers of this species are declining and this species is rare throughout its range (Zeiner et. al., 1990b). Potential impacts to red fox including temporary disturbance of foraging areas would need to be addressed and mitigated in the CEQA/NEPA document.

A.1.13 Grey-headed pika

The gray-headed pika is one of five subspecies of American pika found in the western United States. Pikas are most closely related to rabbits and tend to inhabit high elevation talus slopes; although they have been known to occur in the debris piles swept downslope from avalanche (Eder 1974). The Pika's diet consists primarily of broad-leaved green plants, grasses, and sedges. The pika will dry these materials in the sun and then create cashes under rocks. Pikas do not hibernate during the winter, and will build elaborate tunnels under the snow to access their caches during the winter (Jameson & Peeters 2004).

A.1.14 Great Basin ram's horn

The Great Basin rams-horn is known to occur within five miles of the project location. The species is currently found in and around the periphery of the northern Great Basin. It is found in larger lakes and slow rivers. Habitat where this species is known to occur offer clear, cold, and slow-moving water. Potential species habitat within the project area includes the Truckee River and its tributaries.

A.1.15 Lake Tahoe amphipod

The Lake Tahoe amphipod is endemic to Lake Tahoe. In a 2008-2009 survey, the species was only found in one sample of 400 taken (CNDDB 2015). It is found at depths between 200 – 400 feet. The species is unlikely to be found within the project area because it is endemic to Lake Tahoe.

A.1.16 Lake Tahoe stygobromid

The Lake Tahoe stygobromid is endemic to Lake Tahoe. The species was abundant in a 1962 survey of the lake (CNDDB 2015). The species is unlikely to be found in the project area because it is endemic to Lake Tahoe.

A.1.17 Western pearlshell

The western pearlshell is known to occur within five miles of the proposed project. The species inhabits cold creeks and rivers with clean water. The species range extends from Alaska to California but is threatened by channelization, poor water quality, and loss of host fish. The species is not listed.

A.2 Plant Species

A.2.1 Plumas ivesia

The Plumas ivesia (*Ivesia sericoleuca*) is known to occur within five miles of the pipeline alignments. Listed by CNPS as 1B.2, the Plumas ivesia is a great basin scrub, found in lower montane coniferous forests, meadows, and vernal pools usually in substrates from 1450 meters to 2000 meters. Populations of Plumas ivesia have been found near the Truckee Airport. Since Plumas ivesia is typically found vernal pools and meadows it is not likely that there is suitable habitat along either pipeline route and would not pose a serious constraints to these pipeline corridors.

A.2.2 Nevada Daisy

The Nevada daisy (*Ergeron nevadincola*) is a great basin scrub, found in lower montane coniferous forest and pinyon-juniper woodland from 1400 to 2900 meters. The Nevada daisy is listed by CNPS as 2.3, a rare plant that needs more information. The daisy is found in the Tahoe City USGS 7.5 minute quad near Deer Park above the summit of "The Craggs." Potential impacts to the Nevada daisy would need to be addressed in the CEQA/NEPA document.

A.2.3 Constance's sedge

Constance's sedge (*Carex constancea*) is listed by CNPS as 1B.2 and known to occur near Sagehen Creek in the experimental forest area. Constance's sedge is found in subalpine coniferous forests normally in the shade (CNDDB, 2008). Potential Impacts to Constance's sedge would need to be addressed in the CEQA/NEPA document.

A.2.4 Donner Pass buckwheat

Donner Pass buckwheat (*Eriogoonum umbellatum var. torreyanu*) is listed as a CNPS 1B.2 species. Donner Pass buckwheat is found in upper montane coniferous forest, chaparral, and meadows. Normally located on steep slopes and ridge tops in rocky volcanic soils surrounded by bare or sparsely vegetated areas (1840-2620meters). Known to occur in the upper reaches of Squaw Creek and near Highway 89 at the junction of Squaw Valley Road. Further analysis of Potential Impacts would be needed in the CEQA/NEPA document.

A.2.5 American manna grass

Listed by CNPS as a 2.3, American manna grass (*Glyceria grandis*) is found in wet meadows, ditches, streams, and ponds in valleys and lower elevations in the mountains from 15 to 1980 meters. Manna grass is known to occur in the Truckee River near Squaw Creek, indicating a high potential of presence near the alignment. Detailed surveys and potential Impacts to American manna grass would need to be conducted for the CEQA/NEPA document.

A.2.6 Marsh skullcap

Marsh skullcap (*Scutellaria galericulata*) is listed by CNPS as a 2.2 species. Found in marshes and swamps throughout lower montane coniferous forest, meadows, and seeps the marsh skullcap could potentially be found in or near the Truckee River and its tributaries. The skullcap is found from 0 to 2100 meters and is known to occur near Truckee. Potential Impacts would need to be addressed in the CEQA/NEPA document.

A.2.7 Munroe's desert mallow

Munroe's desert mallow (*Sphhaeralcea munroana*) is listed by CNPS as a 2.2 species. It is a Great Basin scrub found around 2000 meters in dry open places. Munroe's desert mallow is known to occur on slopes above Squaw Creek. The potential for encountering desert mallow is considered low because the Highway 89 pipeline alignment would be located primarily on the valley floor where the predominant habitat is wet meadow and the USFS 06 Road Pipeline Alignment would cross the Truckee River in an area that is predominately wet meadow. However, there are patches of sagebrush scrub habitat in pocket areas. Since the pipeline alignments are in the vicinity of Squaw Creek, surveys may need to be conducted if suitable habitat exists in the final alignment and proper CEQA/NEPA mitigation measures and analysis would be needed.

A.2.8 Tahoe yellow cress

Only one plant species in the CNDDB search is listed under CESA or FESA. The Tahoe yellow cress is listed as Endangered in California and as a Federal Candidate species (CNPS: 1B.1). The Tahoe yellow cress (*Rorippa subumbellata*) has been documented within five miles of the potential pipeline route. However, this species primarily inhabits sandy beaches, lakeside margins, and riparian communities; on decomposed granite sand. Therefore, the dry mixed coniferous habitat, previously disturbed dirt and paved roads, and the lack of wetlands along the USFS 06 Road Pipeline Alignment does not provide suitable habitat for Tahoe yellow cress. Neither does the paved shoulder of Highway 89; however, the nearby Truckee River and its tributaries provide habitat for the yellow cress. Potential impacts to the species and habitat would need to be addressed in the CEQA document and through Section 7 consultations.

A.2.9 Alder buckhorn

Alder buckthorn, or alder leaved coffeeberry, is a perennial shrub that is native to California. It is part of the Rhamnaceae, or the buckthorn plant family. This species can be found in lower and upper montane coniferous forest, meadows and seeps, and riparian scrub vegetation communities. *Rhamnus alnifolia* has a typical bloom period between May to July in elevations ranging from 4,494 to 6,988 feet (1,370 to 2,130 meters) (Calflora 2015, CNPS 2015c). The species is known to occur in California, however fewer than twenty individuals have been recorded (CNPS 2015c).

A.2.10 Austin's astragalus

Austin's astragalus is a perennial herb that is endemic to California. It is part of the fabaceae, or pea plant family. This species can be found among alpine boulder fields or subalpine coniferous forest vegetation communities. *Astragalus austiniae* has a typical bloom period between July to September in elevations ranging from 8,005 to 9,727 feet (2,440 to 2,965 meters) (Calflora 2015, CNPS 2015c). This herb is important to numerous butterfly species including Queen Alexandra's sulphur (*Colias Alexandra*) and arrowhead blue (*Glaucopsyche piasus*).

A.2.11 Broad-nerved hump moss

Broad-nerved hump moss is a moss that is native to California. It is part of the Meesiaceae, or moss plant family. This species can be found in damp soils including bogs and fens, meadows and seeps, subalpine coniferous forest and upper montane coniferous forest vegetation communities. *Meesia uliginosa* has a typical bloom period in October in elevations ranging from 3,969 to 9,200 feet (1,210 to 2,804 meters) (Calflora 2015, CNPS 2015c). In California, the species is most common around the Lake Tahoe Basin. The greatest threat to the species is water diversion leading to loss of habitat (CNPS 2015c).

A.2.12 Common moonwort

Common moonwart is a rhizomatous fern that is native to California. It is part of the Ophioglossaceae, or adder's-tongue fern family. This species can be found in meadows and seeps, upper montane coniferous forest, and subalpine coniferous forest vegetation communities. *Botrychium lunaria* has a typical bloom period in August in elevations ranging from 6,496 to 11,154 feet (1,980 to 34,00 meters) (Calflora 2015, CNPS 2015c). In addition to California, the species is known to occur in Idaho, Oregon, and Washington and is likely threatened to grazing over the extent of its ranger (CNPS 2015c).

A.2.13 Davy's sedge

Davy's sedge is endemic to California, and is part of the Cyperaceae, or sedge family. This species can be found in subalpine coniferous forest and upper montane coniferous forest vegetation communities. Carex davyi has a typical bloom period between May through August in elevations ranging from 4,921 to 10,498 feet (1,500 to 3,200 meters) (Calflora 2015, CNPS 2015c). This species is known to occur in California, with fewer than twenty occurrences recorded. Davy's sedge is potentially threatened by grazing and logging (CNPS 2015c). There is a moderate

potential for Davy's sedge to occur within the proposed Project area with suitable habitat known to occur in the proposed Project area.

A.2.14 Long-petaled lewisia

Long-petaled lewisia a is a perennial herb that is endemic to California. It is part of the Montiaceae, or Miner's lettuce family. This species can be found in granitic, alpine bolder and rock fields, and sub alpine coniferous forest vegetation communities. Lewisia longipetala has a typical bloom period between July through September and can be found in elevation ranging from 8,202 to 9,596 feet (2,500 to 2,925 meters) (Calflora 2015, CNPS 2015c). The species is known to occur in California by less than twenty occurrences near the Lake Tahoe portion of the Sierra Nevada (CNPS 2015c). Long-petaled lewisia is possibly threatened by horticultural collection (CNPS 2015c).

A.2.15 Nuttall's ribbon-leaved pondweed

Nuttall's ribbon-leaved pondweed is a perennial herb that is found in northern California. The species is found in shallow, standing and slow-flowing waters at elevations up to 1900 meters. There is a low potential for Nuttall's ribbon-leaved pondweed to occur within the project area; the only known occurrence in the project area occurred in 1932 in Tahoe City (CNDDB 2015).

A.2.16 Robbin's pondweed

Robbin's pondweed is a perennial herb that is found in wetlands. This species prefers shallow, muddy waters. In California, it can be found in elevation ranging from 1,500 to 3,500 meters. Robbin's pondweed is known to occur in Donner Lake, indicating there is a medium potential for Robbin's pondweed to occur within the project area (CNDDB 2015).

A.2.17 Santa Lucia dwarf rush

Santa Lucia dwarf rush is an annual herb that is endemic to California. It is part of the Juncaceae, or rush, plant family. This species can be found in chaparral, (Great Basin) scrub, lower montane coniferous forest, meadows, seeps, and vernal pool vegetation communities. *Juncus luciensis* typically bloom April to July (mid to late-bloom cycle) in elevation ranging from 984 to 6,692 feet (300 to 2,040 meters) (Calflora 2015, CNPS 2015c). The plant stem is wide, hairy, and ranges 0.1 to 0.3 millimeters. The leaves are at the base and range 1.5 centimeters. The flowers have green mid-veins, are dark red at the tips, typically have six parts ranging 1.6 to 4.2 millimeters (Jepson eFlora 2015).

A.2.18 Scalloped moonwort

Scalloped moonwort is a rhizomatous fern that is native to California. It is part of the Ophioglossaceae, or adder's tongue family. This species can be found in bogs and fens, lower and upper montane coniferous forest, meadows and seeps, and in marshes and swamps. Botrychium crenulatum has a typical bloom period from June through September and can be found in elevations ranging from 4,160 to 10,761 feet (1,268 to 3,280 meters) (Calflora 2015, CNPS 2015c).

The species is known to occur in nine western states including a broad distribution throughout the Sierra Nevada, the Trinity and Costal Ranges; as well as the Werner Range (CNPS 2015c). Scalloped moonwort is threatened by foot traffic, grazing and fuel reduction projects among others (CNPS 2015c).

A.2.19 Threetip sagebrush

Threetip sagebrush is a shrub that is native to California. It is part of the Asteraceae, or sunflower family. This species can be found in rocky and volcanic environments, and in upper montane coniferous forest openings. *Artemisia tripartita* ssp. *tripartita* has a typical bloom period in August and can be found in elevations ranging from 7,217 to 8,530 feet (2,200 to 2,600 meters) (Calflora 2015, CNPS 2015c). Threetip sagebrush if found in nine western states and is threatened by ski resort development and other recreational uses (CNPS 2015c).

NCSD-ZONE 4
MARTIS VALLEY
WATER SYSTEM

NORTHSTAR
COMMUNITY
SERVICES DISTRICT

TRUCKEE-DONNER
PUBLIC UTILITY
DISTRICT

USFS 06 Alignment

USFS 06 Road

Powerline Alignment

Bike Path Alignment

W. River St.

89

80

Squaw Valley Rd.

TTSA TRI Alignment

Highway 89 Alignment

Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AEX, Getmapping, Aerogrid, IGN, IGP, swisstopo, and the GIS User Community

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LEGEND

Highway 89 Corridor
- Highway 89 Alignment
- TTSA TRI Alignment
- Placer County Bike Path Alignment (Bike Path Alignment)

United States Forest Service 06 Road Corridor (USFS 06 Corridor
- Liberty Energy Powerline Alignment (Powerline Alignment)
- USFS 06 Road Alignment (USFS 06 Alignment)

- Potential Booster Pump Station
- Potential Storage Reservoir
- Water Purveyor Boundary

0 1,750 3,500 Feet

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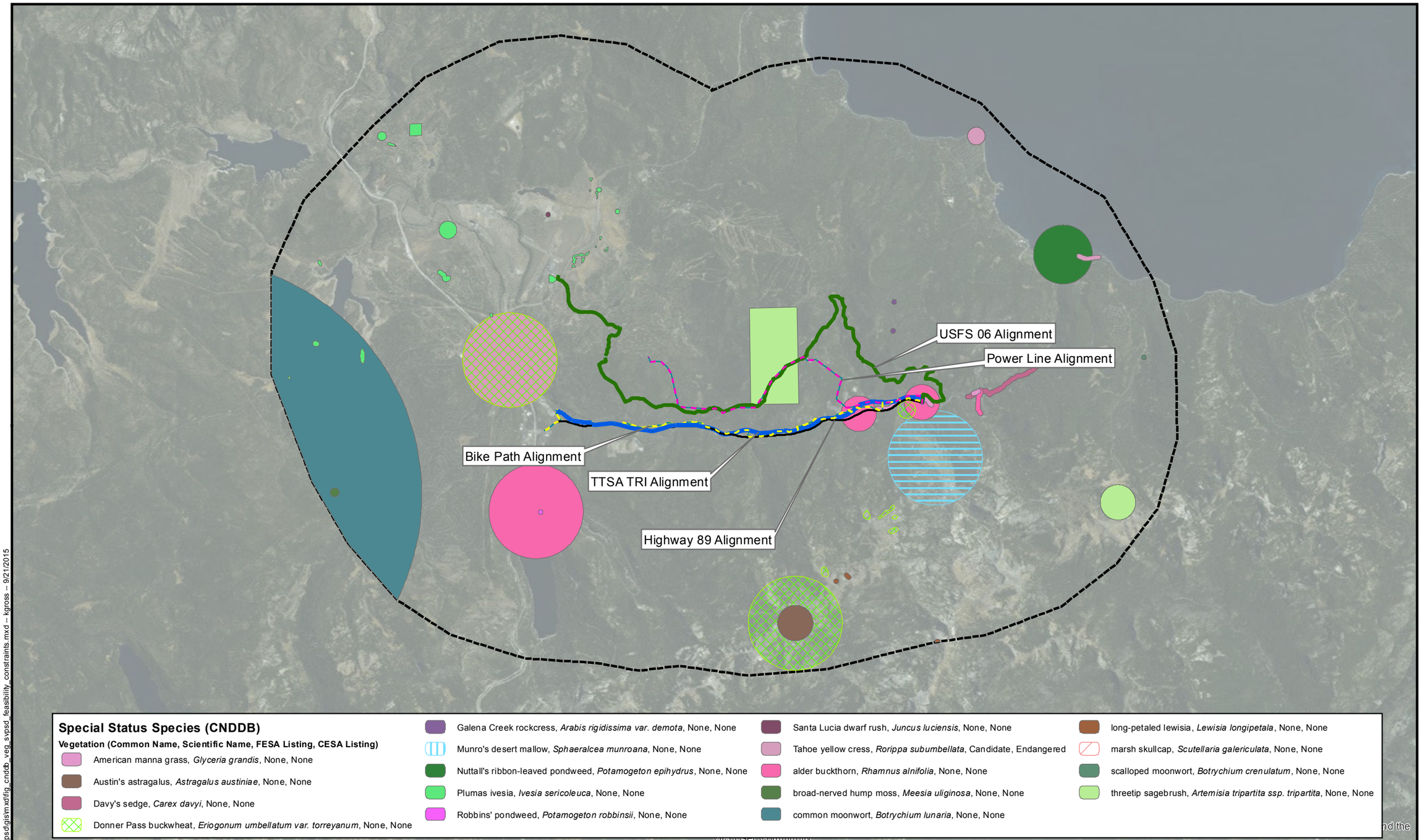
SQUAW VALLEY PUBLIC SERVICE DISTRICT

REDUNDANT WATER SUPPLY-PREFERED ALTERNATIVE EVALUATION PROJECT
PHASE 3 - FEASIBILITY STUDY UPDATE

SHEET TITLE: PROJECT LOCATION AND POTENTIAL ALIGNMENTS

FIGURE NUMBER: 5-1



Special Status Species (CNDDB)

Vegetation (Common Name, Scientific Name, FESA Listing, CESA Listing)

- American manna grass, *Glyceria grandis*, None, None
- Austin's astragalus, *Astragalus austiniae*, None, None
- Davy's sedge, *Carex davyi*, None, None
- Donner Pass buckwheat, *Eriogonum umbellatum var. torreyanum*, None, None
- Galena Creek rockcress, *Arabis rigidissima var. demota*, None, None
- Munro's desert mallow, *Sphaeralcea munroana*, None, None
- Nuttall's ribbon-leaved pondweed, *Potamogeton epihydrus*, None, None
- Plumas ivesia, *Ivesia sericoleuca*, None, None
- Robbins' pondweed, *Potamogeton robbinsii*, None, None
- Santa Lucia dwarf rush, *Juncus luciensis*, None, None
- Tahoe yellow cress, *Rorippa subumbellata*, Candidate, Endangered
- alder buckthorn, *Rhamnus alnifolia*, None, None
- broad-nerved hump moss, *Meesia uliginosa*, None, None
- common moonwort, *Botrychium lunaria*, None, None
- long-petaled lewisia, *Lewisia longipetala*, None, None
- marsh skullcap, *Scutellaria galericulata*, None, None
- scalloped moonwort, *Botrychium crenulatum*, None, None
- threetip sagebrush, *Artemisia tripartita ssp. tripartita*, None, None

LEGEND

Highway 89 Corridor

- Highway 89 Alignment
- TTSA TRI Alignment
- Placer County Bike Path Alignment (Bike Path Alignment)

United States Forest Service 06 Road Corridor (USFS 06 Corridor)

- Liberty Energy Powerline Alignment (Powerline Alignment)
- USFS 06 Road Alignment (USFS 06 Alignment)

5 Mile Buffer

0 2,000 4,000 8,000 Feet

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SQUAW VALLEY PUBLIC SERVICE DISTRICT

REDUNDANT WATER SUPPLY-PREFERED ALTERNATIVE EVALUATION PROJECT PHASE 3 - FEASIBILITY STUDY UPDATE

SHEET TITLE: SPECIAL STATUS SPECIES - VEGETATION WITHIN 5 MILES OF THE PROJECT AREA

FIGURE NUMBER: 5-2

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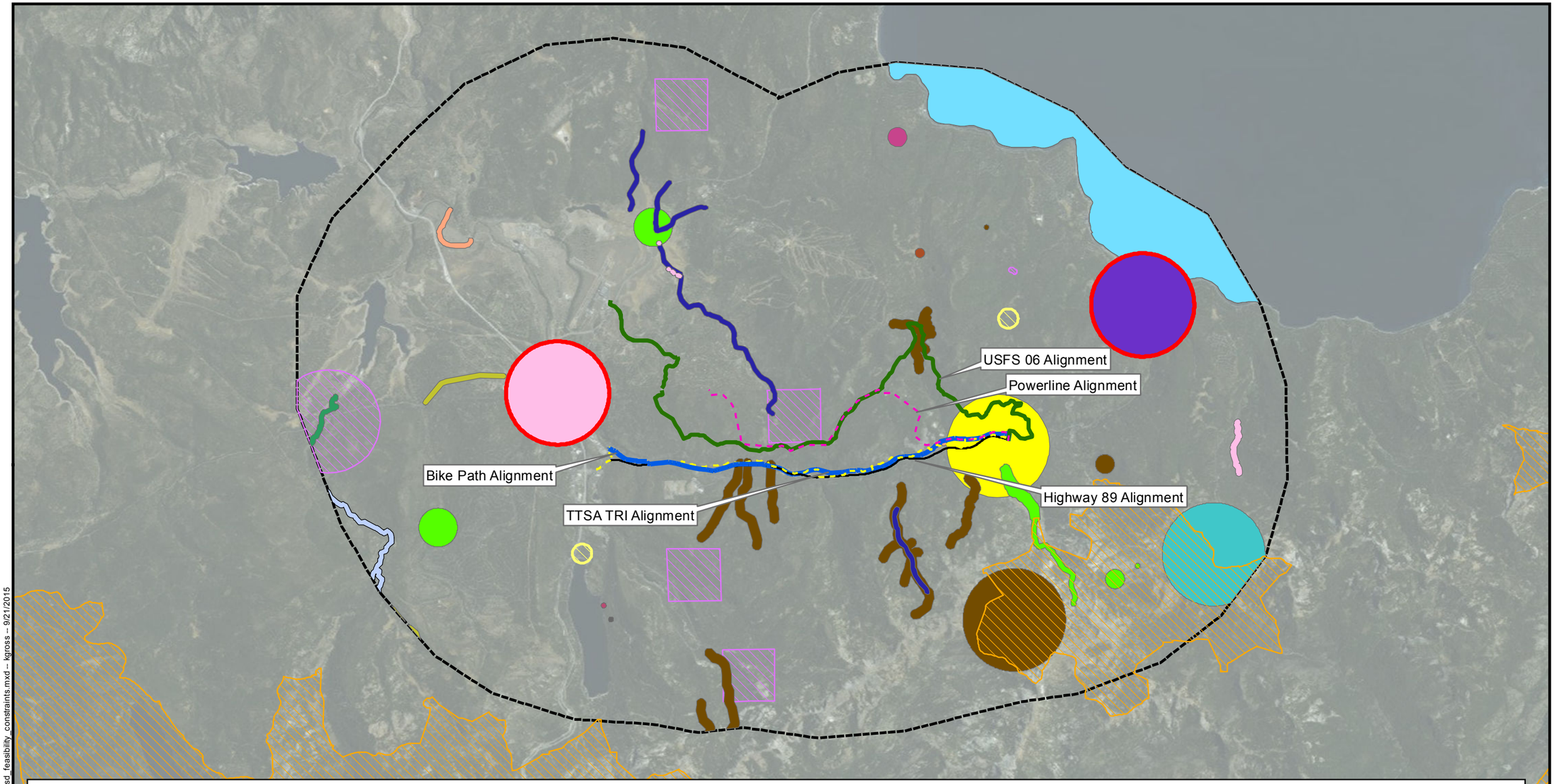

Special Status Species (CNDDB)

Wildlife (Common Name, Scientific Name, FESA Listing, CESA Listing)

- California wolverine, *Gulo gulo*, None, Threatened
- Great Basin Cutthroat Trout/Paiute Sculpin Stream, *Great Basin Cutthroat Trout/Paiute Sculpin Stream*, None, None
- Great Basin Sucker/Dace/Redside Stream With Cutthroat Trout, *Great Basin Sucker/Dace/Redside Stream With Cutthroat Trout*, None, None
- Great Basin rams-horn, *Helisoma newberryi*, None, None
- Lahontan cutthroat trout, *Oncorhynchus clarkii henshawi*, Threatened, None
- Lake Tahoe amphipod, *Stygobromus lacicolus*, None, None
- Lake Tahoe benthic stonefly, *Capnia lacustra*, None, None
- Lake Tahoe stygobromid, *Stygobromus tahoensis*, None, None
- Sierra Nevada mountain beaver, *Aplodontia rufa californica*, None, None
- Sierra Nevada red fox, *Vulpes vulpes necator*, None, Threatened
- Sierra Nevada snowshoe hare, *Lepus americanus tahoensis*, None, None
- Sierra Nevada yellow-legged frog, *Rana sierrae*, Endangered, Threatened
- Sierra marten, *Martes caurina sierrae*, None, None
- bald eagle, *Haliaeetus leucocephalus*, Delisted, Endangered
- gray-headed pika, *Ochotona princeps schisticeps*, None, None
- long-legged myotis, *Myotis volans*, None, None
- northern goshawk, *Accipiter gentilis*, None, None
- osprey, *Pandion haliaetus*, None, None
- western pearlshell, *Margaritifera falcata*, None, None
- western white-tailed jackrabbit, *Lepus townsendii townsendii*, None, None
- willow flycatcher, *Empidonax traillii*, None, Endangered
- yellow warbler, *Setophaga petechia*, None, None

Designated Critical Habitat

- Sierra Nevada Yellow Legged Frog, *Rana sierrae*

LEGEND

Highway 89 Corridor

- Highway 89 Alignment
- TTSA TRI Alignment
- Placer County Bike Path Alignment (Bike Path Alignment)

United States Forest Service 06 Road Corridor (USFS 06 Corridor)

- Liberty Energy Powerline Alignment (Powerline Alignment)
- USFS 06 Road Alignment (USFS 06 Alignment)

5 Mile Buffer

0 2,000 4,000 8,000 Feet

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REDUNDANT WATER SUPPLY-PREFERED ALTERNATIVE EVALUATION PROJECT
PHASE 3 - FEASIBILITY STUDY UPDATE

SHEET TITLE: SPECIAL STATUS SPECIES - WILDLIFE WITHIN 5 MILES OF THE PROJECT AREA

FIGURE NUMBER: 5-3

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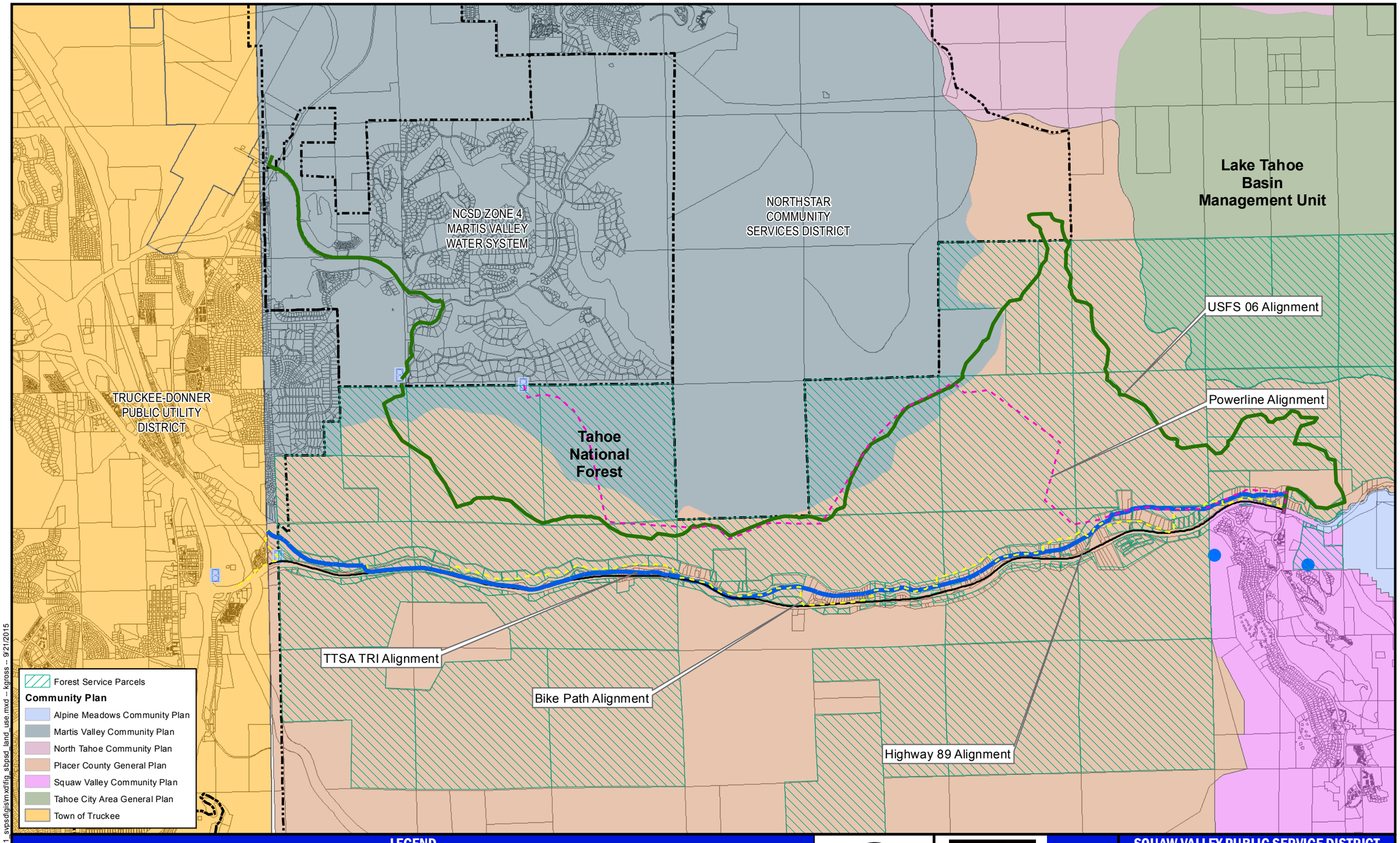

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LEGEND

Highway 89 Corridor
- Highway 89 Alignment
- TTSA TRI Alignment
- Placer County Bike Path Alignment (Bike Path Alignment)

United States Forest Service 06 Road Corridor (USFS 06 Corridor)
- Liberty Energy Powerline Alignment (Powerline Alignment)
- USFS 06 Road Alignment (USFS 06 Alignment)

- Booster Pump Station
- Storage Reservoir
- Water Purveyor Boundary

0 1,950 3,900 Feet

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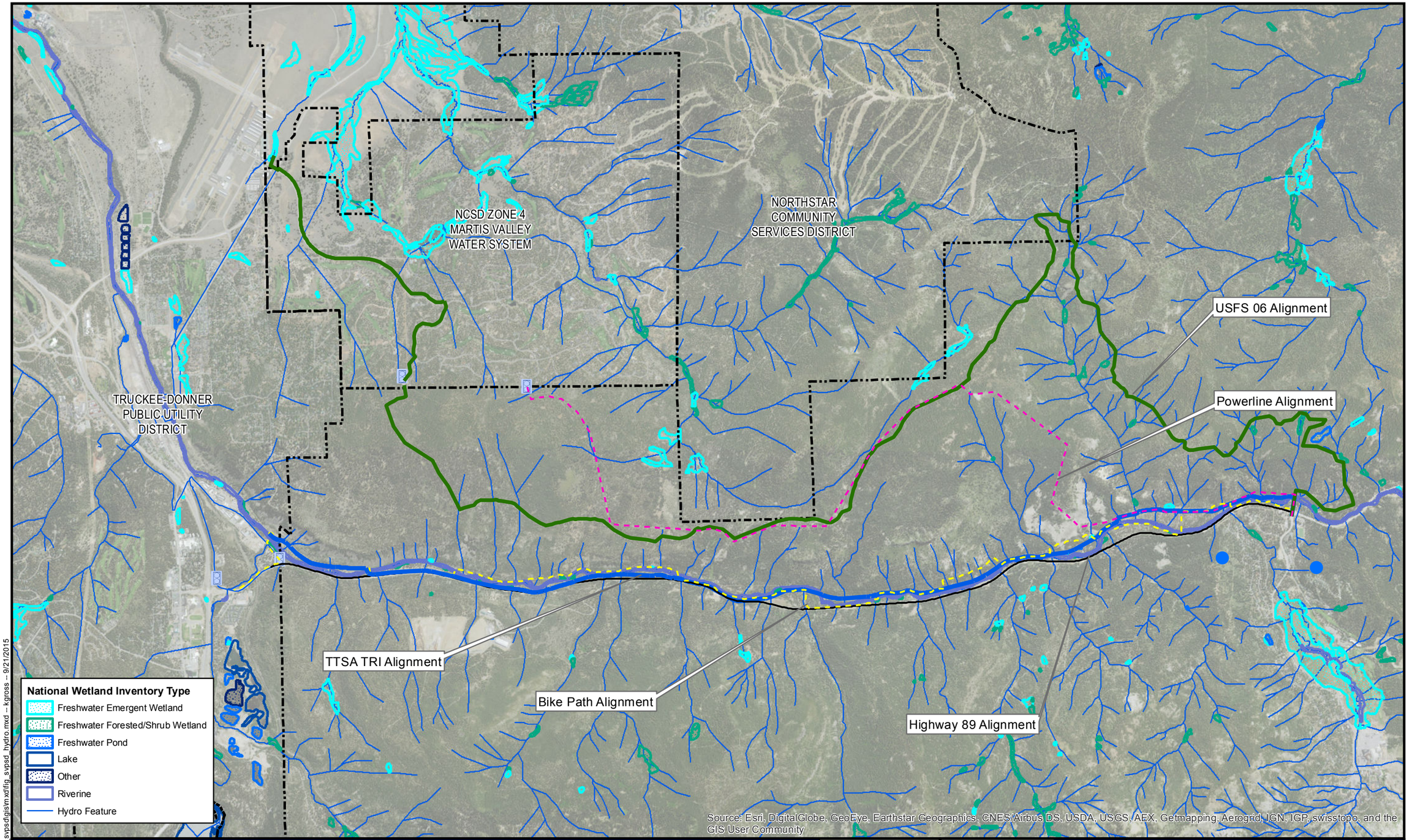
PHASE 3 - FEASIBILITY STUDY UPDATE

SHEET TITLE: JURISDICTIONS/LAND USE

FIGURE NUMBER: 5-4



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LEGEND

Highway 89 Corridor
- Highway 89 Alignment
- TTSA TRI Alignment
- Placer County Bike Path Alignment (Bike Path Alignment)

United States Forest Service 06 Road Corridor (USFS 06 Corridor)
- Liberty Energy Powerline Alignment (Powerline Alignment)
- USFS 06 Road Alignment (USFS 06 Alignment)

- Booster Pump Station
- Storage Reservoir
- Water Purveyor Boundary

0 1,950 3,900 Feet

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PHASE 3 - FEASIBILITY STUDY UPDATE

SHEET TITLE: HYDROLOGY/WETLANDS

FIGURE NUMBER: 5-5

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ENGINEERING

TECHNICAL MEMORANDUM

SQUAW VALLEY PUBLIC SERVICE DISTRICT

REDUNDANT WATER SUPPLY – PREFERRED ALTERNATIVE EVALUATION PROJECT PHASE 3 - FEASIBILITY STUDY UPDATE

Prepared For: Mike Geary, P.E., General Manager

Prepared By: Lucas Tipton, P.E., Farr West Engineering

Reviewed By: Dave Hunt, P.E., Farr West Engineering

Date: November 10, 2015

Subject: **Technical Memorandum No. 6 – Planning Level Facilities Cost Estimate**

6.1 PURPOSE

This technical memorandum summarizes the required project facilities and provides planning level cost estimates for the alternatives within the Highway 89 and USFS 06 corridors.

6.2 DISCUSSION

6.2.1. WATER SUPPLY FACILITIES COST SUMMARY

In general, there are four significant facilities that are needed to provide a redundant water supply for the Olympic Valley, including the District and the Squaw Valley Mutual Water Company (SVMWC), from the Martis Valley. Each of these facilities are similar regardless of alignment alternative. They include the following:

- Well Construction (650+ gpm capacity)
- Transmission Line (10" pipeline)
- Booster Pump Station (650+ gpm capacity)
- Terminal Tank (1 million gallons)

In the 2009 Alternative/Supplemental Water Supply and Enhanced Utilities Feasibility Study, planning level efforts grouped potential alignment alternatives into two corridors: the Highway 89 Corridor and the United States Forrest Service (USFS) 06 Corridor. Further study of the project

and of the alignment corridors has yielded a total of five alternative alignments within these corridors. These alignments include:

- Highway 89 Alignment;
- Placer County Bike Path Alignment;
- TTSA TRI Alignment;
- USFS 06 Road Alignment, and
- Liberty Energy Pole Line Alignment.

Figure 6-1 provides a summary of these alignments. Farr West developed a detailed planning level cost estimate for each one of these facilities for each of the five potential alignments. The costs for the well and terminal water storage tank are similar for each option. The cost for transmission line construction for each alternative is different due to the fact the pipelines follow five completely different routes from the Martis Valley to Squaw Valley. The cost for the booster pump station is different based on the required pumping head for the various alternatives, with the USFS 06 and Powerline alternatives requiring much higher horsepower pumps.

In addition to the four facilities described above, line items have also been added for the following:

- EIR preparation, environmental permitting, and preliminary planning and design;
- Administrative and legal costs associated with land acquisition, easements, etc.;
- Design engineering and construction management, and
- Construction contingency.

Table 6-1 provides a side by side comparison of the summary costs associated with each alignment based. A more detailed cost estimate for each alternative is provided in Tables 6-2 through 6-6.

Table 6-1 – Emergency Water Intertie Project Cost Estimate

	Highway 89	
1	Well Construction	$ 1,153,000
2	10 Inch Transmission	$ 15,833,000
3	Booster Pump Station	$ 1,030,000
4	Terminal Tank	$ 1,085,000
5	EIR/Permitting/Preliminary Design	$ 500,000
6	Administrative/Legal (10%)	$ 1,910,100
7	Engineering Design (8%)	$ 1,528,080
8	Construction Management (10%)	$ 1,910,100
9	Construction Contingency (10%)	$ 1,910,100
	Total	**$ 26,860,000**

	Placer County Bike Path	
1	Well Construction	$ 1,153,000
2	10 Inch Transmission	$ 12,858,000
3	Booster Pump Station	$ 1,030,000
4	Terminal Tank	$ 1,085,000
5	EIR/Permitting/Preliminary Design	$ 1,500,000
6	Administrative/Legal (10%)	$ 1,612,600
7	Engineering Design (8%)	$ 1,290,080
8	Construction Management (10%)	$ 1,612,600
9	Construction Contingency (10%)	$ 1,612,600
	Total	**$ 23,750,000**
	TTSA TRI	
1	Well Construction	$ 1,153,000
2	10 Inch Transmission	$ 12,689,000
3	Booster Pump Station	$ 1,030,000
4	Terminal Tank	$ 1,085,000
5	EIR/Permitting/Preliminary Design	$ 1,500,000
6	Administrative/Legal (10%)	$ 1,595,700
7	Engineering Design (8%)	$ 1,276,560
8	Construction Management (10%)	$ 1,595,700
9	Construction Contingency (10%)	$ 1,595,700
	Total	**$ 23,520,000**
	USFS 06 Road	
1	Well Construction	$ 1,153,000
2	10 Inch Transmission	$ 19,816,000
3	Booster Pump Station	$ 1,121,000
4	Terminal Tank	$ 1,085,000
5	EIR/Permitting/Preliminary Design	$ 1,500,000
6	Administrative/Legal (10%)	$ 2,317,500
7	Engineering Design (8%)	$ 1,854,000
8	Construction Management (10%)	$ 2,317,500
9	Construction Contingency (10%)	$ 2,317,500
	Total	**$ 33,480,000**

	Liberty Energy Power Line	
1	Well Construction	$ 1,153,000
2	10 Inch Transmission	$ 13,869,000
3	Booster Pump Station	$ 1,070,000
4	Terminal Tank	$ 1,085,000
5	EIR/Permitting/Preliminary Design	$ 1,500,000
6	Administrative/Legal (10%)	$ 1,717,700
7	Engineering Design (8%)	$ 1,374,160
8	Construction Management (10%)	$ 1,717,700
9	Construction Contingency (10%)	$ 1,717,700
	Total	**$ 25,200,000**

6.2.2. COST ESTIMATING ASSUMPTIONS

As discussed previously there are four different facilities that need to be constructed for the Redundant Water Supply Project. They include the well, transmission main, booster pump station, and terminal tank. The cost estimates for each of these facilities were developed using various methods. First, Farr West has performed the engineering design for several similar facilities over the past few years. This first-hand knowledge provides unique insight into the current costs for construction of these types of facilities. In addition, cost estimates of similar projects that have been constructed in the past 12 months within the Tahoe Basin were analyzed as well as similar projects in Northern Nevada and Northern California. Finally, several manufactures and general contractors were contacted about several of the components needed to build these facilities. These meetings and discussions were used to adjust the final cost estimate numbers as seen below.

Tables 6-2 through 6-6 provided the detailed planning level cost estimates for each alignment alternatives. Below is a discussion about each of these facilities.

Well

Based on the redundant water supply demands presented in Technical Memorandum #1, the average day demand in the highest occupancy month is estimated to be 650 gpm at the buildout level of development in the Valley. For planning purposes, a water source with a minimum of 650 gpm capacity would be required to satisfy this demand. A production well satisfying the State Water Resources Control Board (SWRCB) standards would be constructed based on this criteria. For the purpose of this study, a well drilled to a total depth of 500-800 feet in the Martis Valley is assumed. Well construction would include drilling, developing, and testing followed by equipping the well to include a pump and motor, disinfection equipment, site work, a building, and electrical and controls. Farr West estimates that this new well construction would cost approximately $1.15 million dollars.

Well construction does not readily lend itself to being phased. A potential phasing option would include constructing one well to meet the existing water demands, followed by a second well as future demands increased. This would require the District to secure land for two water supply

wells in the same vicinity. The cost to do so would likely approach 1 million dollars per well and would negate any savings of initial capital costs by constructing a reduced capacity well.

Transmission Main

All five alignment alternatives include the installation of fully restrained 10-inch cement lined ductile iron pipe and appurtenances for the entire length of the route from the booster pump station to the terminal tank. In some cases (e.g. bridge crossings, jack and bore crossings, sections within 10-feet of a parallel sewer main) another material or type of pipe may be required. Cost estimates for each alignment alternative include consideration for these circumstances. Also, the Highway 89, Bike Trail, and TTSA TRI alignments lend themselves to the installation of fiber optic conduit for future use by data, cable and cellular providers in the area. Discussions with Suddenlink Communications have indicated that while this corridor presents a significant asset to any network structure, it would be unlikely for a provider to share in the cost of construction. Providers would be more apt to lease conduit space from the District after all installation is complete. Any joint trench partner presents a future revenue source and not a cost savings in planning, design or construction.

Highway 89 Alternative

The Highway 89 alternative would include a transmission line which encroaches into the Caltrans right-of-way for about 8.5 miles along Highway 89 from Truckee to Squaw Valley. The east and west shoulders of Highway 89 present previously disturbed areas which would be highly conducive to an underground utility alignment. However, there is a significant potential for costly paving and resurfacing needed to rehabilitate the shoulder to bring it back into compliance with Caltrans specifications. In addition, Caltrans staff have indicated that all construction activities would either have to occur at night, 9 pm to 6 am, or be protected by K-rail barrier structures for the full length of work. The cost estimate provided with this memorandum assumes a mix of K-rail and traffic control personnel for three full construction seasons. Also, there are approximately 60-70 culverts that run along Highway 89 that would require a jack and bore pipeline construction method. This alternative assumes that construction would require rock excavation for up to 15% of the proposed route.

Placer County Bike Path Alternative

Placer County is currently undertaking a planning and environmental study for approximately nine miles of Class I bike trail from Truckee to Squaw Valley Road. The bike trail would average 10 to 12-feet in width, would be paved with asphalt, and would route through federal or public land for the entire length. In its completed state the bike path would also require multiple retaining walls. The cost estimate presented with this memorandum assumes that the water project could be coordinated with Placer County in such a way that the Bike Trail project would provide all paving and the majority of retaining walls. The water project would include much of the initial vegetation removal, rock excavation for up to 20% of the proposed route, grading of slopes, construction access improvements, and construct a minimal number of retaining walls. Bridge crossings would be required for the eight bridges that are indicated as a part of the most recent Bike Path alignment.

TTSA TRI Alternative

TTSA currently maintains and operates over twelve miles of sewer interceptor between Tahoe City and Truckee, commonly referred to as the TRI interceptor, with much of the alignment following the Truckee River and Highway 89 corridor favorable to the water line project. The TRI is a gravity sewer main built in the 1970's, is comprised mostly of reinforced concrete pipe (RCP), has an average depth to pipe of two to three feet, an existing 20-foot easement on USFS property, and an existing 10-foot easement on private parcels along the alignment. A water pipeline installed along this alignment would require asphalt paving in areas inside of Caltrans right of way, jack and bore construction where the alignment crosses the Truckee River, rock excavation for approximately 20% of the proposed route, and retaining walls in areas of steep side slopes. Construction would also require easements through private parcels and special construction approvals from the SWRCB to install the water main within four to ten feet of a sewer main.

USFS 06 Alternative

The USFS 06 alternative includes piping from the existing Zone 4 Water System Carson Range Tank along the USFS 06 Road to Squaw Valley Road (approximately 12.8 miles), and a jack and bored crossing of the Truckee River to get to the proposed terminal tank in Squaw Valley. This alternative has minimal costs associated with pavement restoration, traffic control, bridge reinforcement, and retaining walls. However, this alignment does have significant costs associated with the length of the alignment, rock excavation up to 40% of the proposed route, construction access, and materials staging. The alignment is in a remote location which would not lend itself to materials transport by large construction vehicles or two-way traffic. In addition, a significant re-vegetation and Best Management Practices (BMP's) effort is anticipated for this corridor.

Liberty Energy Pole Line Alternative

Research of the USFS 06 corridor alternative yielded the discovery of an existing utility corridor which may facilitate the construction of an underground water main from the Zone 4 Water System Olana Drive Tank to Squaw Valley (approximately 8.1 miles). As with the USFS 06 alignment, the Powerline alternative would require a single Truckee River crossing, rock excavation up to 60% of the length of the route, and a significant re-vegetation/BMP effort. Construction access and material staging is also a significant concern with this route. The two most significant disadvantages to this alternative is the steep rock field which the alignment descends from the bluff towards the Truckee River, and receiving consent from Liberty Energy to install an underground utility line inside of their existing easement(s).

Booster Pump Station

A booster pump station would be required for all five alternatives to supply water from the existing NCSD or TDPUD systems to the terminal water storage tank in Squaw Valley. The facility would have a minimum capacity of 650 gpm.

The three alternatives which follow the Highway 89 corridor would receive water from the TDPUD system at a maximum hydraulic grade line (HGL) of 6,170 feet. The terminal tank HGL

in Squaw Valley will be the controlling element at 6,350 feet (Zone 1A). The pumping head for this alternative would require approximately 100 horsepower (hp). The USFS 06 and Powerline alternatives would draw water from Zone 4 tanks at an elevation of approximately 6,350 and 6,515 feet, respectively. The USFS 06 alignment would have a high point near 7,200 feet in elevation, and the Powerline alignment would have a high point near 7,115 feet in elevation. The pumping head required for these two options indicate pump sizes of approximately 250 hp and 150 hp, respectively.

With all alternatives, the booster pump station would be enclosed in an 800 sq-ft (minimum) masonry block building. The pump station would house the required electrical/control equipment, necessary vertical turbine pumps, and the appropriate chemical storage facilities. The estimated cost is ranges from $1.03 million dollars to $1.12 million dollars depending on the alignment alternative.

The booster pump station does lend itself well to construction phasing. Initially, the size of the building and mechanical layout will allow for the full 650 gpm flow. But, individual pumps can be installed in phases if the District prefers. The cost reduction using this method would be seen in the purchase and installation of the vertical turbine pumps.

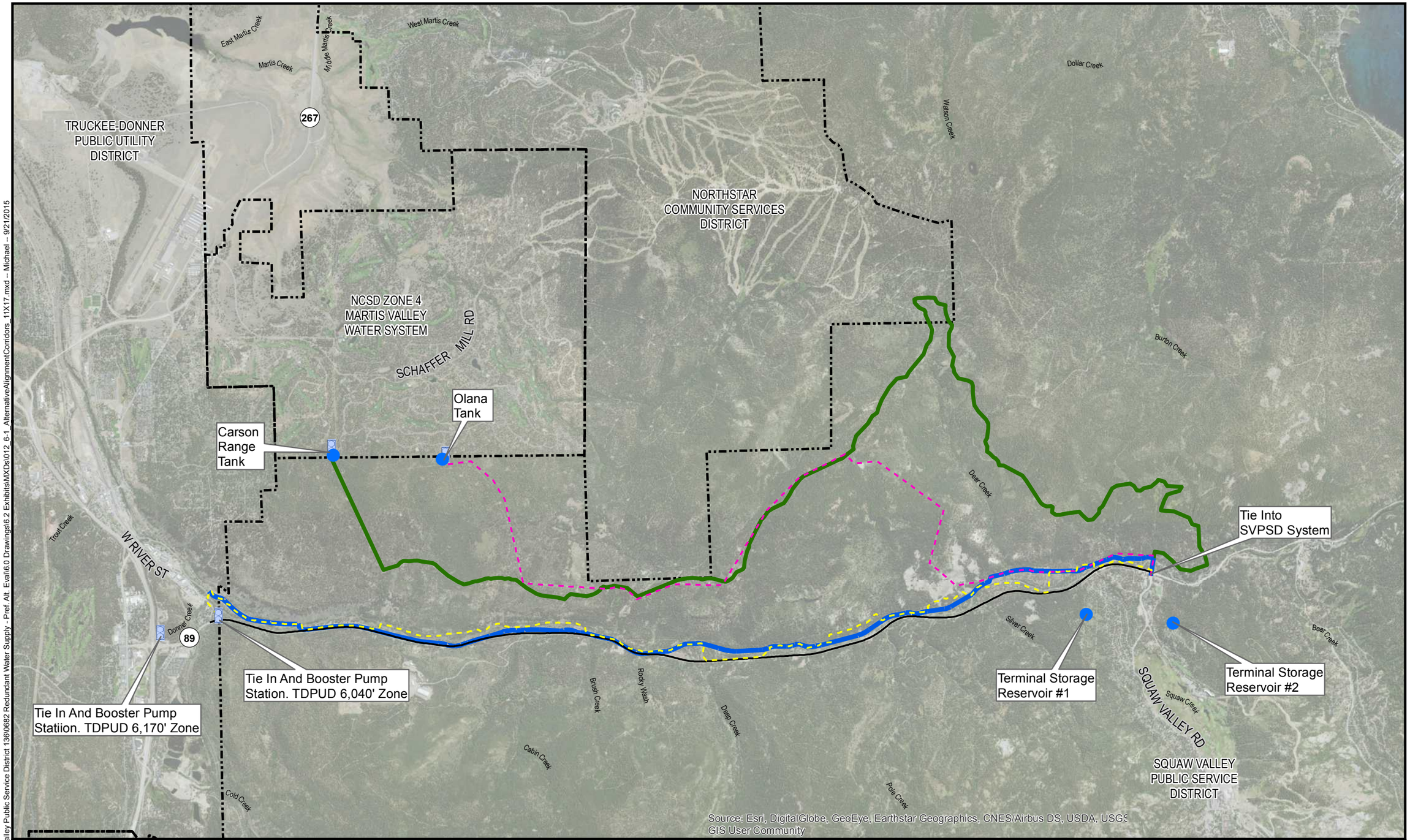
Terminal Tank

A one million gallon terminal tank located at the southern end of the water transmission main would be required for receiving the water supply. The tank would be set at an HGL of approximately 6,350 feet and create a new pressure zone in the District's system named Zone 1A. The tank could be located either somewhere north of Squaw Creek and the Painted Rock subdivision, or south of Squaw Valley Road in USFS property near the Placer County park property. The recommended tank size is based on the following criteria:

- The District's current water storage capacity is 1,780,000 gallons,
- The estimated maximum redundant water supply demand at buildout is approximately 600 gpm,
- The redundant water supply well would be constructed to meet the average day of the maximum month, or a minimum of 600 gpm,
- Storage would be required to provide maximum day and peak hour storage, as well as emergency and fire demand components,
- Operating storage would provide for one (1) days demand (600 gpm) or approximately 860,000 gallons of storage,
- Emergency storage would be sized for two (2) days demand, or approximately 1,720,000 gallons of storage,
- Fire storage would include 300,000 gallons for a 2,500 gpm fire flow and a duration of 2 hours, and
- The total system storage, including operating, emergency, and fire would be approximately 2.8 million gallons.

Based on these assumptions, an additional 1 million gallons of water storage would be necessary to meet the redundant water supply demands under buildout conditions.

Distribution system piping to connect the tank to the existing water distribution system would also be required. The three largest expenditures for the terminal tank are site piping, site work, and tank erection. The total cost of the tank is approximately $1.085 million dollars.



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LEGEND

- Storage Reservoir
- Booster Pump Station
- Bike Path Alignment
- Powerline Alignment
- USFS Alignment
- Highway 89 Alignment
- TTSA TRI Alignment
- Water Purveyor Boundary

0 2,000 4,000 Feet

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REDUNDANT WATER SUPPLY - PREFERRED ALTERNATIVE EVALUATION PROJECT
PHASE 3 - FEASIBILITY STUDY UPDATE

SHEET TITLE: FACILITIES MAP & ALIGNMENT CORRIDORS

FIGURE NUMBER: 6-1

Table 6-2 - Planning Level Cost Estimate Highway 89

Item No.	Description	Qty.	Unit	Unit Cost	Cost	
	CONSTRUCTION COSTS FOR WELL CONSTRUCTION					
1.0	**Mobilization/Demobilization**					
1.1	Mobilization/Demobilization	1	L.S.	$75,000	$75,000	
2.0	**Capital Cost**					
2.1	Drill 30-inch Diameter Borehole	100	L.F.	$200	$20,000	
2.2	Furnish and Install Conductor Casing	100	L.S.	$200	$20,000	
2.3	Drill 22-inch Nominal Exploratory Borehole	700	L.F.	$180	$126,000	
2.4	Borehole Geophysical Log	1	L.S.	$5,000	$5,000	
2.5	10-Inch Diameter Well Casing (HSLA)	250	L.F.	$100	$25,000	
2.6	10-inch Louvered Well Casing	600	L.F.	$150	$90,000	
2.7	Filter Pack	1	L.S.	$10,000	$10,000	
2.8	Sanitary Seal	1	L.S.	$7,500	$7,500	
2.9	Deviation Survey	1	L.S.	$2,500	$2,500	
2.10	Well Development	40	Hours	$350	$14,000	
2.11	Surface Completion	1	L.S.	$5,000	$5,000	
2.13	Install/Remove Test Pump	350	L.F.	$30	$10,500	
2.14	Test Pumping	250	Hrs	$220	$55,000	
2.15	Cutting Disposal	1	L.S.	$10,000	$10,000	
2.16	Well Site work	1	L.S.	$50,000	$50,000	
2.17	Well Exterior Piping	1	L.S.	$77,000	$77,000	
2.18	Well Vertical Turbine Pump	1	L.S.	$110,000	$110,000	
2.19	Well Mechanical	1	L.S.	$80,000	$80,000	
2.20	Well Disinfection	1	L.S.	$25,000	$25,000	
2.21	Well Electrical	1	L.S.	$175,000	$175,000	
2.22	Well Controls	1	L.S.	$35,000	$35,000	
2.23	Masonry Well Building	500	S.F.	$250	$125,000	
	Total Construction Cost of Well					**$ 1,153,000**
	CONSTRUCTION COSTS FOR TRANSMISSION LINE					
1.0	**Mobilization/Demobilization**					
1.1	Mobilization/Demobilization	1	L.S.	$796,918	$796,918	
2.0	**Capital Cost**					
2.1	10-inch Ductile Iron Transmission Main (HWY 89 West Shoulder)	42,729	L.F.	$175	$7,477,523	
2.2	Pavement Patch (3" AC/8" Base)	4,000	S.F.	$5.50	$22,000	
2.3	Pavement Patch (12" AC/24" Base)	342,000	S.F.	$7.50	$2,565,000	
2.4	Grind and Overlay	598,000	S.F.	$2.25	$1,345,500	
2.5	Jack and Bore (50' for Culvert Crossing, 200' for River Crossing)	3,400	L.F.	$500	$1,700,000	
2.6	Traffic Control	1	L.S.	$600,000	$600,000	
2.7	Testing and Disinfection	1	L.S.	$100,000	$100,000	
2.8	Stormwater Pollution Prevention Plan (SWPPP)	1	L.S.	$250,000	$250,000	
2.9	Revegatation/Landscape	1	L.S.	$25,000	$25,000	
2.10	Construction Access/Staging	1	L.S.	$150,000	$150,000	
2.11	Rock Excavation	6,409	L.F.	$125	$801,163	
	Total Construction Cost of the Transmission Line					**$ 15,833,000**
	CONSTRUCTION COSTS FOR BOOSTER PUMP STATION					
1.0	**Mobilization/Demobilization**					
1.1	Mobilization/Demobilization	1	L.S.	$51,834	$51,834	
2.0	**Capital Cost**					
2.1	Temporary Erosion Controls and Tree Protection	1	L.S.	$50,000	$50,000	
2.2	Pump Station Site Work	1	L.S.	$50,000	$50,000	
2.3	Pump Station Building	1	L.S.	$100,000	$100,000	
2.4	Vertical Turbine Suction Cans	1	L.S.	$25,000	$25,000	
2.5	Vertical Turbine Pumps	1	L.S.	$151,000	$151,000	
2.6	Pump Station Mechanical	1	L.S.	$175,000	$175,000	
2.7	Chlorination Equipment	1	L.S.	$20,000	$20,000	
2.8	HVAC Equipment	1	L.S.	$25,000	$25,000	
2.9	Pump Station Electrical Work	1	L.S.	$160,000	$160,000	
2.10	Primary Power Infrastructure	1	L.S.	$50,000	$50,000	
2.11	Pump Station Instrumentation and Controls Work	1	L.S.	$125,000	$125,000	
2.12	Fire Sprinker System	1	L.S.	$10,000	$10,000	
2.13	Disinfection and Testing	1	L.S.	$12,000	$12,000	
2.14	10-inch Tie-in to existing TDPUD's system	1	L.S.	$25,000	$25,000	
	Total Construction Cost for the Booster Pump Station					**$ 1,030,000**
	CONSTRUCTION COSTS FOR ONE MILLON GALLON TERMINAL TANK					
1.0	**Mobilization/Demobilization**					
1.1	Mobilization/Demobilization	1	L.S.	$54,590	$54,590	
2.0	**Capital Cost**					
2.1	Terminal Storage Tank Site Work	1	L.S.	$200,000	$200,000	
2.2	Terminal Storage Tank Site Piping	1	L.S.	$200,000	$200,000	
2.3	Terminal Storage Tank Erection	1	L.S.	$400,000	$400,000	
2.4	Terminal Storage Tank Interior Painting	1	L.S.	$75,000	$75,000	
2.5	Terminal Storage Tank Exterior Painting	1	L.S.	$25,000	$25,000	
2.6	Terminal Storage Tank Telemetry, Control and Install	1	L.S.	$50,000	$50,000	
2.7	Landscaping and Revegetation	1	L.S.	$35,000	$35,000	
2.8	Cathodic Protection Equipment	1	L.S.	$45,000	$45,000	
	Total Construction Cost for the Terminal Tank					**$ 1,085,000**
	Construction Total					**$ 19,101,000**
2.0	**Other Costs**					
2.1	EIR/Preliminary Design	1	L.S.	$500,000	$500,000	
2.2	Administrative and legal expenses (10%)	1	L.S.	$1,910,100	$1,910,100	
2.3	Engineering/Construction Management (18%)	1	L.S.	$3,438,180	$3,438,180	
2.4	Construction Contingency (10%)	1	L.S.	$1,910,100	$1,910,100	
	Other Costs Total					**$ 7,758,380**
	TOTAL PROJECT COSTS					**$ 26,860,000**

Table 6-3 - Planning Level Cost Estimate Bike Path

Item No.	Description	Qty.	Unit	Unit Cost	Cost	
	CONSTRUCTION COSTS FOR WELL CONSTRUCTION					
1.0	**Mobilization/Demobilization**					
1.1	Mobilization/Demobilization	1	L.S.	$75,000	$75,000	
2.0	**Capital Cost**					
2.1	Drill 30-inch Diameter Borehole	100	L.F.	$200	$20,000	
2.2	Furnish and Install Conductor Casing	100	L.S.	$200	$20,000	
2.3	Drill 22-inch Nominal Exploratory Borehole	700	L.F.	$180	$126,000	
2.4	Borehole Geophysical Log	1	L.S.	$5,000	$5,000	
2.5	10-Inch Diameter Well Casing (HSLA)	250	L.F.	$100	$25,000	
2.6	10-inch Louvered Well Casing	600	L.F.	$150	$90,000	
2.7	Filter Pack	1	L.S.	$10,000	$10,000	
2.8	Sanitary Seal	1	L.S.	$7,500	$7,500	
2.9	Deviation Survey	1	L.S.	$2,500	$2,500	
2.10	Well Development	40	Hours	$350	$14,000	
2.11	Surface Completion	1	L.S.	$5,000	$5,000	
2.13	Install/Remove Test Pump	350	L.F.	$30	$10,500	
2.14	Test Pumping	250	Hrs	$220	$55,000	
2.15	Cutting Disposal	1	L.S.	$10,000	$10,000	
2.16	Well Site work	1	L.S.	$50,000	$50,000	
2.17	Well Exterior Piping	1	L.S.	$77,000	$77,000	
2.18	Well Vertical Turbine Pump	1	L.S.	$110,000	$110,000	
2.19	Well Mechanical	1	L.S.	$80,000	$80,000	
2.20	Well Disinfection	1	L.S.	$25,000	$25,000	
2.21	Well Electrical	1	L.S.	$175,000	$175,000	
2.22	Well Controls	1	L.S.	$35,000	$35,000	
2.23	Masonry Well Building	500	S.F.	$250	$125,000	
	Total Construction Cost of Collection System					**$ 1,153,000**
	CONSTRUCTION COSTS FOR TRANSMISSION LINE					
1.0	**Mobilization/Demobilization**					
1.1	Mobilization/Demobilization	1	L.S.	$647,151	$647,151	
2.0	**Capital Cost**					
2.1	10-inch Ductile Iron Transmission Main (Placer Co Preferred Alignment)	47,101	L.F.	$175	$8,242,675	
2.2	Pavement Patch (3" AC/8" Base)	2,000	S.F.	$5.50	$11,000	
2.3	Grading/Retaining Walls	1	L.S.	$1,030,000	$1,030,000	
2.4	Bridge Crossing	400	LF	$500	$200,000	
2.5	Jack and Bore (50' for Culvert Crossing, 200' for River Crossing)	200	L.F.	$500	$100,000	
2.6	Traffic Control	1	L.S.	$180,000	$180,000	
2.7	Testing and Disinfection	1	L.S.	$100,000	$100,000	
2.8	Stormwater Pollution Prevention Plan (SWPPP)	1	L.S.	$250,000	$250,000	
2.9	Revegatation/Landscape	1	L.S.	$94,202	$94,202	
2.10	Construction Access/Staging	1	L.S.	$825,000	$825,000	
2.11	Rock Excavation	9,420	L.F.	$125	$1,177,525	
	Total Construction Cost of the Transmission Line					**$ 12,858,000**
	CONSTRUCTION COSTS FOR BOOSTER PUMP STATION					
1.0	**Mobilization/Demobilization**					
1.1	Mobilization/Demobilization	1	L.S.	$51,834	$51,834	
2.0	**Capital Cost**					
2.1	Temporary Erosion Controls and Tree Protection	1	L.S.	$50,000	$50,000	
2.2	Pump Station Site Work	1	L.S.	$50,000	$50,000	
2.3	Pump Station Building	1	L.S.	$100,000	$100,000	
2.4	Vertical Turbine Suction Cans	1	L.S.	$25,000	$25,000	
2.5	Vertical Turbine Pumps	1	L.S.	$151,000	$151,000	
2.6	Pump Station Mechanical	1	L.S.	$175,000	$175,000	
2.7	Chlorination Equipment	1	L.S.	$20,000	$20,000	
2.8	HVAC Equipment	1	L.S.	$25,000	$25,000	
2.9	Pump Station Electrical Work	1	L.S.	$160,000	$160,000	
2.10	Primary Power Infrastructure	1	L.S.	$50,000	$50,000	
2.11	Pump Station Instrumentation and Controls Work	1	L.S.	$125,000	$125,000	
2.12	Fire Sprinker System	1	L.S.	$10,000	$10,000	
2.13	Disinfection and Testing	1	L.S.	$12,000	$12,000	
2.14	10-inch Tie-in to existing TDPUD's system	1	L.S.	$25,000	$25,000	
	Total Construction Cost for the Booster Pump Station					**$ 1,030,000**
	CONSTRUCTION COSTS FOR ONE MILLON GALLON TERMINAL TANK					
1.0	**Mobilization/Demobilization**					
1.1	Mobilization/Demobilization	1	L.S.	$54,590	$54,590	
2.0	**Capital Cost**					
2.1	Terminal Storage Tank Site Work	1	L.S.	$200,000	$200,000	
2.2	Terminal Storage Tank Site Piping	1	L.S.	$200,000	$200,000	
2.3	Terminal Storage Tank Erection	1	L.S.	$400,000	$400,000	
2.4	Terminal Storage Tank Interior Painting	1	L.S.	$75,000	$75,000	
2.5	Terminal Storage Tank Exterior Painting	1	L.S.	$25,000	$25,000	
2.6	Terminal Storage Tank Telemetry, Control and Install	1	L.S.	$50,000	$50,000	
2.7	Landscaping and Revegetation	1	L.S.	$35,000	$35,000	
2.8	Cathodic Protection Equipment	1	L.S.	$45,000	$45,000	
	Total Construction Cost for the Terminal Tank					**$ 1,085,000**
	Construction Total					**$ 16,126,000**
2.0	**Other Costs**					
2.1	EIR/Preliminary Design	1	L.S.	$1,500,000	$1,500,000	
2.2	Administrative and legal expenses (10%)	1	L.S.	$1,612,600	$1,612,600	
2.3	Engineering/Consturction Management (18%)	1	L.S.	$2,902,680	$2,902,680	
2.4	Construction Contingency (10%)	1	L.S.	$1,612,600	$1,612,600	
	Other Costs Total					**$ 7,627,880**
	TOTAL PROJECT COSTS					**$ 23,750,000**

Table 6-4 - Planning Level Cost Estimate TTSA

Item No.	Description	Qty.	Unit	Unit Cost	Cost	
	CONSTRUCTION COSTS FOR WELL CONSTRUCTION					
1.0	**Mobilization/Demobilization**					
1.1	Mobilization/Demobilization	1	L.S.	$75,000	$75,000	
2.0	**Capital Cost**					
2.1	Drill 30-inch Diameter Borehole	100	L.F.	$200	$20,000	
2.2	Furnish and Install Conductor Casing	100	L.S.	$200	$20,000	
2.3	Drill 22-inch Nominal Exploratory Borehole	700	L.F.	$180	$126,000	
2.4	Borehole Geophysical Log	1	L.S.	$5,000	$5,000	
2.5	10-Inch Diameter Well Casing (HSLA)	250	L.F.	$100	$25,000	
2.6	10-inch Louvered Well Casing	600	L.F.	$150	$90,000	
2.7	Filter Pack	1	L.S.	$10,000	$10,000	
2.8	Sanitary Seal	1	L.S.	$7,500	$7,500	
2.9	Deviation Survey	1	L.S.	$2,500	$2,500	
2.10	Well Development	40	Hours	$350	$14,000	
2.11	Surface Completion	1	L.S.	$5,000	$5,000	
2.13	Install/Remove Test Pump	350	L.F.	$30	$10,500	
2.14	Test Pumping	250	Hrs	$220	$55,000	
2.15	Cutting Disposal	1	L.S.	$10,000	$10,000	
2.16	Well Site work	1	L.S.	$50,000	$50,000	
2.17	Well Exterior Piping	1	L.S.	$77,000	$77,000	
2.18	Well Vertical Turbine Pump	1	L.S.	$110,000	$110,000	
2.19	Well Mechanical	1	L.S.	$80,000	$80,000	
2.20	Well Disinfection	1	L.S.	$25,000	$25,000	
2.21	Well Electrical	1	L.S.	$175,000	$175,000	
2.22	Well Controls	1	L.S.	$35,000	$35,000	
2.23	Masonry Well Building	500	S.F.	$250	$125,000	
	Total Construction Cost of Collection System					**$ 1,153,000**
	CONSTRUCTION COSTS FOR TRANSMISSION LINE					
1.0	**Mobilization/Demobilization**					
1.1	Mobilization/Demobilization	1	L.S.	$638,672	$638,672	
2.0	**Capital Cost**					
2.1	10-inch Ductile Iron Transmission Main (TTSA Alignment)	43,938	L.F.	$175	$7,689,094	
2.2	Pavement Patch (3" AC/8" Base)	13,000	S.F.	$5.50	$71,500	
2.3	Pavement Patch (12" AC/24" Base)	123,025	S.F.	$7.50	$922,691	
2.4	Grind and Overlay	123,025	S.F.	$2.25	$276,807	
2.5	Jack and Bore (50' for Culvert Crossing, 200' for River Crossing)	200	L.F.	$500	$100,000	
2.6	Traffic Control	1	L.S.	$108,000	$108,000	
2.7	Testing and Disinfection	1	L.S.	$100,000	$100,000	
2.8	Stormwater Pollution Prevention Plan (SWPPP)	1	L.S.	$250,000	$250,000	
2.9	Revegatation/Landscape	1	L.S.	$87,875	$87,875	
2.10	Construction Access/Staging	1	L.S.	$769,000	$769,000	
2.11	Rock Excavation	8,788	L.F.	$125	$1,098,442	
2.12	Grading/Retaining Walls	1	L.S.	$577,000	$577,000	
	Total Construction Cost of the Transmission Line					**$ 12,689,000**
	CONSTRUCTION COSTS FOR BOOSTER PUMP STATION					
1.0	**Mobilization/Demobilization**					
1.1	Mobilization/Demobilization	1	L.S.	$51,834	$51,834	
2.0	**Capital Cost**					
2.1	Temporary Erosion Controls and Tree Protection	1	L.S.	$50,000	$50,000	
2.2	Pump Station Site Work	1	L.S.	$50,000	$50,000	
2.3	Pump Station Building	1	L.S.	$100,000	$100,000	
2.4	Vertical Turbine Suction Cans	1	L.S.	$25,000	$25,000	
2.5	Vertical Turbine Pumps	1	L.S.	$151,000	$151,000	
2.6	Pump Station Mechanical	1	L.S.	$175,000	$175,000	
2.7	Chlorination Equipment	1	L.S.	$20,000	$20,000	
2.8	HVAC Equipment	1	L.S.	$25,000	$25,000	
2.9	Pump Station Electrical Work	1	L.S.	$160,000	$160,000	
2.10	Primary Power Infrastructure	1	L.S.	$50,000	$50,000	
2.11	Pump Station Instrumentation and Controls Work	1	L.S.	$125,000	$125,000	
2.12	Fire Sprinker System	1	L.S.	$10,000	$10,000	
2.13	Disinfection and Testing	1	L.S.	$12,000	$12,000	
2.14	10-inch Tie-in to existing TDPUD's system	1	L.S.	$25,000	$25,000	
	Total Construction Cost for the Booster Pump Station					**$ 1,030,000**
	CONSTRUCTION COSTS FOR ONE MILLON GALLON TERMINAL TANK					
1.0	**Mobilization/Demobilization**					
1.1	Mobilization/Demobilization	1	L.S.	$54,590	$54,590	
2.0	**Capital Cost**					
2.1	Terminal Storage Tank Site Work	1	L.S.	$200,000	$200,000	
2.2	Terminal Storage Tank Site Piping	1	L.S.	$200,000	$200,000	
2.3	Terminal Storage Tank Erection	1	L.S.	$400,000	$400,000	
2.4	Terminal Storage Tank Interior Painting	1	L.S.	$75,000	$75,000	
2.5	Terminal Storage Tank Exterior Painting	1	L.S.	$25,000	$25,000	
2.6	Terminal Storage Tank Telemetry, Control and Install	1	L.S.	$50,000	$50,000	
2.7	Landscaping and Revegetation	1	L.S.	$35,000	$35,000	
2.8	Cathodic Protection Equipment	1	L.S.	$45,000	$45,000	
	Total Construction Cost for the Terminal Tank					**$ 1,085,000**
	Construction Total					**$ 15,957,000**
2.0	**Other Costs**					
2.1	EIR/Preliminary Design	1	L.S.	$1,500,000	$1,500,000	
2.2	Administrative and legal expenses (10%)	1	L.S.	$1,595,700	$1,595,700	
2.3	Engineering/Consturction Management (18%)	1	L.S.	$2,872,260	$2,872,260	
2.4	Construction Contingency (10%)	1	L.S.	$1,595,700	$1,595,700	
	Other Costs Total					**$ 7,563,660**
	TOTAL PROJECT COSTS					**$ 23,520,000**

Table 6-5 - Planning Level Cost Estimate USFS 06

Item No.	Description	Qty.	Unit	Unit Cost	Cost	
	CONSTRUCTION COSTS FOR WELL CONSTRUCTION					
1.0	**Mobilization/Demobilization**					
1.1	Mobilization/Demobilization	1	L.S.	$75,000	$75,000	
2.0	**Capital Cost**					
2.1	Drill 30-inch Diameter Borehole	100	L.F.	$200	$20,000	
2.2	Furnish and Install Conductor Casing	100	L.S.	$200	$20,000	
2.3	Drill 22-inch Nominal Exploratory Borehole	700	L.F.	$180	$126,000	
2.4	Borehole Geophysical Log	1	L.S.	$5,000	$5,000	
2.5	10-Inch Diameter Well Casing (HSLA)	250	L.F.	$100	$25,000	
2.6	10-inch Louvered Well Casing	600	L.F.	$150	$90,000	
2.7	Filter Pack	1	L.S.	$10,000	$10,000	
2.8	Sanitary Seal	1	L.S.	$7,500	$7,500	
2.9	Deviation Survey	1	L.S.	$2,500	$2,500	
2.10	Well Development	40	Hours	$350	$14,000	
2.11	Surface Completion	1	L.S.	$5,000	$5,000	
2.13	Install/Remove Test Pump	350	L.F.	$30	$10,500	
2.14	Test Pumping	250	Hrs	$220	$55,000	
2.15	Cutting Disposal	1	L.S.	$10,000	$10,000	
2.16	Well Site work	1	L.S.	$50,000	$50,000	
2.17	Well Exterior Piping	1	L.S.	$77,000	$77,000	
2.18	Well Vertical Turbine Pump	1	L.S.	$110,000	$110,000	
2.19	Well Mechanical	1	L.S.	$80,000	$80,000	
2.20	Well Disinfection	1	L.S.	$25,000	$25,000	
2.21	Well Electrical	1	L.S.	$175,000	$175,000	
2.22	Well Controls	1	L.S.	$35,000	$35,000	
2.23	Masonry Well Building	500	S.F.	$250	$125,000	
	Total Construction Cost of Collection System					**$ 1,153,000**
	CONSTRUCTION COSTS FOR TRANSMISSION LINE					
1.0	**Mobilization/Demobilization**					
1.1	Mobilization/Demobilization	1	L.S.	$997,390	$997,390	
2.0	**Capital Cost**					
2.1	10-inch Ductile Iron Transmission Main (FS06 Alignment)	67,613	L.F.	$175	$11,832,303	
2.2	Pavement Patch (3" AC/8" Base)	3,000	S.F.	$5.50	$16,500	
2.3	Jack and Bore (50' for Culvert Crossing, 200' for River Crossing)	200	L.F.	$500	$100,000	
2.4	Traffic Control	1	L.S.	$45,000	$45,000	
2.5	Testing and Disinfection	1	L.S.	$100,000	$100,000	
2.6	Stormwater Pollution Prevention Plan (SWPPP)	1	L.S.	$250,000	$250,000	
2.7	Revegatation/Landscape	1	L.S.	$135,226	$135,226	
2.8	Construction Access/Staging	1	L.S.	$2,959,000	$2,959,000	
2.9	Rock Excavation	27,045	L.F.	$125	$3,380,658	
	Total Construction Cost of the Transmission Line					**$ 19,816,000**
	CONSTRUCTION COSTS FOR BOOSTER PUMP STATION					
1.0	**Mobilization/Demobilization**					
1.1	Mobilization/Demobilization	1	L.S.	$56,445	$56,445	
2.0	**Capital Cost**					
2.1	Temporary Erosion Controls and Tree Protection	1	L.S.	$50,000	$50,000	
2.2	Pump Station Site Work	1	L.S.	$50,000	$50,000	
2.3	Pump Station Building	1	L.S.	$100,000	$100,000	
2.4	Vertical Turbine Suction Cans	1	L.S.	$35,000	$35,000	
2.5	Vertical Turbine Pumps	1	L.S.	$188,000	$188,000	
2.6	Pump Station Mechanical	1	L.S.	$185,000	$185,000	
2.7	Chlorination Equipment	1	L.S.	$20,000	$20,000	
2.8	HVAC Equipment	1	L.S.	$25,000	$25,000	
2.9	Pump Station Electrical Work	1	L.S.	$170,000	$170,000	
2.10	Primary Power Infrastructure	1	L.S.	$60,000	$60,000	
2.11	Pump Station Instrumentation and Controls Work	1	L.S.	$135,000	$135,000	
2.12	Fire Sprinker System	1	L.S.	$10,000	$10,000	
2.13	Disinfection and Testing	1	L.S.	$12,000	$12,000	
2.14	10-inch Tie-in to existing NCSD's system	1	L.S.	$25,000	$25,000	
	Total Construction Cost for the Booster Pump Station					**$ 1,121,000**
	CONSTRUCTION COSTS FOR ONE MILLON GALLON TERMINAL TANK					
1.0	**Mobilization/Demobilization**					
1.1	Mobilization/Demobilization	1	L.S.	$54,590	$54,590	
2.0	**Capital Cost**					
2.1	Terminal Storage Tank Site Work	1	L.S.	$200,000	$200,000	
2.2	Terminal Storage Tank Site Piping	1	L.S.	$200,000	$200,000	
2.3	Terminal Storage Tank Erection	1	L.S.	$400,000	$400,000	
2.4	Terminal Storage Tank Interior Painting	1	L.S.	$75,000	$75,000	
2.5	Terminal Storage Tank Exterior Painting	1	L.S.	$25,000	$25,000	
2.6	Terminal Storage Tank Telemetry, Control and Install	1	L.S.	$50,000	$50,000	
2.7	Landscaping and Revegetation	1	L.S.	$35,000	$35,000	
2.8	Cathodic Protection Equipment	1	L.S.	$45,000	$45,000	
	Total Construction Cost for the Terminal Tank					**$ 1,085,000**
	Construction Total					**$ 23,175,000**
2.0	**Other Costs**					
2.1	EIR/Preliminary Design	1	L.S.	$1,500,000	$1,500,000	
2.2	Administrative and legal expenses (10%)	1	L.S.	$2,317,500	$2,317,500	
2.3	Engineering/Consturction Management (18%)	1	L.S.	$4,171,500	$4,171,500	
2.4	Construction Contingency (10%)	1	L.S.	$2,317,500	$2,317,500	
	Other Costs Total					**$ 10,306,500**
	TOTAL PROJECT COSTS					**$ 33,480,000**

Table 6-6 - Planning Level Cost Estimate Powerline

Item No.	Description	Qty.	Unit	Unit Cost	Cost	
	CONSTRUCTION COSTS FOR WELL CONSTRUCTION					
1.0	**Mobilization/Demobilization**					
1.1	Mobilization/Demobilization	1	L.S.	$75,000	$75,000	
2.0	**Capital Cost**					
2.1	Drill 30-inch Diameter Borehole	100	L.F.	$200	$20,000	
2.2	Furnish and Install Conductor Casing	100	L.S.	$200	$20,000	
2.3	Drill 22-inch Nominal Exploratory Borehole	700	L.F.	$180	$126,000	
2.4	Borehole Geophysical Log	1	L.S.	$5,000	$5,000	
2.5	10-Inch Diameter Well Casing (HSLA)	250	L.F.	$100	$25,000	
2.6	10-inch Louvered Well Casing	600	L.F.	$150	$90,000	
2.7	Filter Pack	1	L.S.	$10,000	$10,000	
2.8	Sanitary Seal	1	L.S.	$7,500	$7,500	
2.9	Deviation Survey	1	L.S.	$2,500	$2,500	
2.10	Well Development	40	Hours	$350	$14,000	
2.11	Surface Completion	1	L.S.	$5,000	$5,000	
2.13	Install/Remove Test Pump	350	L.F.	$30	$10,500	
2.14	Test Pumping	250	Hrs	$220	$55,000	
2.15	Cutting Disposal	1	L.S.	$10,000	$10,000	
2.16	Well Site work	1	L.S.	$50,000	$50,000	
2.17	Well Exterior Piping	1	L.S.	$77,000	$77,000	
2.18	Well Vertical Turbine Pump	1	L.S.	$110,000	$110,000	
2.19	Well Mechanical	1	L.S.	$80,000	$80,000	
2.20	Well Disinfection	1	L.S.	$25,000	$25,000	
2.21	Well Electrical	1	L.S.	$175,000	$175,000	
2.22	Well Controls	1	L.S.	$35,000	$35,000	
2.23	Masonry Well Building	500	S.F.	$250	$125,000	
	Total Construction Cost of Collection System					**$ 1,153,000**
	CONSTRUCTION COSTS FOR TRANSMISSION LINE					
1.0	**Mobilization/Demobilization**					
1.1	Mobilization/Demobilization	1	L.S.	$698,060	$698,060	
2.0	**Capital Cost**					
2.1	10-inch Ductile Iron Transmission Main (FS06 Alignment)	42,857	L.F.	$175	$7,499,888	
2.2	Pavement Patch (3" AC/8" Base)	200	S.F.	$5.50	$1,100	
2.3	Pavement Patch (12" AC/24" Base)	0	S.F.	$7.50	$0	
2.4	Grind and Overlay	0	S.F.	$2.25	$0	
2.5	Jack and Bore (50' for Culvert Crossing, 200' for River Crossing)	200	L.F.	$500	$100,000	
2.6	Traffic Control	1	L.S.	$45,000	$45,000	
2.7	Testing and Disinfection	1	L.S.	$100,000	$100,000	
2.8	Stormwater Pollution Prevention Plan (SWPPP)	1	L.S.	$250,000	$250,000	
2.9	Revegatation/Landscape	1	L.S.	$85,713	$85,713	
2.10	Construction Access/Staging	1	L.S.	$1,875,000	$1,875,000	
2.11	Rock Excavation	25,714	L.F.	$125	$3,214,238	
	Total Construction Cost of the Transmission Line					**$ 13,869,000**
	CONSTRUCTION COSTS FOR BOOSTER PUMP STATION					
1.0	**Mobilization/Demobilization**					
1.1	Mobilization/Demobilization	1	L.S.	$53,848	$53,848	
2.0	**Capital Cost**					
2.1	Temporary Erosion Controls and Tree Protection	1	L.S.	$50,000	$50,000	
2.2	Pump Station Site Work	1	L.S.	$50,000	$50,000	
2.3	Pump Station Building	1	L.S.	$100,000	$100,000	
2.4	Vertical Turbine Suction Cans	1	L.S.	$30,000	$30,000	
2.5	Vertical Turbine Pumps	1	L.S.	$164,000	$164,000	
2.6	Pump Station Mechanical	1	L.S.	$180,000	$180,000	
2.7	Chlorination Equipment	1	L.S.	$20,000	$20,000	
2.8	HVAC Equipment	1	L.S.	$25,000	$25,000	
2.9	Pump Station Electrical Work	1	L.S.	$165,000	$165,000	
2.10	Primary Power Infrastructure	1	L.S.	$55,000	$55,000	
2.11	Pump Station Instrumentation and Controls Work	1	L.S.	$130,000	$130,000	
2.12	Fire Sprinker System	1	L.S.	$10,000	$10,000	
2.13	Disinfection and Testing	1	L.S.	$12,000	$12,000	
2.14	10-inch Tie-in to existing NCSD's system	1	L.S.	$25,000	$25,000	
	Total Construction Cost for the Booster Pump Station					**$ 1,070,000**
	CONSTRUCTION COSTS FOR ONE MILLON GALLON TERMINAL TANK					
1.0	**Mobilization/Demobilization**					
1.1	Mobilization/Demobilization	1	L.S.	$54,590	$54,590	
2.0	**Capital Cost**					
2.1	Terminal Storage Tank Site Work	1	L.S.	$200,000	$200,000	
2.2	Terminal Storage Tank Site Piping	1	L.S.	$200,000	$200,000	
2.3	Terminal Storage Tank Erection	1	L.S.	$400,000	$400,000	
2.4	Terminal Storage Tank Interior Painting	1	L.S.	$75,000	$75,000	
2.5	Terminal Storage Tank Exterior Painting	1	L.S.	$25,000	$25,000	
2.6	Terminal Storage Tank Telemetry, Control and Install	1	L.S.	$50,000	$50,000	
2.7	Landscaping and Revegetation	1	L.S.	$35,000	$35,000	
2.8	Cathodic Protection Equipment	1	L.S.	$45,000	$45,000	
	Total Construction Cost for the Terminal Tank					**$ 1,085,000**
	Construction Total					**$ 17,177,000**
2.0	**Other Costs**					
2.1	EIR/Preliminary Design	1	L.S.	$1,500,000	$1,500,000	
2.2	Administrative and legal expenses (10%)	1	L.S.	$1,717,700	$1,717,700	
2.3	Engineering/Consturction Management (18%)	1	L.S.	$3,091,860	$3,091,860	
2.4	Construction Contingency (10%)	1	L.S.	$1,717,700	$1,717,700	
	Other Costs Total					**$ 8,027,260**
	TOTAL PROJECT COSTS					**$ 25,200,000**