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NOTICE OF AVAILABILITY and INTENT TO ADOPT

NOTICE IS HEREBY GIVEN that the Mono County Community Development Department, as lead agency under California Environmental Quality Act (CEQA), has prepared an Initial Study / Negative Declaration (IS/ND) for Sierra East Homeowner Association Water System Improvement Project and is providing public notice.

Project Title: Sierra East Homeowner Association Water System Improvement Project Draft Initial Study and Negative Declaration

Project Location: Sierra East Mobile Home Park, 108952 Highway 395, approximately 1.7 miles north of the Community of Walker, California.

Project Description: The proposed project will relocate and redrill the existing Cold Well, rehabilitate the existing Hot Well, install a hot well cooling loop, install water meters, install an emergency propane generator, and construct an arsenic removal system. The purpose of the proposed Project is to comply with the federal and state drinking water standards and begin removing naturally-occurring arsenic from the potable water supply. The need for the project is in response to the February 2012 order that was issued by the Mono County Health Department requiring the Sierra East Homeowner Association to comply with current arsenic maximum concentration limits (MCLs) and associated monitoring and reporting. A Negative Declaration (NegDec) has been prepared pursuant to the California Environmental Quality Act (CEQA) based on the assessment presented in the Sierra East Homeowner Association Water System Improvements Project Initial Study. The Initial Study has been augmented to address Federal Cross-cutting requirements pertaining to the National Environmental Policy Act (NEPA) that are triggered by application for grant funding through the Clean Water State Revolving Fund Program, a portion of which is federal monies provided by the United States Environmental Protection Agency (USEPA).

The public review period opened on September 10, 2015, and will close at 5pm on Friday, October 9, 2015. Any comments concerning the findings of the proposed Initial Study/Negative Declaration must be submitted in writing and received by Mono County no later than 5 p.m. on October 9, 2015. Comments received will be considered by Mono County prior to certification of the Negative Declaration and action on the proposed project. Mono County will adopt the Negative Declaration on or about October 16, 2015. The Proposed Mitigated Negative Declaration and related documents can be viewed online at: http://monocounty.ca.gov/planning/page/projects-under-review or by visiting the Community Development Department offices in Mammoth Lakes or Bridgeport.

For additional information, comments and/or concerns, contact Gerry Le Francois at 760-924-1810 or at glefrancois@mono.ca.gov.

Sierra East Home Owner Association Water System Improvement Project

DRAFT

Initial Study and Negative Declaration

September 9, 2015

Prepared For:

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Negative Declaration

Introduction

The Sierra East Homeowners Association (SEHOA) is a community in Antelope Valley about three miles south of the town of Coleville, California. The SEHOA owns and operates a small community water system (System Number 2600622) and is responsible for providing safe drinking water to its residents. The water system receives its source water from two groundwater wells and services approximately 29 single family residential connections. Historically, both source wells have tested positive for high arsenic levels. One of the source wells has, in addition to the high arsenic level, tested positive for bacteriological contamination on occasion. In February of 2012 the SEHOA received a compliance order (No. 02-03-12-622) from the Mono County Health Department Division of Environmental Health, which requires that the SEHOA cease and desist from continuing its use of the existing system's source water and provide the system with water of satisfactory quality per Section 116655 of the California Health and Safety Code.

Highly varied groundwater quality, resulting from a complex range of hydrogeological conditions in the Antelope Valley, presents the SEHOA with various groundwater quality challenges. One of the two source wells for the SEHOA has hot water (up to 145°F) while the other source well that is about 500 feet away has cold water. Both wells have arsenic concentrations several times the Federal Maximum Contaminant Level (MCL). After receiving a compliance order from the Mono County Department of Environmental Health, the SEHOA applied for and received grant funding to pursue available options for arsenic remediation. Based on existing peak water usage and peak water usage calculated for build out of the project site, the recommended treatment alternative is an adsorption system (Alternative 2A, as detailed in Appendix A of the Initial Study).

This Negative Declaration (NegDec) has been prepared pursuant to the California Environmental Quality Act (CEQA) based on the assessment presented in the Sierra East Homeowner Association Water System Improvements Project Initial Study that is attached. The Initial Study has been augmented to address Federal Cross-cutting requirements pertaining to the National Environmental Policy Act (NEPA) that are triggered by application for grant funding

through the Clean Water State Revolving Fund Program, a portion of which is federal monies provided by the United States Environmental Protection Agency (USEPA).

Project Name and Summary

The purpose of the proposed Sierra East Homeowner Association Water System Improvement Project (Project) is to comply with the federal and state drinking water standard and begin removing naturally occurring arsenic from the potable water supply. As of January 23, 2006, water suppliers are held to a higher standard for arsenic, which was lowered from 50 ppb (parts per billion) to 10 ppb. While this is the federal maximum contaminant level, or MCL, the California Department of Health Services administers the regulatory process through county health departments. Arsenic concentrations have been tested in the SEHOA source water wells at concentrations of 29 µg/L up to 170 µg/L or approximately 3 to 17 times the primary MCL of 10 µg/L. The SEHOA operates under a domestic water supply permit issued by the Mono County Health Department Division of Environmental Health (Department). The proposed Project responds to the February 2012 order to comply with current arsenic MCL and the required monitoring and reporting.

Currently, residents of the SEHOA use point of use reverse osmosis water treatment, typically under the sink, to remove arsenic from water that is domestically consumed. In accordance with the California Health and Safety Code this is only a temporary measure until a permanent solution can be implemented that provides potable water to the entire distribution system. SEHOA received a planning grant, Agreement No. SRF13P120 and Project No. 2600622-001P, through the Drinking Water State Revolving Fund Program (DWSRF), to plan for correcting the deficiencies with the water system. As part of the planning process they contracted with R.O. Anderson Engineering to prepare the Preliminary Engineering Report, environmental documentation, and improvement plans necessary to bring the water system into compliance.

A number of water treatment systems alternatives were considered in the Preliminary Engineering Report, which was presented to the SEHOA, California Department of Health and California State Water Resources Control Board (State Water Board) on May 14, 2014. As a result of this review and the discussions that followed, a recommended Project was determined. The proposed Project will include the following components and actions:

- New Adsorption System for Removal of Arsenic;
- New Mechanical Building that will house the adsorption system and two 5000 gallon storage tanks;
- Abandon, Relocate and Redrill the existing Cold Well;
- Rehabilitate the existing Hot Well;
- New Hot Well Cooling Loop;
- New Water Meters;
- New Emergency Propane Generator; and
- Maintain the existing Mechanical Building/Community Spa for use as a Community Center and storage for the SEHOA.

Environmental Determination

An Initial Study (attached) has been prepared to assess the potential effects of the proposed improvements on the human and physical environment of the SEHOA property and proposed project area. The analysis of potential environmental impacts from the proposed Project is based on data gathered for this Project and other related projects. Additional data was obtained from personal communications and from the sources listed in Chapter 4 of the attached Initial Study.

Based on the analysis presented in the Initial Study, the proposed Project and related actions would have less-than-significant or no impacts on the environment. No additional mitigation is required.

I find that the proposed Project could not have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

Contact Person

_____	_____
Signature	**Date**
Louis Molina_____	_REHS / Environmental Health Director
Printed Name	**Title**

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Chapter 1: Introduction & Project Description

1.1 Introduction and Background

Establishing a new well with a potable water source was determined to be infeasible and therefore, an arsenic removal system has been designed. There are numerous commercially available arsenic removal systems that are effective. Since the Sierra East Homeowner Association (SEHOA) has a relatively small system with a design capacity of 27 gallons per minute (GPM) and a limited maintenance and operations budget, two types of arsenic removal systems were preliminarily planned and designed: adsorption and reverse osmosis. Other arsenic removal systems, such as coagulation and filtration, were considered but determined to be too expensive both in capital and operations and maintenance costs. The reverse osmosis alternative was considered and preliminary designs completed, but was not carried forwarded because this system produces a waste stream that has concentrations of arsenic and total dissolved solids that can be greater that groundwater concentrations. Additionally, reverse osmosis systems can be difficult to permit.

The SEHOA Water System Improvements Project (Project) will install an adsorption treatment system that addresses the SEHOA water quality concerns for arsenic at the point where source water enters the water supply distribution system and upstream of domestic connections. Additional project components include upgrades to and rehabilitation of the existing water supply system.

1.1.A *Purpose and Need*

The SEHOA proposes to relocate and redrill the existing Cold Well, rehabilitate the existing Hot Well, install a hot well cooling loop, install water meters, install an emergency propane generator, and construct an arsenic removal system. The proposed adsorption system will be housed in a new 24 foot by 30 foot mechanical building. The purpose of the proposed Project is to comply with the federal and state drinking water standards and begin removing naturally-occurring arsenic from the potable water supply. As of January 23, 2006, water suppliers are held to a higher standard for arsenic, which was lowered from 50 ppb (parts per billion) to 10 ppb. The United States Environmental Protection Agency (USEPA) sets primary maximum concentration limits (MCLs), which are legally enforceable standards to protect the health of

drinking water consumers. Secondary MCLs are non-enforceable standards for contaminants that may either cause cosmetic effects (skin discoloration) or have aesthetic effects on the water such as taste and odor. States may choose to enforce Federal secondary MCLs at their discretion. While this is the federal maximum contaminant level, or MCL, the California Department of Health Services is administering the regulatory process with compliance typically monitored through county health departments. The SEHOA operates under a domestic water supply permit issued by the Mono County Health Department Division of Environmental Health (Department). The need for the Project is in response to the February 2012 order that was issued by the Department requiring the SEHOA to comply with current arsenic MCL and associated monitoring and reporting.

1.1.B *Project Funding*

The SEHOA received a planning grant, Agreement No. SRF13P120 and Project No. 2600622-001P, through the Safe Drinking Water State Revolving Fund (SDWSRF), to address the deficiencies of the water system. As part of the planning process, the SEHOA contracted with R.O. Anderson Engineering to prepare an Preliminary Engineering Report, the environmental documentation, and improvement plans necessary to bring the water system into compliance. The arsenic removal system will be funded by the SEHOA and any construction grant funding that the SEHOA may receive.

The State Water Resources Control Board's (State Water Board) Division of Financial Assistance recently streamlined access to the Drinking Water State Revolving Fund (DWSRF), making it easier for water systems to apply for project funds that will enhance and upgrade the drinking water supplies of millions of Californians.

Brought over with the transfer of the drinking water program on July 1, 2014, the DWSRF program offers below-market-rate loans to water providers to upgrade their drinking water systems to meet state and federal safe drinking water standards. As of January 1, 2015, the Division of Financial Assistance can accept DWSRF applications online year round, making it easier for water suppliers to begin developing critical public health upgrades to drinking water systems.

In addition, the State Water Board's DWSRF Policy Handbook makes more projects eligible for DWSRF funding. Newly expanded project types include: defective water meter replacement;

treatment to address secondary MCL exceedance; and water infrastructure replacement or update, including transmission or distribution lines, groundwater wells and other infrastructure. Water providers interested in DWSRF funds can now apply at any time as there is no pre-application or invitation process. The State Water Board funds DWSRF projects on a ready-to-proceed basis and will put projects that address critical public health issues in the highest priority, including imminent water supply outages and nitrate MCL violations. The SEHOA will pursue construction funding through this application process.

1.1.C *Project Location*

The SEHOA is located in northern Mono County on the east side of Highway 395 between the towns of Coleville and Walker, California, in the southern portion of Antelope Valley, as illustrated in Figure 1-A. The West Walker River flows north towards Topaz Lake and lies immediately adjacent to the eastern boundary of SEHOA. The Sierra Nevada foothills lie just to the west of the SEHOA, with the mountains themselves being just a few miles further west. The SEHOA property is comprised of 45 parcels, bearing Mono County Assessor Parcel Numbers 0247001 through 0247044 and 0247046. Figure 1-B illustrates the extent of the SEHOA property. The use and size of these 45 parcels depicted in Figure 1-B are presented in Table 1-A. With the exception of the relocated Cold Well, the proposed water system improvements will be located in an approximately 0.22 acre project area within the SEHOA property that is along the southern boundary, as depicted on Figure 1-B and detailed on Plan Sheet C01 of Appendix B, Improvement Plan Set.

Figure 1-A: Vicinity and Location Map

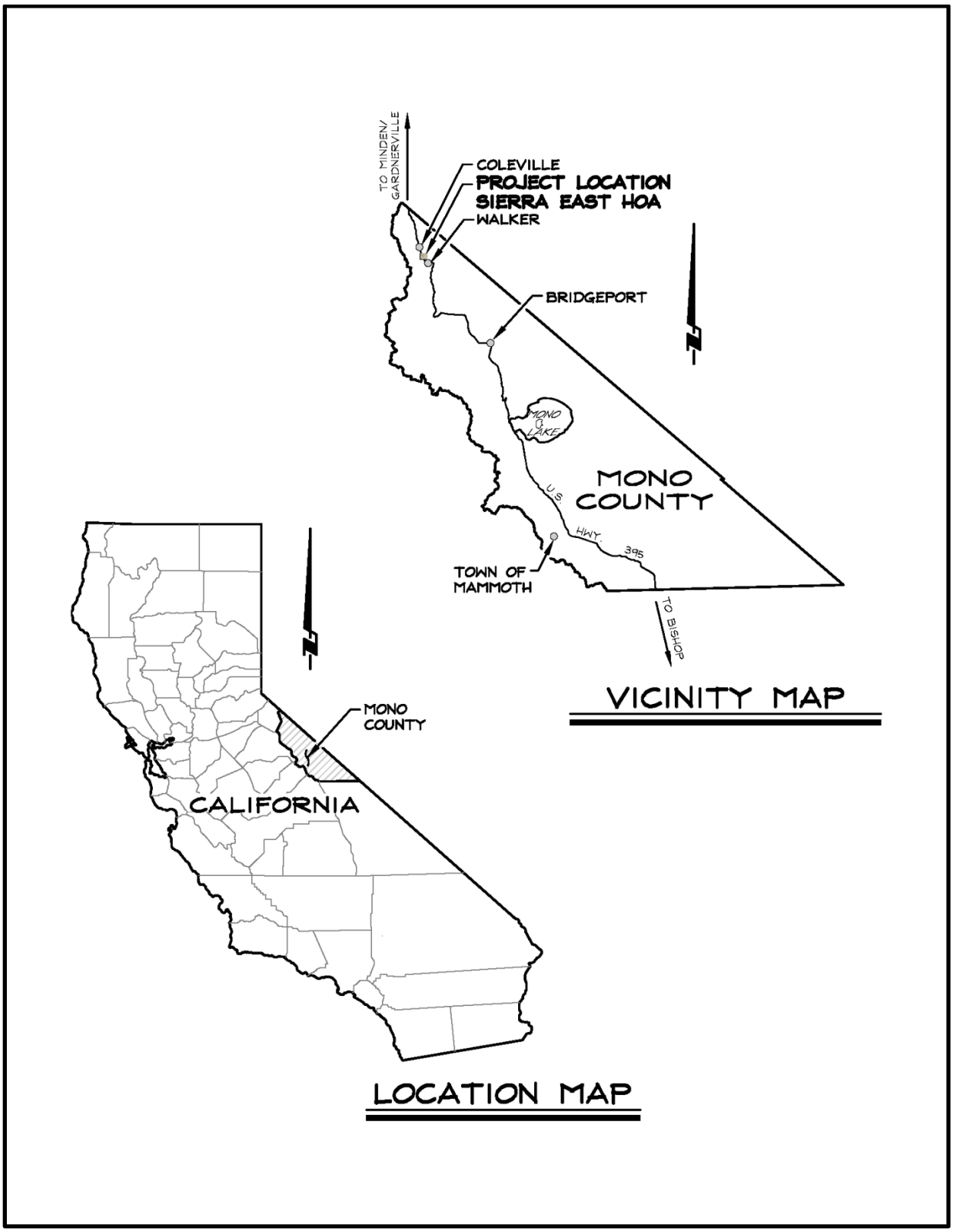


Figure 1-B: SEHOA Property and Project Site

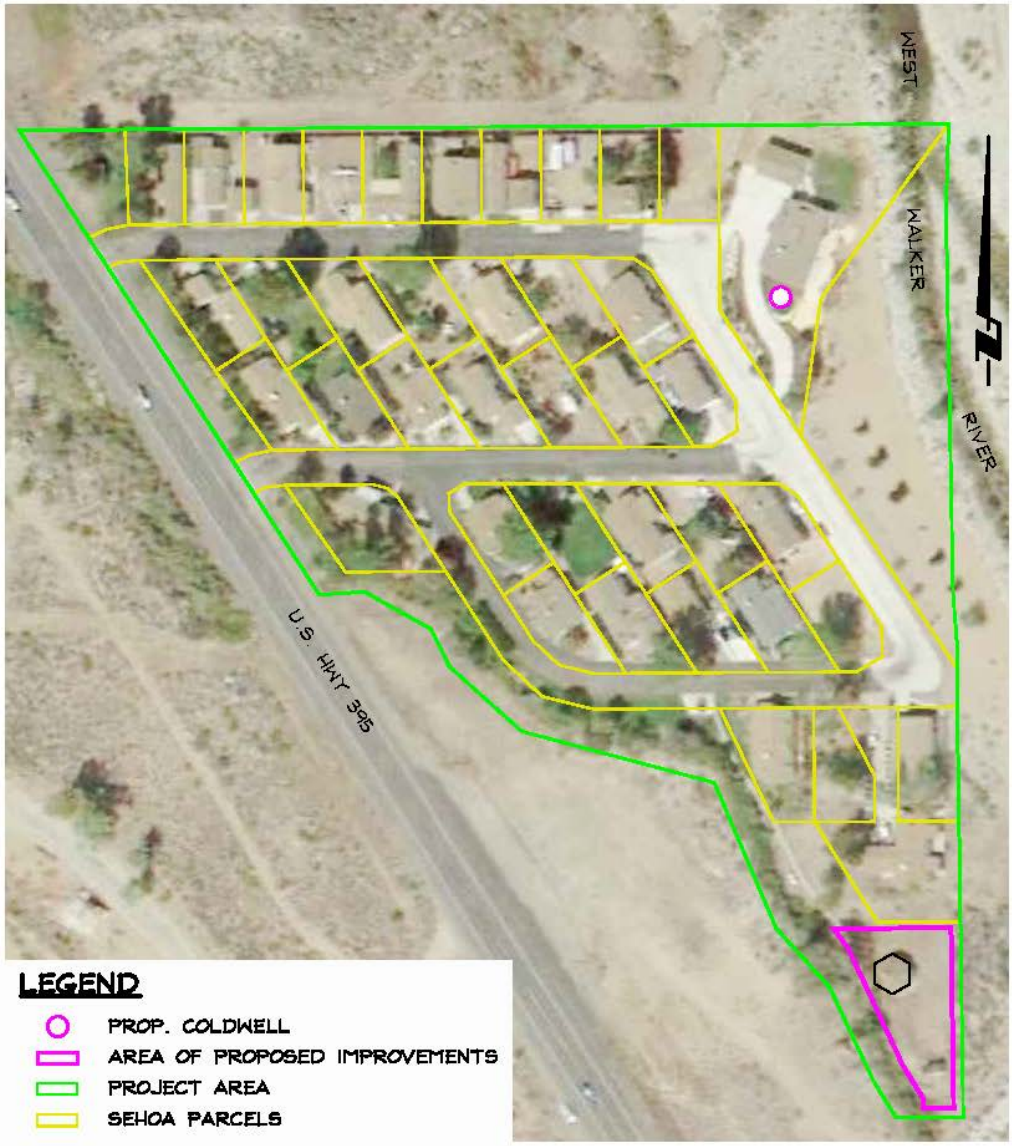


Table 1 –A: SEHOA Property Ownership			
Number of Parcels	Use	Ownership	Approximate Area (acres)
1	Streets	SEHOA and/or Mono County	1.74
1	Vacant and Unbuildable	Mono County	0.09
10	Some improvements such as parking areas, propane tanks, septic systems and some landscaping but no residences	SEHOA	0.96
29	Single family homes	Private Ownership	3.47
2	Vacant but could be developed with a single family home	Private Ownership	0.21
2	Greenbelt with some improvements including wells, the combination pump house and community center and some landscaping	SEHOA	1.77
45	**TOTALS**		**8.24**

1.2 Project Description

Figure 1-C illustrates the overall site plan for the proposed Project. Figure 1-D depicts the treatment system proposed for arsenic removal from the existing SEHOA water supply is an adsorption system. The adsorption system will be installed at the point where source water enters the water supply distribution system upstream of domestic connections. The existing infrastructure for the SEHOA water supply and distribution system is approximately 32 years old and is arranged as a single path or tree system with 3-inch mains and ¾ inch service laterals for each domestic connection. The Project will upgrade and rehabilitate the existing supply wells, but improvements to the distribution system will not be addressed. The proposed Project will include the following components and actions:

- New Adsorption System for Removal of Arsenic;

- New Mechanical Building that will house the adsorption system and two 5000 gallon storage tanks;
- Abandon, Relocate and Redrill the existing Cold Well;
- Rehabilitate the existing Hot Well;
- New Hot Well Cooling Loop;
- New Water Meters;
- New Emergency Propane Generator; and
- Maintain the existing Mechanical Building/Community Spa for use as a Community Center and storage for the SEHOA.

1.2.A *Description of the Arsenic Removal Project*

The maximum production rate of the existing Cold Well is 50 GPM (California Department of Water Resources [CDWR] Well Log No. 162959) and the maximum production rate of the existing Hot Well is 75 GPM (CDWR Well Log No. 37969). The Project will avoid substantial impacts to groundwater supplies and recharge through installation and monitoring of new water meters and installation of two 5,000 gallon storage tanks. Ultimately, the Project limits maximum production from either well or both wells in parallel to 40 GPM or less as a function of the flow control valves in the arsenic removal system. That is, maximum production rates under this Project will be less than the historic maximum production rates.

Arsenic removal by adsorption is the process by which arsenic is physically and/or chemically removed from water and attached to a porous media. Adsorption is an effective treatment process for removing both arsenic and fluoride. Figure 1-D depicts the proposed adsorption system and illustrates the arsenic removal process. The adsorption system involves taking water pumped directly from the well and diverting it through a pre-filter to remove large particles, sediment, and debris. After passing through the pre-filter, the water enters the adsorptive media canisters where arsenic and other contaminants such as fluoride are removed. Prior to the adsorptive media, calcium chloride is injected to increase hardness and mitigate the presence of silica. Adsorption, as with nearly all arsenic removal processes, requires that the incoming arsenic be oxidized into arsenate. The SEHOA source water arsenic contaminant is mainly arsenate, but there is some unoxidized arsenic that requires oxidizing by chlorination prior to treatment. Oxidation will be accomplished through the metered addition of Hypochlorite (NaOCl) and Calcium Chloride (CaCl).

Once the water has passed through the adsorptive media, it is stored in tanks and subsequently delivered to a downstream point of use. Supplemental storage of the treated water is necessary for the water supply to meet peak day demand is 27 GPM, which exceeds the pump capacity. The total minimum recommended design storage, including regulating and emergency storage, is 8,900 gallons. This storage will be provided by two identical 5,000 gallon storage tanks operating in parallel so that one tank can be taken out of service for repairs and maintenance while maintaining water service though the system.

Adsorption is a passive process and in most cases does not require a substantial pressure differential in order to operate. Depending on the pressure drop across the arsenic removal system, as determined during final design, a booster pump may not be necessary upstream of the adsorption system. However, if the treated water is stored in gravity tanks, rather than a hydropneumatic tank, booster pumps would be required to deliver the stored water to the distribution system.

1.2.B *New Mechanical Building*

A new mechanical building will be constructed to house the proposed equipment and two 5,000 gallon water storage tanks. The new building, a 24 foot by 30 foot CMU concrete block building with 10 foot high walls, will be constructed in the immediate proximity of the existing mechanical building. The building foundation pad will be elevated to at least one foot (12 inches) above the base floodplain elevation of 5,264 feet above mean sea level. An HVAC system will be installed with the new building, consisting of propane fired heater, a smaller electric heater, exhaust fan, and louvers. The mechanical building will have lighting, electric service, control systems for alarm and climate control, and a metal roll up door to facilitate moving the storage tanks in and out. Figure 1-E illustrates the components of the proposed mechanical building. Lighting will be installed near the entrance door on the proposed building. The lighting is only necessary in case of an emergency after hours. Lighting will have timers to shut off after two hours from being activated as not to cause an undue nuisance. Furthermore, the lighting will use cut-off luminaries with light directed downward. The existing mechanical building, although too small to accommodate the new adsorption system, will continue to be utilized as a Community Center and potentially for storage needs of the SEHOA.

Figure 1-C: Proposed Site Plan

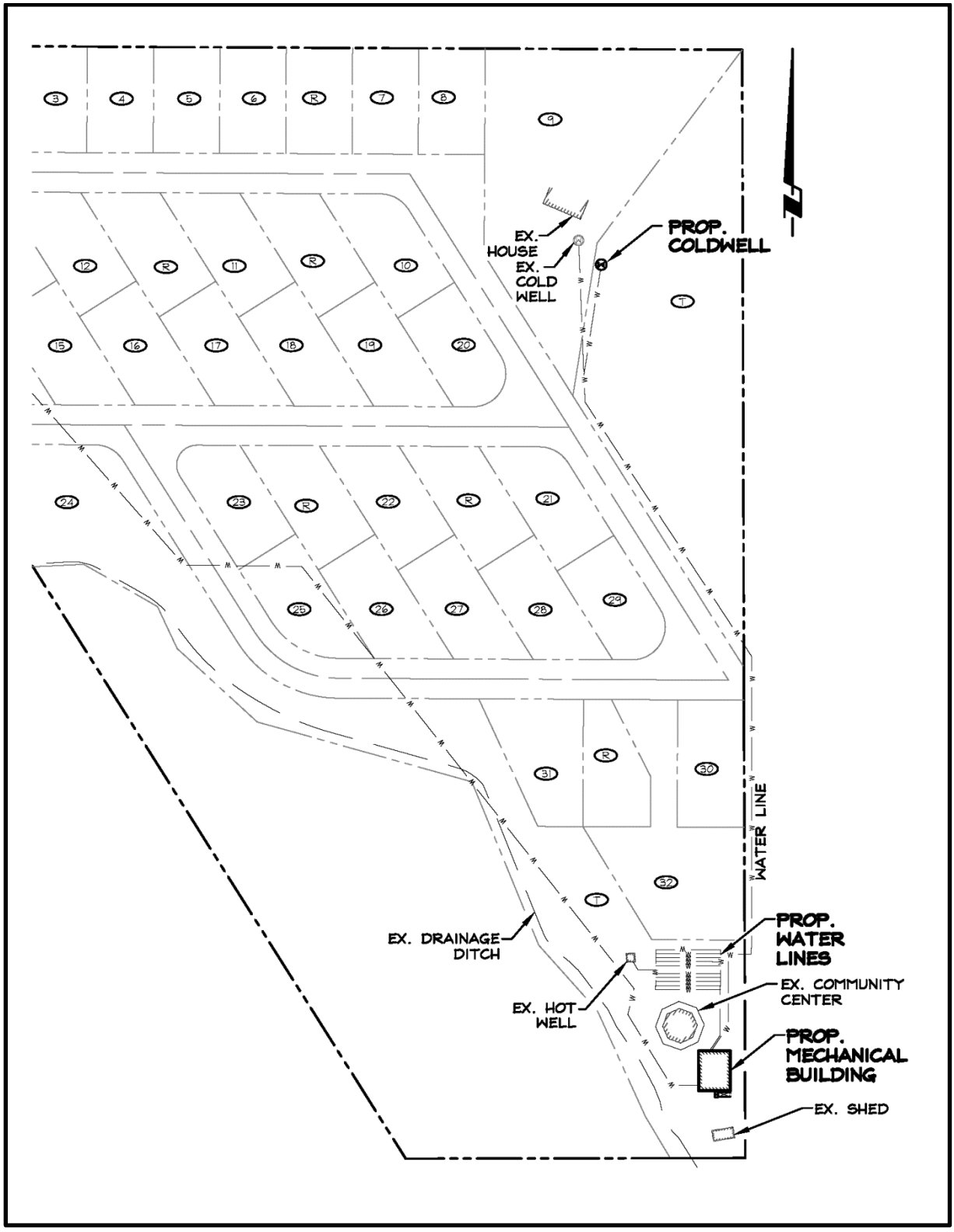


Figure 1-D: Proposed Arsenic Removal System (Adsorption)

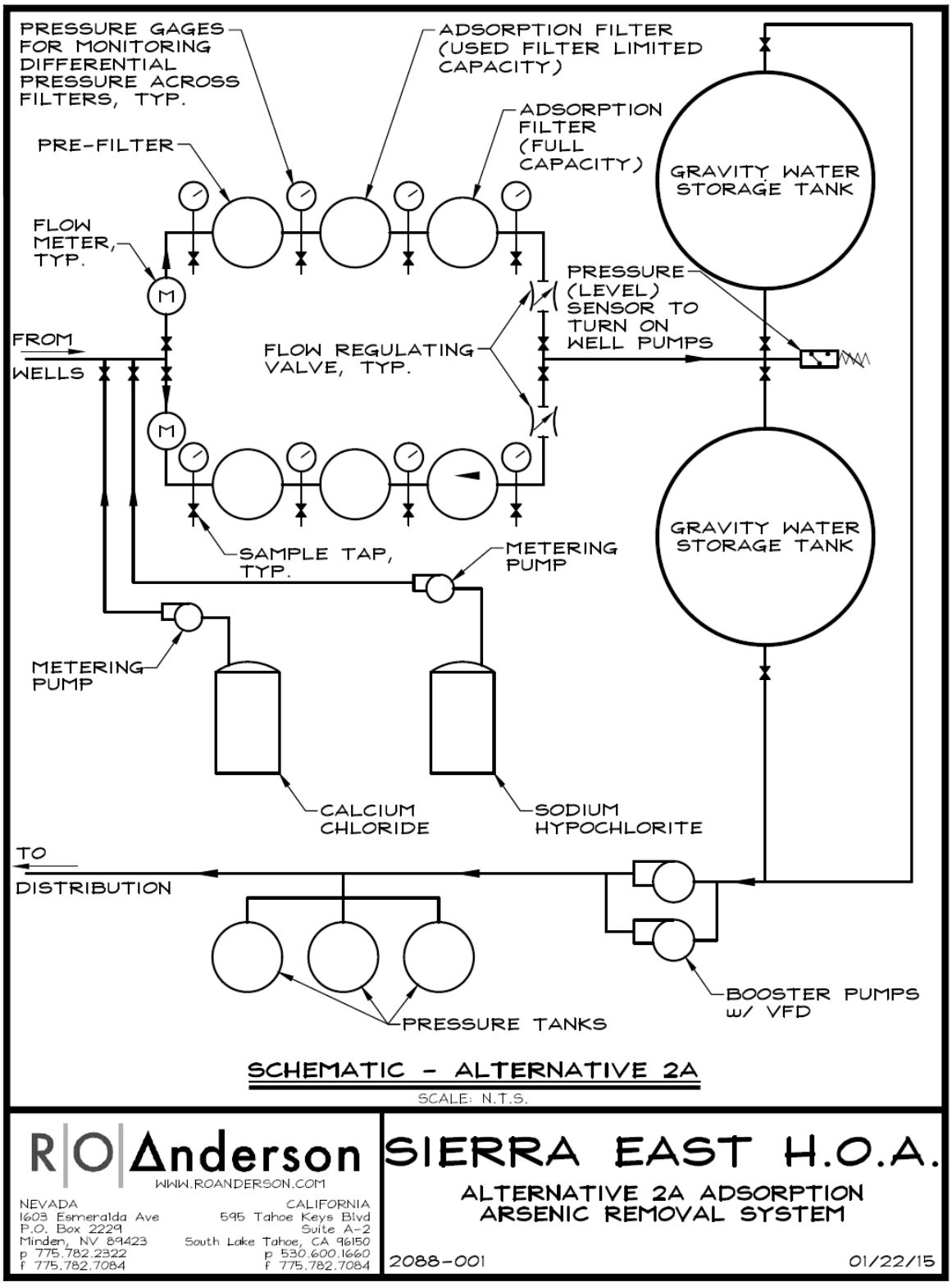
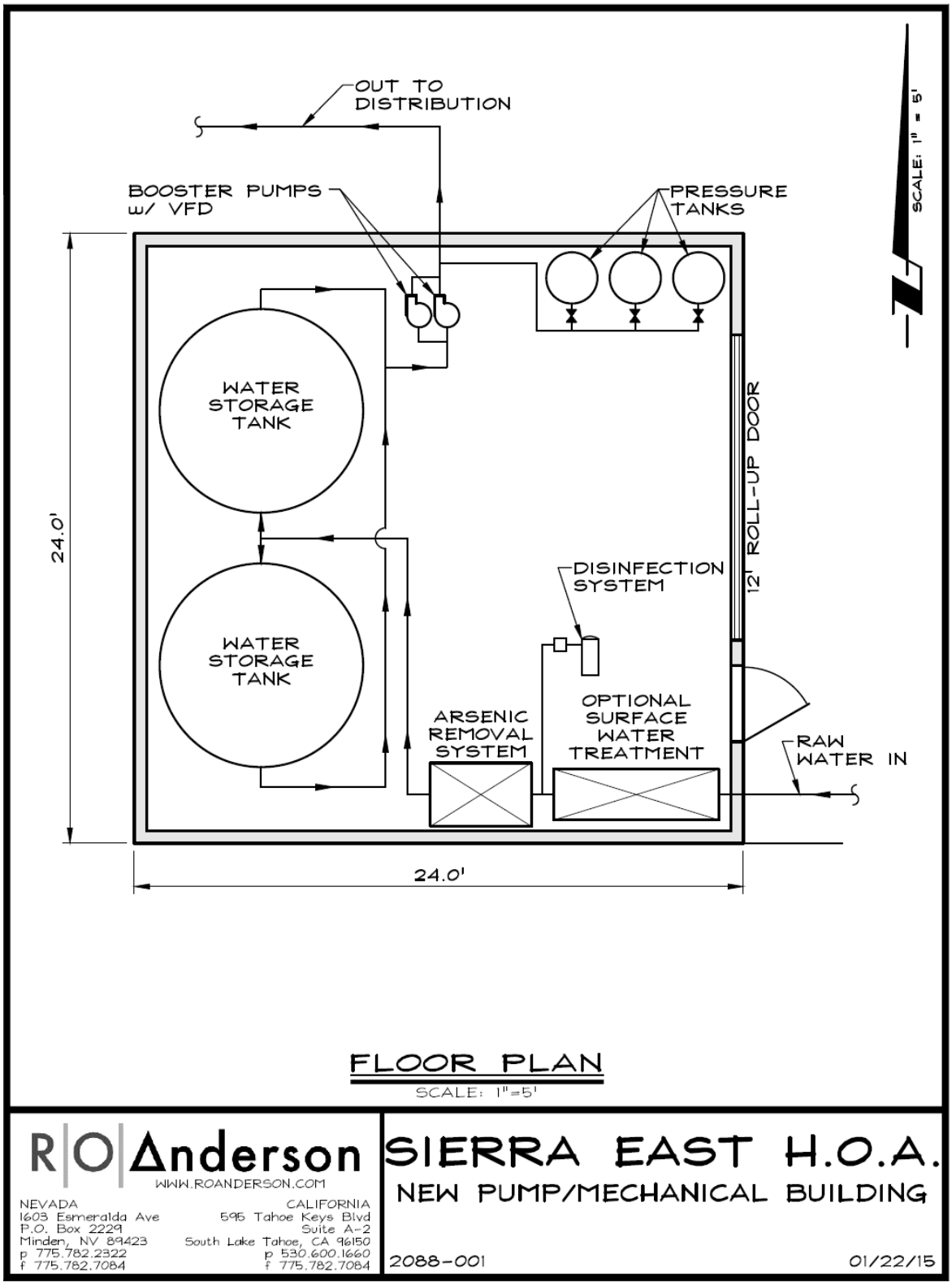


Figure 1-E. New Mechanical Building



1.2.C *Redrill the Cold Well*

The CDWR Well Log No. 162959 reports the maximum production rate of the Cold Well at 50 gallons per minute (GPM). However, the field estimated average production rate of this well is 9 GPM. The Cold Well can currently meet the minimum domestic demand; however, based on review of available data and historic water supply information, the maximum capacity of this well and its condition is uncertain. Because of the uncertainty that the Cold Well can meet the maximum daily demand of 27 GPM and because the well has had past occurrences of bacteriological contamination, the Cold Well will be abandoned at the existing location and redrilled approximately 25 feet to the southeast on property owned by the SEHOA, as depicted in Appendix A, Figure 2. The locations of existing and proposed Cold Well are also identified in Figure 1-C above. The relocated Cold Well will be designed to address corrosion, screen clogging and sanitary seal concerns and equipped with a pump sized for the maximum capacity up to 27 GPM. The relocated Cold Well will serve as the primary water supply and the final design will assure that the top of the well casing is sited above the base flood elevation of the West Walker River. The casing for existing Cold Well will be pulled, physical structures removed, and the hole will be filled and sealed with expanding grout per California Department of Water Resources specifications.

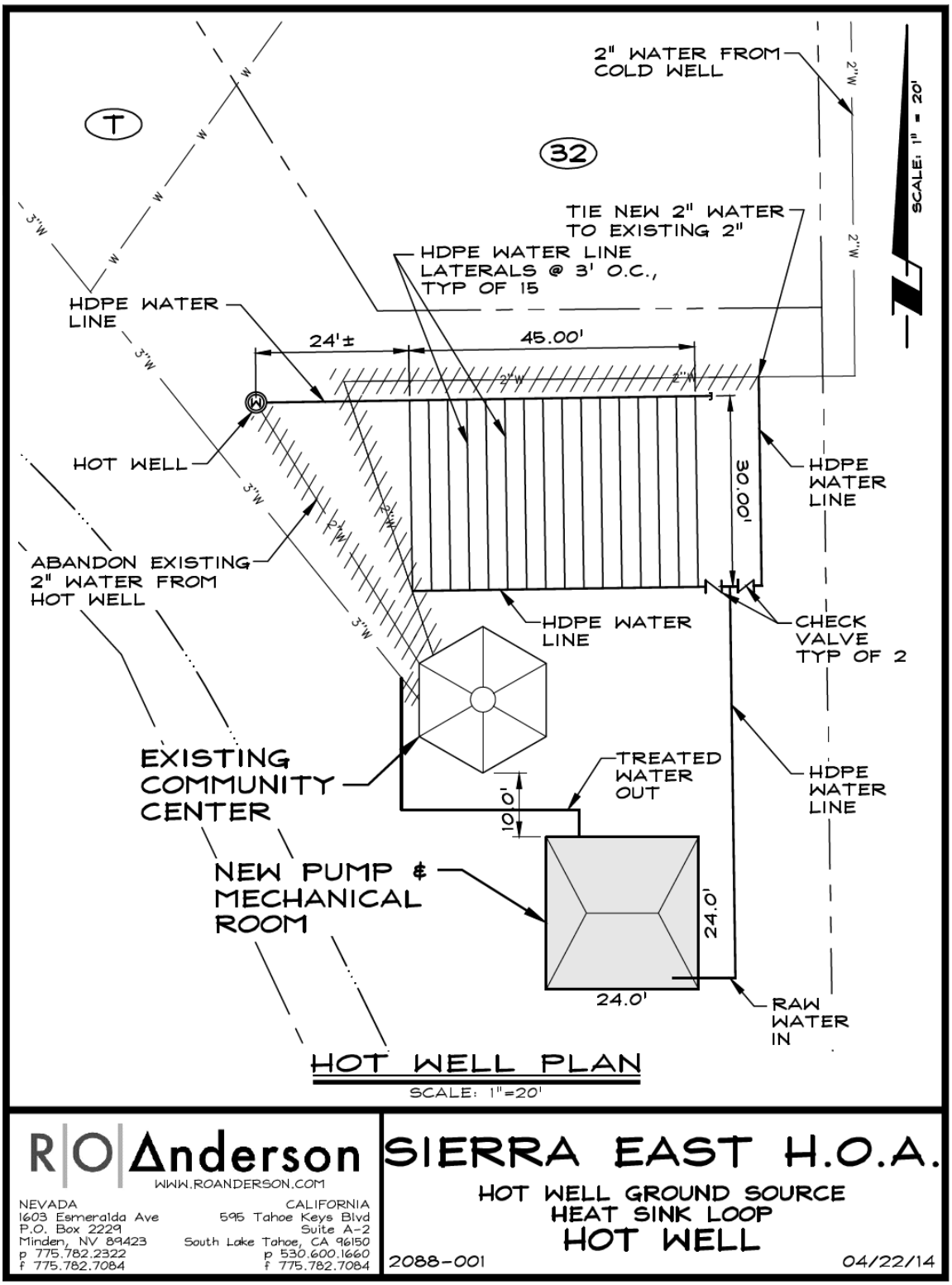
1.2.D *Rehabilitate the Hot Well*

The CDWR Well Log No. 37969 reports the maximum production rate of the Hot Well at 75 GPM. Although the actually production rate is currently unmetered, the Hot Well average production rate has been determined adequate to meet the maximum day demand of 27 GPM. The existing casing and screen will be cleaned and maintained to improve upon existing capacity. As detailed in Appendix A, the water temperature of the Hot Well is measured at 100 degrees Fahrenheit and greater, temperatures that may be detrimental to the piping materials in the water system. To reduce maximum water temperatures to temperatures that are appropriate for the arsenic removal system, a cooling loop is proposed as described in Subsection 1.2.E that follows. In order to provide for a redundant system, the Hot Well will be kept in use as an auxiliary water source and will serve as the backup water supply.

1.2.E *Hot Well Cooling Loop*

In order to provide for a redundant system, the Hot Well will be kept in use as an auxiliary water source and the proposed cooling loop will be used to reduce water temperatures before pumping through the arsenic removal and water distribution systems. Reducing water temperatures from the Hot Well reduces the cost of treatment equipment and materials and generally will provide for greater longevity of the water supply system. The Project will install a ground source heat sink (i.e., cooling) loop. Water from the Hot Well will be pumped through a buried manifold of small diameter pipes that are designed to maximize the convective surface area by which heat will dissipate into the adjacent ground material. The Cooling Loop will be installed at an approximate depth of 60 inches below ground surface, which is above the seasonal high groundwater level, as based on fault trenching performed to depths of seven feet and the absence of groundwater during these geotechnical explorations (Black Eagle Consulting 2015). The Hot Well Cooling Loop is illustrated in Figure 1-F.

Figure 1-F. Hot Well Cooling Loop



1.2.F *Water Meters*

The SEHOA system is presently un-metered. Water consumption has been estimated from measured amperage draw at the Cold Well electrical meter and from kilowatt/hour consumption on the monthly bills from Liberty Utilities for the Hot Well. Meters are an infrastructure upgrade that can be used to assess fees for the use of water and to promote water conservation. Water meters are also useful for identifying the presence and magnitude of system leakage. Meters are not considered to be an urgent need for the SEHOA; however, they will be a benefit and allow for water restrictions to be implemented if peak demand cannot be met.

Water meters will be placed on the ¾-inch service laterals to each residence and common area service with an isolation valve within the water meter vault. A touch read system is proposed, where the operator touches the lid of each meter vault with an instrument and the meter reading is transferred electronically to the instrument. The instrument is then connected to a computer and the readings are downloaded and stored electronically. The data can then be transferred to billing software that will generate monthly bills.

1.2.G *Emergency Generator*

Installation of a large generator will allow the water system to remain operational during power outages, preventing system pressure losses and gaps in service. The emergency generator will be fueled by propane and will ensure a continuous water supply during a power interruption. The proposed emergency generator will be in accordance with standards for water systems but will not meet the stricter National Fire Protection Association standards for fire protection systems.

1.2.H *Removal of Waste Generated by Treatment Process*

The adsorption process does not typically produce a waste stream. Preliminary calculations, based upon the expected amount of arsenic to be added to the cartridge in addition to the binding of the arsenic to the media along with the expected pH, indicate that spent cartridges will not be considered a hazardous waste according to California and federal guidelines and can be disposed of as a non-regulated waste (ordinary waste). However, to be in strict compliance with regulations the media will be tested following adsorption system start up to verify that cartridges are not considered hazardous. Spent cartridges can either be sent back to the manufacturer for disposal or transported to an approved disposal facility.

1.2.I *Construction and Maintenance*

Table 1-B outlines the construction timeline that is anticipated to occur over approximately four months and utilize a variety of equipment.

Table 1 –B: Project Construction Schedule

TASK	DAYS	TRIPS/DAY	TYPE
Mobilization	3	3	1 Medium Truck and 1 Large Delivery Trucks
Redrill cold well	5	2	Well Truck (Large)
Rehab hot well	5	2	Well Truck (Large)
Excavation, fill and pad preparation	14	2	Light Trucks & Onsite Equipment – Back Hoe, Excavator, Rolling Vibratory Compactor
Building construction & floor drain connection to existing septic	21	2	Light Trucks & Onsite Backhoe
Mechanical and equipment installation, electrical	21	2	Light Trucks, Delivery Trucks (large)
Cold well connection	3	2	Light Trucks
Start up and testing – transition to cold well supply through new system for potable water	3	2	Light Trucks and Sedan
Cooling loop installation	5	2	Light Trucks and Back Hoe Onsite
Hot well connection	1	2	Light Trucks
Water meter installation	14	2	Light Trucks and Back Hoe onsite
Totals	**95**	**17**	

Long-term maintenance of the arsenic removal system and facilities will involve the following:

- 95% of maintenance will be performed onsite by residents and involve no additional trips.
- Water sampling by a certified operator will occur monthly (one trip/month) utilizing a light duty sedan.
- Well maintenance will occur annually, assume one trip/year by a heavy well truck.
- Filters will likely be replaced quarterly or less, depending on water quality sampling results.
- Mechanical and electrical repairs and maintenance will occur annually, assume one trip/year in a light truck.

1.2.J *Best Management Practices Plan/Project Design Measures*

The following Best Management Practices (BMPs) and Design Features are included as part of the Project proposal.

Particulate Matter Control/Dust Control Plan. Great Basin Unified Air Pollution Control District (GBUAPCD) Rule 400 and 401 require that reasonable precautions be taken to prevent visible particulate matter from being airborne, under normal wind conditions, beyond the property from which the emissions originate. To ensure that emissions of particulate matter will be minimized, the following feasible PM10 control measures for construction activities will be implemented:

• Water active construction areas at least twice daily and more often during windy periods. Active areas adjacent to existing land uses will be kept damp, or will be treated with non-toxic stabilizers or dust palliatives.

• Apply water three times daily, or apply (non-toxic) soil stabilizers on unpaved access roads, parking areas and staging areas at construction sites.

• Sweep daily (preferably with water sweepers) paved access roads, parking areas and staging areas at construction sites.

• Hydro seed or apply non-toxic soil stabilizers to inactive construction areas.

• Enclose, cover, water twice daily, or apply non-toxic soil binders to exposed stockpiles (dirt, sand, etc.).

• Limit traffic speeds on unpaved roads to 5 mph.

• Install fiber rolls, filtration fencing or other erosion control measures to prevent silt runoff to public roadways.

• Suspend excavation and grading activity whenever the wind is so high that it results in visible dust plumes despite control efforts.

Construction Equipment Air Pollutant and Greenhouse Gas Emissions Control Plan. To ensure that emissions from construction equipment exhaust will be reduced the following measures will be implemented:

• Use alternative fuel construction equipment to the fullest extent possible.

• Minimize idling time (e.g., 5 minute maximum).

• Maintain properly tuned equipment according to equipment manufacturer's guidelines.

• Limit the hours of operation of heavy equipment and/or the amount of equipment in use as specified for noise mitigation purposes.

Pre-Construction Nest Surveys. In compliance with the Migratory Bird Treaty Act (MBTA), if project construction occurs during the nesting season between the months of April and August, the SEHOA will protect existing active bird nests and/or nursery sites impacted by construction activities:

- The SEHOA will develop an Active Raptor and Migratory Bird Protection Program (Program) to meet the requirements of the MBTA. The Program will include surveys, consultation with California Department of Fish and Wildlife (CDFW) and the US Fish and Wildlife Service (USFWS) (if necessary), and protective actions.

- Pre-construction surveys, scheduled during the nesting/breeding season and immediately prior to initial Project construction (e.g., excavation, grading and vegetation removal), will be conducted to identify active raptor and migratory bird nest sites within the project area that may not have occurred previously or were not identified during prior biological surveys.

- During initial construction activities, a qualified biological monitor will be present to determine if raptors or migratory birds are occupying trees within the project area and immediate vicinity. The biological monitor will have the authority to stop construction near occupied trees or nursery sites if construction activities appear to be negatively impacting nursery sites, nesting raptors, migratory birds or their young.

- If construction must be stopped, the biological monitor will consult with CDFW and also USFWS (if applicable) staff within 24 hours to determine appropriate actions to restart construction while avoiding and reducing impacts to identified nursery sites, raptor nests and/or migratory bird nests.

Groundwater Protection. In order to prevent groundwater degradation, the following measures will be implemented:

- Store, maintain construction equipment (except fueling by truck) at designated staging areas;

- Maintain spill cleanup equipment with fuel trucks. Cleanup fuel spills immediately;

- Minimize the amount and duration of construction materials stored onsite. Store construction materials that could adversely affect groundwater quality (e.g. paint, solvents, and fuels) on containment pallets or similar facilities that would prevent discharges to the ground in the event of a spill or leak; and

- Maintain spill cleanup materials onsite. Respond to spills and leaks immediately to contain and remove the pollutants from the site.

Prevent and Control Noxious Weeds. In order to prevent the spread of noxious weeds, the following measures will be implemented:

- It is recommended that construction vehicles, including off-road vehicles, are cleaned when they come into the project site, especially when equipment arrives from a known weed infested area. Equipment will be considered clean when visual inspection does not reveal soil, seeds, plant material, or other such debris.

- Vehicles used for project are not permitted to pull off the road other than within the project site. Stage equipment in weed-free areas to prevent vehicles from introducing or spreading noxious weeds, especially cheatgrass.

- Earth-moving equipment, gravel, fill, or other materials are required to be weed-free. Use onsite sand, gravel, rock, or organic matter when possible. Otherwise, obtain weed-free materials from gravel pits and fill sources that have been surveyed and approved.

- Minimize the amount of ground and vegetation disturbance in the construction areas. When the construction part of the project is completed, vegetation will be re-established in the disturbance footprint in order to minimize weed establishment.

- Hand pull or flag and avoid weed infestations prior to project implementation.

Construction Noise Reduction Techniques. In order to reduce construction related noise, the following measures will be implemented:

- Equipment will be adequately muffled and maintained.

- No piece of equipment which generates maximum noise levels greater than 85 dBA measured at 50 feet will be allowed on site.

Cultural Resources Eligibility Evaluations. If the SEHOA or contractor suspects that unanticipated buried cultural deposits or human remains have been encountered during any phase of project implementation, soil disturbance and construction work within 50 feet of the deposit will cease and a qualified archaeologist will be contacted immediately and retained to evaluate the significance of the discovery.

Protect Undiscovered Human Remains. If potential human remains are discovered during any project activities, ground-disturbing activity within 50 feet of the discovery will l be halted and the R.O. Anderson project engineer will be contacted immediately to coordinate evaluation of the remains by a professional archaeologist. If the remains are human, the Mono County coroner will be notified immediately according to Section 5097.98 of the State Public Resources Code and Section 7050.5 of California's Health and Safety Code. If the remains are determined by the Mono County coroner to be Native American, the Native American Heritage Commission (NAHC) will be notified within 24 hours. The NAHC will identify a Most Likely Descendant who will be designated to cooperate with R.O. Anderson, the lead agency, and the landowner to arrange for the proper disposition of the remains, according to the NAHC guidelines for the treatment and disposition of human remains.

Comply with Mono county Development Standards Floodplain Regulations - 21.160 Standards of Construction.

In areas of special flood hazard, the following standards are required:

A. Anchoring

- New construction and substantial improvements will be anchored to prevent flotation, collapse or lateral movements of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy.
- Manufactured homes will meet the anchoring standards of Section 21.190.

B. Construction Materials and Methods

- New construction and substantial improvements will be constructed with materials and utility equipment resistant to flood damage.
- New construction and substantial improvements will be constructed using methods and practices that minimize flood damage.
- New construction and substantial improvements will be constructed with electrical, heating, ventilation, plumbing and air conditioning equipment and other service facilities that are designed and/or located so as to prevent water from entering or accumulating within the components during flooding.

C. Elevations and Floodproofing

- New construction and substantial improvement of any structure will have the lowest floor, including basement, elevated to or above the base flood elevation (i.e., the depth number specified in feet on the FIRM), or at least two feet above the highest adjacent grade if no depth number is specified. Nonresidential structures may meet the standards in Section 21.160.C.2. Upon the completion of the structure the elevation of the lowest floor including basement, will be certified by a registered professional engineer or surveyor, or verified by the county building inspector to be properly elevated. Such certification or verification will be provided to the Floodplain Administrator.

- Non-residential construction will either be elevated in conformance with Section 21.160.C.1. together with attendant utility and sanitary facilities:

    a. Be floodproofed so that, below the base flood level, the structure is watertight with walls substantially impermeable to the passage of water.
    b. Have structural components capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy; and,
    c. Be certified by a registered professional engineer or architect that the standards of this subsection are satisfied. Such certifications will be provided to the Floodplain Administrator.

- Require, for new construction and substantial improvements, that fully enclosed areas below the lowest floor that are subject to flooding will be designed to automatically equalize hydrostatic flood forces on exterior walls by allowing for the entry and exit of floodwaters. Designs for meeting this requirement must either be certified by a registered professional engineer or architect or meet or exceed the following minimum criteria:

    a. Either a minimum of two openings having a total net area of not less than one square inch for every square foot of enclosed area subject to flooding will be provided. The bottom of openings will be no higher than one foot above grade. Openings may be equipped with screens, louvers, valves or other coverings or devices provided that they permit the entry and exit of flood waters; or,
    b. Be certified to comply with a local floodproofing standard approved by the Federal Insurance Administration.

- Manufactured homes will also meet the standards in Section 21.190.

D. 21.170 Standards for Utilities

- New and replacement water supply and sanitary sewage systems will be designed to minimize or eliminate infiltration of flood waters into the system and discharges from the system into flood waters.

- On-site waste disposal systems will be located to avoid impairment to them, or contamination from them during flooding.

1.2.K *Permitting*

1.2.K.1 **Mono County**

The Mono County Community Development Department (CDD), consisting of the Planning, Building and Code Compliance divisions, provides a variety of development services for the unincorporated areas of the county. The CDD will require a Building Permit.

The Mono County Public Works Department will require a Grading Permit and a waiver for development of a non-residential structure within the 100-year floodplain of the Walker River.

1.2.K.2 **Great Basin Unified Air Pollution Control District (GBUAPCD)**

Although no specific air quality plans are applicable to the project site, the GBUAPCD requires compliance with state and federal air quality standards. The project applicant must obtain permits for land disturbance with the GBUAPCD prior to operations. Compliance with permit conditions will assure that the Project does not degrade air quality.

1.3 Lead Agency

Mono County will serve as the Lead Agency as defined by the California Environmental Quality Act (CEQA). The Mono County Community Development Department is processing this document for public review and comment. The approval of this project and certification of this Initial Study and Negative Declaration will be Louis Molina, REHS / Environmental Health Director, Mono County Health Department.

1.4 Environmental Review

Mono County will use this Initial Study to identify potential environmental constraints associated with the Project and to solicit input regarding the Project from agencies and the general public. This document is prepared in accordance with CEQA and the CEQA Guidelines. This Initial Study will also be used in support of a Negative Declaration when considering the approval of the project. The federal USEPA funding requires that the environmental effects of the actions proposed under the Drinking Water State Revolving Fund (DWSRF) grant program be subject to the National Environmental Policy Act (NEPA).

The State Water Board is required to comply with CEQA when funding a project. The DWSRF Program receives partial funding from the USEPA. Due to the federal nexus with USEPA, projects pursuing DWSRF financing must also comply with requirements of the federal authorities and environmental statutes (referred to as the federal cross-cutters). The Environmental Review Unit in the Division of Financial Assistance fulfills the State Water Board's responsibility to comply with CEQA and federal environmental laws by reviewing the environmental documents provided by the applicant and developing the State Water Board's environmental findings.

The Initial Study will be circulated for public and agency review from September 10, 2015 to October 9, 2015. Copies of the document are available during normal operating hours at the Mono County Community Development Department offices in Bridgeport located at 74 North School Street, Annex 1, Bridgeport, CA and in Mammoth Lakes at 437 Old Mammoth Road, Minaret Village Mall, Suite P, Mammoth Lakes, CA . The document can be found online at the following web address: http://monocounty.ca.gov/planning/page/projects-under-review

Approval of this Initial Study and Negative Declaration will be the week of October 12, 2015, after the close of comments. The Mono County Environmental Health Department will be certifying this document.

Comments on this document must be received by 5:00 p.m. on October 9, 2015. Comments can be e-mailed to glefrancois@mono.ca.gov or sent via mail to:

C/O Gerry LeFrancois, Principal Planner
Mono County Community Development Department
P.O. Box 347
Mammoth Lakes, CA 93546

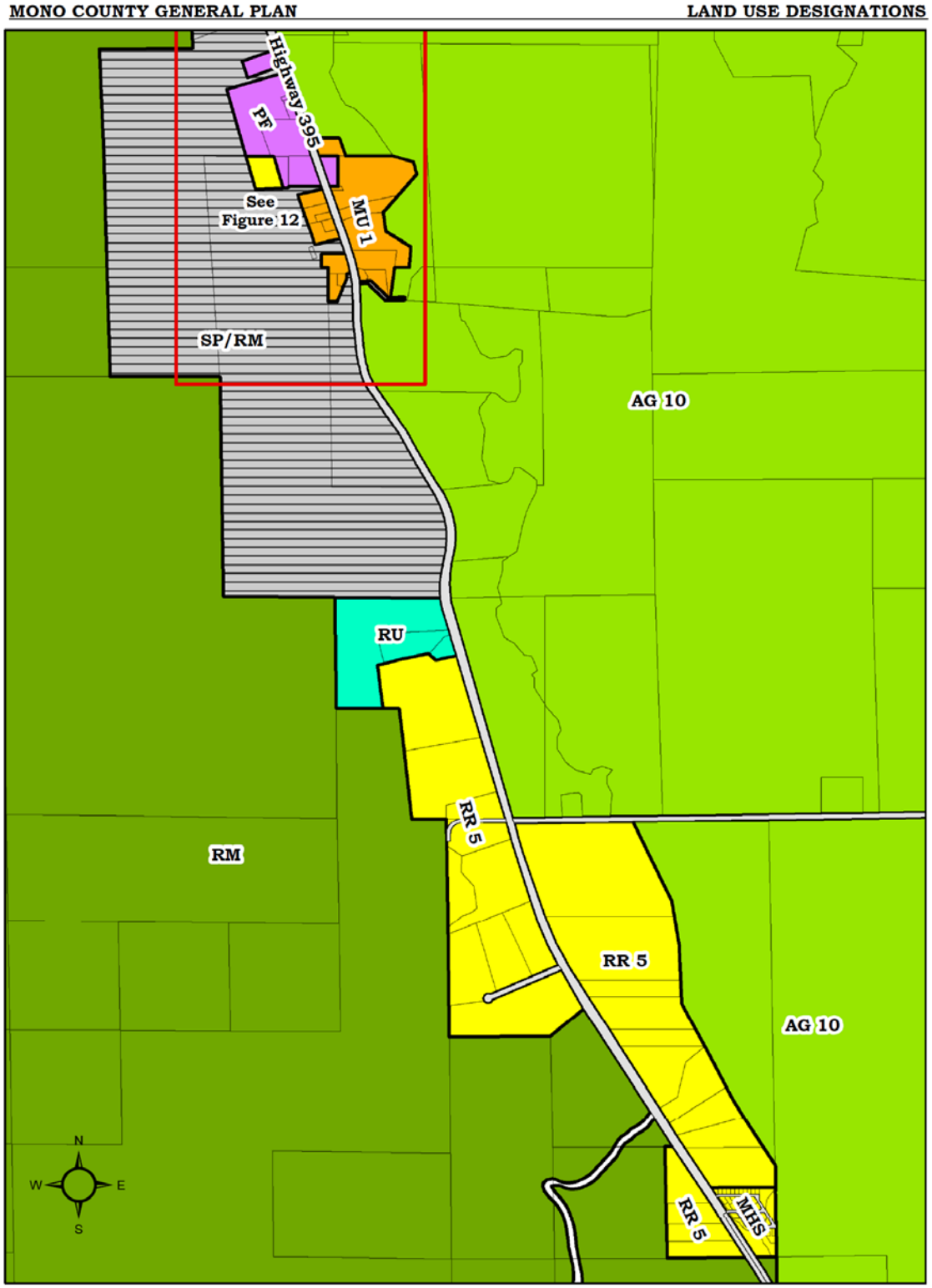
1.5 General Plan Designation

The Mono County General Plan land use designation is a general category or class of land use activity (e.g., "residential," "commercial" or "industrial") that is permitted to occur on specific parcels of land in the unincorporated area of the county that have been duly assigned that designation by the County pursuant to the Land Use Element of the General Plan. Land use designations are generally described in Section IV of the Land Use Element and their specific assignments to individual parcels of land in the unincorporated area of the county are depicted in the Land Use Maps set forth in Section VII of the Land Use Element. Because assigned land use designations essentially create regulatory boundaries or areas within which certain permitted uses may occur, parcels of land are sometimes described under these Land Development Regulations as being located within their assigned land use designations.

The proposed Project will be located in an area designated as a Manufactured Housing Subdivision land use district (MHS) as defined in the Mono County General Plan. Manufactured Housing Subdivisions may be allowed, subject to a Use Permit and Tract Map application, in the following land use designations: MFR-H (Manufactured Home Site), ER (Estate Residential) and RR (Rural Residential). The project site is surrounded by other residential, resource protection, and agricultural land uses and properties designated Residential (RR-5), Resource Management (RM) and Agriculture (AG-10).

The Mono County General Plan designates land use for the project area is depicted on Land Use Designation Map Figure 11 – Coleville Area, which is included below as Figure 1-G.

Figure 1-G: Mono Land Use Designations Map –Coleville Area



Coleville Area Figure 11

Chapter 2: Environmental Setting

2.1 Setting Overview

The Sierra East Homeowner Association (SEHOA) is located in Mono County between the communities of Coleville and Walker, which are located along US Highway 395. The SEHOA covers an area of approximately 8.24 acres and services approximately 29 single family residential connections. The SEHOA sits east of US Highway 395 and west of the West Fork of the Walker River in the southern portion of Antelope Valley at an elevation of approximately 5,264 feet above mean sea level. The foothills of the Sierra Nevada lie just to the west of the SEHOA, with the mountains themselves being just a few miles further west.

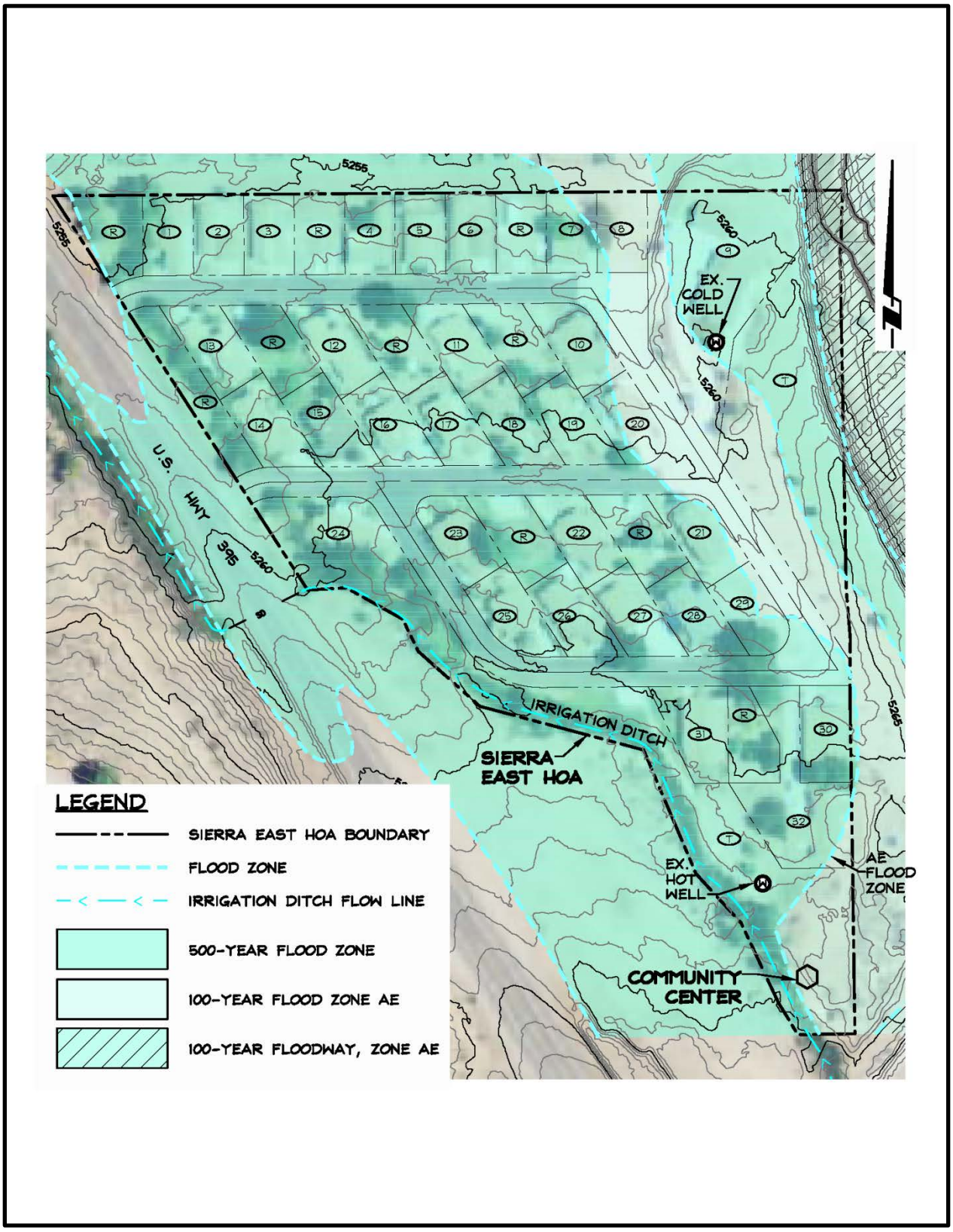
The Project proposes to rehabilitate the existing water supply wells, install water meters and an emergency propane generator, construct a new mechanical building, and install an arsenic removal system to comply with the federal drinking water standard and begin removing naturally occurring arsenic from the potable water supply. The Project will affect a triangular area of approximately 0.22 acres within SEHOA property, as shown in Figure 2-A, Existing Site Conditions. The site is entirely contained in the southeast corner of Section 18, Township 18 North, Range 23 East, Mount Diablo Meridian (38,531 degrees, -119.489 degrees).

2.2 Human Environment

2.2.A *Land Use*

The SEHOA property is presently developed and comprised of 45 parcels, bearing Mono County Assessor Parcel Numbers 0247001 through 0247044 and 0247046 and containing the existing water supply wells and distribution system, access roads and community buildings, as illustrated in Figure 2-A. There are 10 unbuildable lots and the two lots designated as greenbelt (also referred to as common area lots). The SEHOA currently has 29 equivalent dwelling units or EDU's, with 2 additional EDU's that could be built in the future. The principal land uses (not including open space or wild lands) in the area are agricultural and residential, with some scattered commercial uses. As shown in Figure 2-A, the 0.22 acres project site is bordered to the north by the Sierra East residential community; to the east by the West Walker River; to the south by undeveloped land; and to the west by a drainage ditch and US Highway 395.

Figure 2-A. Existing Site Conditions



The existing structures on the project site include:

- A 4 foot by 8 foot shed that houses a pump;
- An octagonal building that houses the existing water system and community hot tub;
- A 1.5 foot tall rock wall along the western and southern perimeters of the common area;
- A 6 foot wide by 3 foot deep drainage ditch that collects and diverts water northwest of the project site; and
- A wooden fence along the eastern property line.

2.2.B *Existing Public Services and Facilities*

2.2.B.1 **Water Supply, Distribution and Wastewater**

Water service (including wastewater) in the area is provided by individual wells and septic systems, as generally shown on Figure 2-A. Sewer service is provided by gravity lines that feed to septic tanks on SEHOA common area parcels, with three contributing lots per septic tank being typical. Domestic water is supplied by 3-inch mains with ¾-inch laterals connected to each home. Common area lots are supplied water for irrigation through a combination of individual services from the 3-inch main and yard hydrants connected to the water system on private lots. Most water laterals have ¾-inch stop and waste valves located underground adjacent to the streets. The distribution lines are dead end lines with no ability for flushing. The existing water system is supplied by two wells known as Well 1 and Well 2. Well 1 yields hot water (up to145° F) and Well 2 yields cold water, which, for obvious reasons, they are also commonly referred to as “Hot Well” and “Cold Well”, respectively. The wells both pump to a common mechanical room that houses an approximate 900-gallon hydro-pneumatic tank with distribution piping and electrical controls. Also included in the mechanical room are dual sodium hypochlorite storage tanks and metering pumps that are used for disinfecting the domestic water supply.

There are currently no fire hydrants and the water system is not designed for fire suppression with minimal storage and minimal flows. Figure A shows existing water facilities for the SEHOA. Presently there are no water meters on the SEHOA water system, and no records of measured rates of water consumption are available. Based upon a qualitative analysis of usage from similar residences in the area, an expected annual average use of 200 gallons per day per home, however, other communities along the eastern Sierra Nevada Mountains often have

large increases in water usage during summer months. This seasonal increase is most likely attributable to irrigation and other summer time activities, and the water usage can be double or even triple that of winter time months. In addition to the obvious water uses for irrigation during summer months, the SEHOA is also subject to a population influx by seasonal residents, which is partially why the difference between irrigation season and offseason water consumption is so large.

2.2.B.2 **Power, Gas and Communications**

The project site is provided power through Liberty Utilities (formerly California Pacific Electric Company) who maintains underground lines and services. Telephone is through Frontier Communications with underground lines generally located in common trenches with the power. Gas is provided through AmeriGas Propane with storage tanks on SEHOA common area parcels and service is via underground lines with meters at each place of use.

Electrical meters located at each well measure the kilowatt-hour (kWh) electrical consumption used by the well pumps. The Cold Well has a meter that is dedicated generally to the well pump with minor power consumed by an irrigation controller, while the Hot Well has a meter dedicated to well pump and electrical service within the existing mechanical room, including lights and chlorine metering pumps.

2.2.C *Noise*

There are a variety of noise sources in the SEHOA and immediate vicinity which can be divided into two categories: mobile sources and stationary sources. Examples of mobile sources include automobiles, trucks, airplanes, buses, motorcycles, and other vehicles. Fixed source examples include power equipment, water supply equipment and other activities such as group recreational activities. The main sources of noise in the project site are noises generated from the adjacent road and potentially recreational use of the West Walker River. The noise levels around the site are low and typical of a moderate density, residential environment.

Noise standards for the project site include a maximum 35 dBA (10 p.m. to 7 a.m.) and 45 dBA (7:00 a.m. to 10:00 p.m.) interior and 50 dBA (10 p.m. to 7 a.m.) and 55 dBA exterior in suburban multi-family residential (receptors) land use category (Mono County Code Chapter 10.16 1983). The standard on noise related to construction for a single event is 85 dBA. The

limits placed by Mono County Code Noise Ordinance on construction lasting over 10 days are shown in Table 2-A. Noise sources in the general project vicinity are mainly produced from passing cars and standard residential noises.

Table 2-A: Maximum Noise Levels of Repetitively Scheduled, Long-Term Operations

	Type I Areas Single-Family Residential	Type II Areas Multi-family Residential	Type III Areas Semi-Residential Commercial
Daily, except Sundays & legal holidays 7 a.m. to 7 p.m.	60 dBA	65 dBA	70 dBA
Daily, 7 p.m. to 7 a.m. & all day Sunday & legal holidays	50 dBA	55 dBA	60 dBA

Source: Mono County Code Table 10.16.090A

2.2.D *Traffic and Transportation*

Performance conditions, or Levels of Service (LOS—see Glossary), on State and Federal highways are set by California Department of Transportation (Caltrans) systems planning. Performance conditions on local streets are generally not a concern since local streets typically carry only local traffic. State and federal highways serve as the main access to each community in Mono County and carry the greatest amount of traffic. US Highway 395 has LOS B, and C, for the 4-lane expressway, and 4-lane conventional. At the entrances to SEHOA, US Highway 395 is a 2-lane conventional highway.

2.2.E *Hazards and Hazardous Materials*

Geotechnical explorations conducted on December 218, 2014 found no surface or subsurface hazardous substances in the areas of excavations (Black Eagle Consulting 2015).

Finally, there are no hazardous material sites or releases listed in the Toxic Release Inventory (DTSC 2010a) in project site. A search of the Department of Toxic Substances Control (DTSC) EnviroStor website (DTSC 2010b) listed no sites or facilities near the project site.

2.2.F *Cultural Resources*

ASM Affiliates, Inc. conducted at Class III cultural resources inventory for the Project's Area of Potential Effects (APE) on June 16, 2015.

ASM contacted the Native American Heritage Commission (NAHC) on May 4, 2015 in order to

determine if there are any registered cultural resources, sacred lands, traditional cultural properties, or areas of heritage sensitivity within the project area. The NAHC responded on May 27, 2015 that they had no records pertaining to the presence of Native American cultural resources in the project area. As part of the consultation process, the NAHC provided information for six Native American contacts for four nearby groups including the Bridgeport Paiute Indian Colony, the Mono Lake Indian Community, the Washoe Tribe of Nevada and California, and the Walker River Paiute Tribe. ASM sent a letter via email and/or fax to the chairperson and/or Tribal Historic Preservation Officer (THPO) of each tribe in order to request information they might have concerning the project area. After two weeks, ASM had not received any replies to the letters and on June 12, 2015, followed up with phone calls to each of the contact organizations. In each case, a voicemail or message was left for the appropriate contact. As of June 22, 2015, none of the contacted tribes have responded to ASM's inquiry.

Results of a records search conducted by the Eastern Information Center at the University of California, Riverside, for the APE and a ½-mile buffer surrounding the APE were received on May 4, 2015. The search indicated that five cultural resource inventories had been conducted within a ½-mile radius, none of which overlapped the current APE. Identified cultural resources were limited to two isolated obsidian bifaces recorded within a ½-mile radius of the project area during a 1979 survey. ASM conducted a survey of historic maps, which indicated that the irrigation ditch following the western boundary of the SEHOA property likely dates to the first half of the twentieth century.

The location of the new Cold Well is located towards the northern boundary of the SEHOA property in a landscaped area covered with decomposed granite approximately 90 feet (ft.) from the current course of the West Walker River. This location was inventoried, but the natural ground surface could not be inspected due to the presence of landscaping ground cover. A review of aerial photography and topographic maps of the area indicates that the terrace where the Cold Well will be installed was constructed between 1994 and 1998. The upper layers of the terrace were undoubtedly constructed using fill material or secondary alluvial material before being covered with decomposed granite. Although the natural ground surface could not be inspected, it would have been located in the West Walker River bed and, accordingly, is unlikely to retain any cultural resources even if the course of the West Walker River has changed over time.

Area designated for a Hot Well cooling loop as well as a pump and mechanical room, both of which require ground-disturbing activities is located at the southern SEHOA property boundary. Although the sandy silt at this location appears to represent the natural ground surface of the West Walker River floodplain, the ground within the APE has already been significantly impacted by the construction of a low rockery wall and four associated yard hydrants to create a low terrace. The interior of the APE also appears to have been graded to create a relatively level surface for use as a common area and the construction of an octagonal community center. Various utilities have also been installed including a light pole, Hot Well, and water lines that supply the existing community center. A small spoils pile in the southeast corner of the APE may be the result of various impacts to the area; it was inspected by ASM but did not appear to have any associated cultural material. Although the historic irrigation ditch is located just outside of the APE along the western edge of the southern SEHOA property, it will not be disturbed or impacted by ground-disturbing activities.

No cultural resources were identified on the ground surface of either parcel during the survey and no historic properties will be affected by the project as it is currently planned. Even though the proximity of the APE to the West Walker River increases the probability of encountering both prehistoric and historic cultural resources, modern modifications to the property including construction, landscaping, and utility work decreases the likelihood that an intact resource will be located.

2.3 Physical Environment

2.3.A *Topography*

Topography was derived from LiDAR data provided by the Desert Research Institute (DRI). The LiDAR data was collected as a part of the Walker Basin Project which was flown during 2010-2011. The LiDAR was available as a Digital Elevation Model (DEM) with 1-meter cell resolution. The DEM was used to develop 1-foot contour intervals over the project area. The topography is presented in Figure 2-A. The project site is within a relatively flat area that gently slopes about 1 percent to the east and towards the West Walker River. The vertical relief across the project site is less than 2 feet. The 1.5 foot rock wall creates a grade break in the slope between the

western portion of the SEHOA property and the project site where the improvements will be constructed.

2.3.B *Air Quality*

The project site is located within the jurisdiction of the Great Basin Unified Air Pollution Control District (GBUAPCD). The project site has attainment status by federal standards and non-attainment status by state standards for PM_{10} and Ozone (GBUAPCD and USEPA). The GBUAPCD does not monitor air quality in the Antelope Valley (GBUAPCD 2009). At the state level, Mono County has been designated as non-attainment for ozone and PM_{10}; attainment for $PM_{2.5,}$ carbon monoxide, hydrogen sulfide, lead, sulfates, sulfur dioxide, and nitrogen dioxide; and unclassified for visibility reducing particulates. Federal and California ambient air quality standards for criteria pollutants are summarized in Table 2-B. If construction grading is performed during dry weather, a moderate to high potential for dust generation exists.

Table 2-B: Mono County Federal and State Air Quality Attainment Status

Pollutant	Average Time	Federal Standards	Federal Attainment Status	California Standards	California Attainment Status
Ozone	1-Hr. 8-Hr.	-- 0.075 ppm	Unclassified/ Attainment	0.09 ppm 0.070 ppm–	Non-Attainment
Carbon Monoxide	1-Hr. 8-Hr.	35.0 ppm 9.0 ppm	Unclassified/ Attainment	20.0 ppm 9.0 ppm	Attainment
Nitrogen Dioxide	Annual 1-Hr.	0.053 ppm 100 ppb	Unclassified/ Attainment	– 0.25 ppm	Attainment
Sulfur Dioxide	Annual 24-Hr. 1-Hr.	0.030 ppm 0.14 ppm 75 ppb	Unclassified/ Attainment	– 0.04 ppm 0.25 ppm	Attainment
PM_{10} $PM_{2.5}$	Annual 24-Hr. Annual 24-Hr.	50 μg/m^3 150 μg/m^3 12.0 μg/m^3 35 μg/m^3	Attainment for areas north of Big Pine (including project site)	20 μg/m^3 50 μg/m^3 12 μg/m^3 –	Non-Attainment Attainment

Table 2-B: Mono County Federal and State Air Quality Attainment Status

Pollutant	Average Time	Federal Standards	Federal Attainment Status	California Standards	California Attainment Status
Lead	30-Day Calendar Quarter	– 1.5 μg/m^3	NA	1.5 μg /m^3 --	Attainment
	Rolling 3-Month Average	0.15 μg/m^3		--	

ppm = parts per million
ppm = parts per billion
μg/m^3 = micrograms per cubic meter
N/A = not available

Source: CARB 2013

2.3.C *Geology and Geologic Hazards*

The project site lies in the fault-bounded Antelope Valley located on the Eastern Sierra Nevada range front. The California Geological Survey (CGS) maps the project site as Quaternary Alluvium (Koenig 1992). The geologic unit is described as "stream and river alluvium, glacial outwash, and recent fan deposits". Although the valley is sinking slowly, it is filling with sediments derived from the Sierra almost as fast as it sinks. As is the case further south, springs and geothermal activity are concentrated along (but not limited to) zones of weakness at the margins of the valley. Granitic mountains of the Sierra Nevada border the valley on the west, and Tertiary-aged volcanic form the eastern border of the valley. Abundant cobbles and boulders existing within the subsurface soil profile. No other geologic hazards are identified (Black Eagle Consulting 2015).

2.3.D *Faulting and Seismicity*

In the SEHOA area, Sierra Nevada range-front faults run generally north-northwest along the base of the Sierra Nevada. Principal among these is the Antelope Valley fault system. The fault system forms the range-front scarp of the Sierra Nevada and in some areas can place the igneous, metamorphic and volcanic rocks in the area against the valley fill. The project site is located in Seismic Zone 4 (Uniform Building Code 1997) and situated in the Antelope Valley in

the general area of a known active fault, the Antelope Valley Fault. The historic earthquake magnitudes within a search radius of 70 miles ranged from 6.0 to 9.0.

Geotechnical investigations conducted on December 18, 2014 determine that the proposed project components will not cross the designated fault hazard zone. However, the project site is located within the Earthquake Fault Zones (EFZ) defined by Alquist-Priolo Earthquake Fault Zone Act (1993), as shown on the map for Desert Creek Peak SW ¼ Quadrangle (Hart and Byant 2007). THE EFZ is associated with the Holocene active Antelope Valley Fault that is mapped on the west side of US Highway 395 about 500 feet of the project site. This fault is estimated as having the potential to generate maximum earthquake magnitude of 6.7 Mm (Black Eagle Consulting 2015).

Fault trenching conducted on December 18, 2014 found no evidence of faulting or ground rupture in the area of the proposed mechanical building. Although the likelihood of ground rupture is low based on geotechnical explorations, the potential for severe ground shaking is high because of the project site's proximity to the potentially active Antelope Valley Fault.

Mapping by the United States Geological Society (USGS 2013) indicates that there is a 2 percent probability that a bedrock ground acceleration of 0.64g will be exceeded in any 50-year interval.

2.3.E *Soils*

The soils encountered during December 18, 2014 geotechnical explorations are consistent with the geologic map and consist entirely of sand and gravel with non-plastic fines to excavation depths to seven feet below ground surface. The upper soil layer is 0.5 to 1.5 feet in thickness and generally contains silty sands to silty sand with gravel soils. Underlying soil layer consists of poorly graded gravel with silt, cobbles, and boulders. Due to the dense nature of the site soils, presence of oversized particles, and the relatively deep groundwater table, the potential for soil liquefaction at the site is considered negligible (Black Eagle Consulting 2015).

2.3.F *Hydrology and Flooding*

Site drainage occurs primarily as sheet flow to the east towards the West Walker River. Much of the SEHOA is located within a Federal Emergency Management Agency (FEMA) 500-year floodplain, which is subject to a 0.2% chance of flooding during any given year. Portions of the

SEHOA, particularly on the east side are located within a 100-year Zone AE floodplain, which is shown as a breakout from the West Walker River. This breakout generally flows to the north through the SEHOA streets and impacts up to eight parcels, one that is vacant and buildable and another that is vacant and not buildable due to its location in the floodplain and restrictions placed by the owner, Mono County. The floodplain boundaries are generally depicted in Figure 2-A. The 100-year base flood elevation in the area is 5,264 feet above mean sea level (FEMA 2011).

2.3.G *Groundwater*

The SEHOA is within the Antelope Valley Groundwater Basin and within the North Lahontan Hydrologic Study Area (California Department of Water Resources 2003). Groundwater in the area is generally found within the unconsolidated alluvial and fluvial sediments comprising the basin fill. The ability for the faults, discussed in Subsection 2.3.D above, to inhibit groundwater flow is unknown because significant differences in groundwater quality can be present from one side of a fault to the other.

Groundwater was not encountered during geotechnical explorations, which extended to seven (7) feet below ground surface to a similar surface water elevation of the West Walker River. During the river flood stage the depth of groundwater would be expected to rise towards the surface to meet the floodway.

2.3.H *Water Quality*

The groundwater quality in the Antelope Valley is variable but generally of good quality. Glancy (1971) reported that groundwater present in the area typically had total dissolved solids (TDS) concentrations of approximately 175 to 350 milligrams per liter (mg/L). Boron, fluoride and arsenic have been noted in wells in the valley, and radionuclides were present above their MCL for two out five wells sampled (California Department of Water Resources 2003) in the Antelope Valley. In the SEHOA area, groundwater quality results are available for six wells including the two SEHOA wells. TDS concentrations in these wells range from 79 mg/L in the Codtz Well (south of SEHOA) to 250 mg/L in the Strong Well (north of the SEHOA). Of note is an abrupt change in TDS concentration between the Strong and Vandendrake Wells, across a north-trending geologic structural lineament.

Arsenic concentrations (MCL of 10 µg/L) in the SEHOA area range from 1.2 µg/L at the Cortez Well on the south and 15 µg/L in the Kraft Well to the north, to a high concentration of 57 µg/L in the Strong Well. The two SEHOA wells have average arsenic concentrations of 38 and 37 µg/L, respectively. Elevated uranium concentrations in the area generally trend with elevated arsenic concentrations. The California Public Health Goal (PHG) for uranium is 20 pCi/L (approximately 0.030 mg/L). The wells in the SEHOA area are significantly below the PHG for uranium.

A brief summary of the SEHOA water quality is presented below as Table 2-C, and a more detailed summary of water quality is included in the Preliminary Engineering Report attached as Appendix A. The main water quality concern for the SEHOA is the presence of elevated arsenic above the MCL of 10 µg/L. Arsenic is a toxic substance and as such its ingestion may result in adverse health conditions. While the concentrations of arsenic in both of the SEHOA source wells vary, the last several tests (since July of 2011) have shown arsenic concentrations substantially higher than the MCL. Arsenic is typically present in groundwater as two naturally occurring species – arsenite (As III) and arsenate (As V). The latter specie, arsenate, is the oxidized form of the former, and is more readily removed by various treatment systems. Arsenite, on the other hand, tends to be much more difficult to remove in its natural condition and subsequently must be oxidized into Arsenate prior to removal from water. Testing indicates that arsenic present in SEHOA's source water from the Cold Well is almost entirely (>99%) in the oxidized form, i.e. – *Arsenate.* The source water from the Hot Well is approximately 86 percent oxidized in the form of arsenate. Therefore, oxidation by chlorination prior to removal is beneficial.

In the past there have been bacteriological concerns associated with the water quality from the Cold Well. Some past water samples taken from the Cold Well tested positive for the presence of bacteria, which caused the well to be considered as potentially "*groundwater under the influence of surface water"* according to the Mono County Health Department Division of Environmental Health (Department). It is possible that the previous tests were actually false-positives due to errors caused by improper sampling techniques, because subsequent bacteriological tests for the Cold Well conducted since July of 2011 have been negative. Table 2-C presents the available results of testing for bacteriological contamination that have been conducted monthly since July of 2012. Testing had previously been performed on a quarterly basis.

Table 2-C: Bacteriological Testing at SEHOA		
SAMPLE DATE	**TOTAL COLIFORM**	**MOST PROBABLE NUMBER**
03/26/2012	Negative	No Detection
04/23/2012	Test not Performed	<1.0
07/02/2012	Test not Performed	<1.1
07/30/2012	Negative	No Detection
08/10/2012	Negative	<1.1
09/04/2012	Negative	<1.1
10/03/2012	Negative	<1.1
11/05/2012	Negative	<1.1
12/06/2012	Negative	<1.1
01/02/2013	Negative	<1.1
02/04/2013	Negative	<1.1
03/04/2013	Negative	<1.1
04/03/2013	Negative	<1.1
05/15/2013	Negative	No Detection
06/10/2013	Negative	No Detection
07/01/2013	Negative	No Detection
08/01/2013	Negative	No Detection
09/09/2013	Negative	No Detection
*Most Probable Number varies between 1.0 and 1.1 as a result of laboratory detection limits.		
Source: Preliminary Engineering Report (Appendix A)		

The total coliform tests results are negative, indicating the absence of bacteria in the Cold Well. This is further supported by the enumeration testing shown in the most probable number (MPN) column, which had results below the laboratory detection limit as indicated by the “less than” symbol (<).

Essentially, the enumeration testing indicates the absence of bacteriological contamination at the Cold Well, and since the total coliform tests also include sample points downstream in the system at various residential taps, results indicate that the water system does not have a localized bacteriological contamination either. Based on the results in Table 2-C, there is a strong indication that surface water does not presently influence the Cold Well. Initial conversations with the Department indicate that the County may be willing to accept the test results listed as sufficient for determination regarding the influence of surface water on the Cold Well.

One water quality sample taken from the Hot Well tested for fluoride in excess of the California MCL of 2.0 mg/L (Federal Secondary MCL) at a concentration of 3.0 mg/L. While the water temperature of the Hot Well requires blending with water from the Cold Well or time to cool

before consumption, there are no other water quality parameters impairing the existing SEHOA source water.

2.3.I *Biology*

2.3.I.1 **General Habitat, Vegetation, and Wildlife**

The site has been previously disturbed, stripped of native vegetation, and partially landscaped with turf grass. Native sage brush is located beyond the limits of the proposed improvements. A reconnaissance level field survey to assess habitat conditions and evaluate the project site's potential to support special-status plant and/or animal species was performed by Sierra Ecotone Solutions (SES) biologists on May 12, 2014. SES biologists, Amy Parravano and Garth Alling, walked the project area to perform the visual survey to record the existing vegetation types, wildlife habitat, presence of sensitive natural communities, and the approximate location and extent of wetland features. A detailed botanical survey was performed as well as a passive survey for wildlife species observed within the project area.

Wildlife species assemblage information was based upon existing documentation and information gathered from the *California Wildlife Habitat Relationships System* (CDFG 2008) and *A Guide to Wildlife Habitats of California* (Mayer and Laudenslayer 1988). Plant communities in the project area include Desert Riparian, Sagebrush and Urban. Wildlife habitats onsite include Montane Cottonwood Riparian Forest, Great Basin Sagebrush Scrub (nomenclature follows Sawyer Keeler Wolf 2009). The Desert Riparian habitat is located only in the northeast corner of the project area where the flood zone of the West Walker River is present. The remainder of the project area is Urban, as it is currently developed, and the remainder of the project area is designed as Sagebrush, including the location where the proposed development is to occur. Based on the existing development, the site is currently heavily disturbed with rip-rap along the West Walker River flood zone, fences and vegetation clearing with planning of ornamentals along the eastern portion of the site.

2.3.I.2 **Special Status Species**

The project site is located within the USGS Coleville 7.5-minute topographic quadrangle. The California Department of Fish and Wildlife Natural Diversity Database (CNDDB 2015) was run on March 19, 2015 for records of special-status species occurrences within the Coleville 7.5

min Quad map and surrounding 7.5 min Quads (Topaz Lake, Heenan Lake, Wolf Creek, Disaster Peak, Lont Cannon Peak, Chris Flat, Risue Canyon, Long Dry Canyon). Additionally, a species list was obtained from the US Fish and Wildlife Service (USFWS) for Inyo County on March 19, 2015 and a report was run for the Coleville 7.5 min Quad Map (and associated nine Quads noted above) to focus the data from USFWS. Additionally, the California Native Plant Society (CNPS) database was searched for sensitive and rare plants in Riparian forest habitat in the nine 7.5 min Quad Maps surrounding and including Coleville CA. The database query results and a copy of the USFWS letter are available in Appendix D, which attaches the Biological Assessment Memorandum. Table 2-D lists the plant species observed and Table 2-E lists the wildlife species observed during the May 12, 2014 site survey.

Table 2-D: Plants Species Observed During Site Survey

SCIENTIFIC NAME	COMMON NAME
Cupressus sp.	Ornamental cypress
Pinus sp.	Ornamental pine
Amelanchier utahensis	Pale leaved serviceberry
Artemesia tridentata ssp. tridentata	Great Basin sagebrush
Artemisia ludoviciana ssp. ludoviciana	Silver wormwood
Artemisia spinescens	Budsage
Bromus tectorum	Cheat grass
Ceanothus leucodermis	Chaparral whitethorn
Chrysothamnus viscidiflorus ssp.	Sticky Leaved Rabbitbrush.
Ephedra viridis	Green ephedra
Ericameria nauseosa var. oreophila	Rubber rabbitbrush
Eriogonum umbellatum var. nevadense (no flower)	Sulfur buckwheat
Erodium cicutarium	Redstem filaree
Eschscholzia californica	California poppy
Hordeum jubatum	Fox tail barley
Muhlenbergia minutissima	Annual muhly
Pinus monophylla	Pinyon pine
Populus balsamifera ssp. trichocarpa	Black cottonwood
Prunus emarginata	Bitter cherry
Purshia tridentata var. tridentata	Antelope brush
Rosa woodsii ssp. ultramontana	Interior rose
Salix exigua	Narrowleaf willow
Tetradymia canescens	Gray horsebrush

Source: Sierra Ecotone Solutions 2015

Table 2-E: Wildlife Species Observed During Site Survey	
SCIENTIFIC NAME	**COMMON NAME**
Agelaius phoeniceus	Red-winged blackbird
Anas platyrhynchos	Mallard
Buteo jamaicensis	Red-tailed hawk
Carpodacus mexicanus	House finch
Cathartes aura	Turkey vulture
Corvus corax	Common raven
Callipepla californica	California quail
Coccothraustes vespertinus	Evening grosbeak
Euphagus cyanocephalus	Brewer's blackbird
Hirundo rustica	Barn swallow
Turdus migratorius	American robin
Tyrannus verticalis w	Western kingbird
Zenaida macroura	Morning dove
Odocoileus hemionus	Mule deer

Source: Sierra Ecotone Solutions 2015

2.4 Other Public Agencies Whose Approval is Required

Federal Emergency Management Agency (FEMA) – The FEMA requires a Development Permit for development within the Special Flood Hazard Area (SFHA) shown on a Flood Insurance Rate Map (FIRM). Per *44 CFR 59. Definitions: "Development" means any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations or storage of equipment or materials.* The requirements are keyed to “development” in the floodplain. “Development” means “any man-made change to improved or unimproved real estate.” This includes, but is not limited to:

- *Construction of new structures*
- *Modifications or improvements to existing structures*
- *Excavation*
- *Filling*
- *Paving*
- *Drilling*
- *Driving of piles*
- *Mining*

- *Dredging*
- *Land clearing*
- *Grading*
- *Permanent storage of materials and/or equipment*

FEMA typically defers to the County for determination of development in a special flood hazard zone. Compliance with Mono County floodplain ordinance will be necessary.

Mono County - The Mono County Community Development Department (CDD), consisting of the Planning, Building and Code Compliance divisions, provides a variety of development services for the unincorporated areas of the county. The CDD will require a Building Permit.

The Mono County Public Works Department will require a Grading Permit and a waiver for development of a non-residential structure within the 100-year floodplain of the Walker River.

Great Basin Unified Air Pollution Control District (GBUAPCD) - Although no specific air quality plans are applicable to the project site, the GBUAPCD requires compliance with state and federal air quality standards. The project applicant must obtain permits for land disturbance with the GBUAPCD prior to operations. Compliance with permit conditions will assure that the Project does not degrade air quality.

Chapter 3: Checklist

The evaluation of environmental impacts is based upon the completion of the checklist portion of the Environmental Checklist Form, and consists of the analysis of each impact issue area required under CEQA. The analysis of each checklist item identifies any significance criteria or thresholds used to evaluate each impact question, and any mitigation measure(s) identified to reduce the impact to a less-than-significant level.

This checklist identifies physical, biological, social and economic factors that might be affected by the Project. In some cases, background studies performed in connection with the Project indicate no impacts. A “No Impact” answer in the last column reflects this determination. Where there is a need for clarifying discussion, the discussion is included either following the applicable section of the checklist or is within the body of the environmental document itself. The words "significant" and "significance" used throughout the following checklist are related to CEQA, not NEPA, impacts. The questions in this form are intended to encourage the thoughtful assessment of impacts. Federal Cross-Cutting requirements are addressed in Appendices D and E of this Initial Study.

3.1 Aesthetics

3.1.A *Checklist*

Environmental Issues	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
Would the project:				
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☐	☒
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic building within a state scenic highway?	☐	☐	☒	☐
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☐	☒	☐

Environmental Issues	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☐	☒	☐

3.1.B *Discussion*

A) No Impact

There are no designated scenic vistas in the project area vicinity, and therefore, the Project creates no impact. The project site is located within developed parcels currently used by the SEHOA. The site currently contains the Cold Well, the Hot Well a rock wall, and a community center/storage building that houses the existing water supply system. A new mechanical building is proposed in the immediate vicinity of this existing structure. The existing community center is currently and the proposed mechanical building will be screened from U.S. Highway 395 by existing vegetation. There is no development to the west of the highway that would be sensitive to the additional visual elements, and there are no existing scenic vistas that would be affected by the implementation of this project. Other project components will be underground and would have no impact on a scenic vista. Through the use of setbacks, conformance with Mono County design guidelines, landscaping, and building lighting, which is night-sky friendly with cut-off luminars directed downward, scenic impacts would be avoided.

B) Less Than Significant Impact

U.S. Highway 395 is a State of California Scenic Highway and this highway is adjacent to the project site. The US 395 corridor is defined as the area in the Antelope Valley, outside of communities and along both sides of US Highway 395 that is between the West Walker River to the east and the sloping terrain to the west of US Highway 395 (Mono County Planning Area Land Use Policies – Antelope Valley 2012).

The proposed mechanical building will be partially screened from view from the highway by existing vegetation and will comply with Mono County design review process and standards for development in the US Highway 395 corridor, as required by the building permit process. The remaining proposed improvements will be installed below ground surface. There would be less than significant impacts to scenic resources within a state scenic highway.

C) Less Than Significant Impact

Project construction will have temporary impacts on the scenic quality of the project area; however, the overall Project would not substantially degrade the existing visual character or quality of the site and its surroundings. The proposed mechanical building will blend in with the existing features and land uses, and landscaping and revegetation for site stabilization will provide for an aesthetic improvement over the existing condition. The Project would create less than significant impacts to the visual character.

D) Less than Significant Impact

Interference with nighttime skies from ground level light and glare or interference with vision due to reflective glare would constitute a significant impact. The Project may include the installation of lighting near the entrance door on the proposed mechanical building. The lighting is only necessary in case of an emergency during night time hours. The lighting could be considered an annoyance to neighboring properties; however, the residential portion of the SEHOA is located at a distance that would not be affected by the lighting system. Additionally, lighting will have timers to shut off after being activated as not to cause an undue nuisance. Furthermore, the lighting will use cut-off luminars with light directed downward. The Project would not result in a substantial source of nighttime light or glare.

3.2 Agricultural Resources/ Farm Lands

3.2.A *Checklist*

Environmental Issues	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Department of Conservation as an optional model to use in assessing impacts on agriculture and farmland. *Would the project:*				
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☐	☒
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use?	☐	☐	☐	☒

3.2.B *Discussion*

A) No Impact

The project site is fully contained within the properties of the SEHOA. The project site does not contain Prime Farmland, Unique Farmland, or Farmland of Statewide

Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency. Because no lands designated Prime Farmland, Unique Farmland, or Farmland of Statewide Importance exist within the project site, the Project would result in no impact to these resources.

B) No Impact

The project site is not zoned for agricultural use and does not contain any Williamson Act contracts. Because no such zoning exists within the project site, the Project would result in no impact to these resources.

C) No Impact

The project site is not zoned for forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g)). Because the project site contains no lands with these designations, the Project would result in no impact to these resources.

D) No Impact

The Project does not result in the loss of forest land or conversion of forest land to non-forest use. Because forest land does not exist within the project site, the Project would create no impact to this resource.

E) No Impact

Because designated Farmland does not existing within the project site, the Project would create no impact to this resource.

3.3 Air Quality

3.3.A *Checklist*

Environmental Issues	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. *Would the project:*				
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☐	☒
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☐	☒	☐
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the Project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions, which exceed quantitative thresholds for ozone precursors)?	☐	☐	☒	☐
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☒	☐

3.3.B *Discussion*

A) No Impact

The purpose of the Unified Great Basin Air Pollution Control District (GBUAPCD) is to enforce federal, state and local air quality regulations and to ensure that federal and state air quality standards are met. These standards are set to protect the health of sensitive individuals by restricting how much pollution is allowed in the air. To meet these standards GBUAPCD enforces delegated federal laws, enforces state

laws on stationary (as opposed to mobile) sources of pollution, and passes and enforces local regulations, as they become necessary. The GBUAPCD does not generally regulate mobile air pollution sources (cars and trucks), which is the responsibility of the California Air Resources Board (CARB).

Although no specific air quality plans are applicable to the project site, the GBUAPCD requires compliance with state and federal air quality standards. The Project Applicant must obtain permits for land disturbance with the GBUAPCD prior to operations. Compliance with permit conditions will assure that the Project does not degrade air quality. Because no applicable air quality plan exists that applies to the Antelope Valley area, the Project would result in no impact to such a plan. The Project will not contribute to the generation of significant levels of any air contaminant, and therefore, would not conflict with or obstruct the implementation of the plans of the GBUAPCD.

B) Less than Significant Impact

Project construction and operations will not cause violations to air quality standards or contribute substantially to an existing or projected air quality violation. Construction-related dust is the GBUAPCD's greatest concern and is addressed in GBUAPCD Rules 400 and 401. Rule 400 prohibits discharge into the atmosphere of any air contaminant for a period of more than three minutes in any one hour that is (1) dark or darker in shade as that designated as No. 1 on the Ringelmann Chart or (2) of such as to obscure an observer's view to a degree equal to or greater than does smoke. Rule 401 requires that reasonable precautions be taken to prevent visible particulate matter from being airborne, under normal wind conditions, beyond the property from which the emissions originate.

Based on emissions reports, the Project will not result in appreciable permanent reductions in air quality. Owens Lake and Mono Lake particulate sources within the GBUAPCD violate the federal PM10 standard, but these sources are over a hundred miles from the project site. Although the GBUAPCD reports no existing air quality violations for the project site or immediate vicinity, the Project includes air pollution control measures and practices to avoid and minimize air emissions that could contribute towards an existing or projected air quality violation. The Project proposes

dust control measures for disturbed areas. For ongoing fugitive dust control the Project Applicant or its contractor will water access roads and properly maintain spoil materials.

The new Project facilities will be powered by existing power lines in the project site that are operated by Liberty Utilities. The Project proposes back up power from an emergency propane generator.

The Project is not expected to increase traffic-related emissions. Air quality impacts would be limited to the emissions from equipment involved in the construction of the proposed improvements. These impacts would last the approximate four months of construction. The short duration of the proposed work combined with existing regulations regarding motor vehicle fuels and emissions will result in potential air quality impacts being well below any state or federal significance criteria.

Given the relatively small contributions towards PM10 emissions, the Project will not contribute substantially towards existing non-attainment of PM10 standards during construction, site stabilization, and operations. With implementation of Best Management Practices to ensure compliance with District Rule 400 and 401, the Project would have a less than significant impact on air quality and would not contribute substantially to an existing or projected air quality violation.

C) Less than Significant Impact

The Project will not result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors).

Although there are portions of Mono County within non-attainment areas for federal and state PM10 (particulate matter 10 microns or less in diameter) ambient air quality standards, the primary source for this pollution is the Owens dry lake, located more than 100 miles from the project site. The Project could generate some dust (including PM10 - a criteria pollutant) during grading activities for the installation of the mechanical building and hot well cooling loop. Areas of temporary disturbance

will be watered in accordance with District Rule 400 and 401, which will minimize PM10 emissions. As a result of proposed dust control measures, the Project would not increase PM10 pollutants over existing levels, and the Project would have a less than significant impact on PM10 levels.

D) Less than Significant Impact

A sensitive receptor is generally defined as a person in the population who is particularly more susceptible to health effects from exposure to an air contaminant than is the population at large. Sensitive receptors (and the facilities that house them) in proximity to localized CO sources, toxic air contaminants, or odors are of particular concern. The Project will result in temporary and relatively small amounts of air emissions during construction, as associated with equipment placement of fill and aggregate materials. These pollutant concentrations would not be emitted at substantial levels. Project operations will be performed within buildings and include an arsenic removal system that minimizess the creation of air borne pollutants and does not require a waste stream. The Project would not expose sensitive receptors to substantial pollutant concentrations.

E) Less than Significant Impact

Construction could generate odors from heavy diesel machinery. The generation of odors during the construction period would be temporary, would tend to be dispersed within a short distance from the active work area, and therefore, would result in less than significant impacts to the residents of the SEHOA and construction workers.

No objectionable odors will be generated from the Project following construction. Project operations would not create objectionable odors affecting a substantial number of people because arsenic removal operations would occur within the new mechanical building and by equipment designed to contain and/or neutralize objectionable odors.

3.4 Biological Resources

3.4.A *Checklist*

Environmental Issues	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
Would the project:				
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☐	☐	☒	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☐	☐	☐	☒
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☐	☐	☒
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of wildlife nursery sites?	☐	☐	☒	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☐	☐	☒
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

3.4.B *Discussion*

A) Less than Significant Impact

The Project will be located entirely within the SEHOA property. The project site has been used as a community open space area and to house the water supply system for over 30 years. As a result, the project site has been heavily disturbed and is essentially void of vegetation with the exception of some irrigated turf grass areas. Plant communities comprising the overall SEHOA property include Desert Riparian, Sagebrush and Urban. Wildlife habitats include Montane Cottonwood Riparian Forest and Great Basin Sagebrush Scrub. The project site is designated Sagebrush in the location of the proposed treatment system.

The project site is located within the USGS Coleville 7.5 minute topographic quadrangle. The California Department of Fish and Wildlife Natural Diversity Database (CNDDB 2015) search was conducted on March 19, 2015 for records of special-status species occurrences within the Coleville 7.5 minute Quad map and surrounding 7.5 minute Quads (e.g., Topaz Lake, Heenan Lake, Wolf Creek, Disaster Peak, Lont Cannon Peak, Chris Flat, Risue Canyon, Long Dry Canyon). Additionally, a species list was obtained from the US Fish and Wildlife Service (USFWS) office in Inyo County on March 19, 2015, and a report was run for the Coleville 7.5 minute Quad map and the nine associated Quad maps listed above to focus the data from USFWS. The California Native Plant Society (CNPS) database was also searched for sensitive and rare plants in riparian forest habitat in the nine 7.5 minut quad map surrounding and including Coleville, California. The database query results and a copy of the USFWS letter are available in Appendix D, Biological Assessment Memorandum. Table 3-A summarized the database query results.

Table 3-A: Regional Species and Habitats of Concern				
Common Name/ Scientific Name	**Status**	**General Habitat Description (Zeiner et al 1990 and Calflora 2015)**	**Habitat Present/ Absent/ Unknown**	**Rationale**
Amphibians				
Rana muscosa Sierra Nevada yellow-legged frog	FE	Streams, lakes, and ponds in montane riparian, lodgepole pine, subalpine conifer and wet meadow habitats. Always encountered within a few feet of water. Tadpoles may require 2 - 4 years to complete their aquatic development.	A	No suitable habitat within the project area. The ditch flowing along the eastern border of the project area does not contain suitable habitat due to periodic flows and lack of vegetation structure to support SNYLF. The rocky embankment in the north east corner of the project area along the edge of the Walker River drainage does not contain suitable habitat.
Birds				
Haliaeetus leucocephalus Bald eagle	D	Breeds and roosts in remote coniferous forests in close proximity to a river, stream, lake, reservoir, marsh, or other wetland area.	P	Suitable roosting habitat is located adjacent to the project area in cottonwood trees along the Walker River. Closest known occurrence is a nesting pair presumed to be extant at Topaz Lake approximately 10 miles to the north.
Mammals				
Martes pennanti Pacific fisher	FC	Extensive forested areas with continuous canopy in higher elevations. Avoids entering open areas that have no overstory or shrub cover.	A	No suitable habitat within the project area due to the absence of forested area and limited overstory cover.
Plants and Fungi				
Boechera cobrensis Masonic rockcress	2B.3	A perennial herb that is native to California that blooms in June and July in sandy habitat especially sagebrush.	P	Suitable habitat present onsite.
Carex occidentalis western sedge	2B.3	Grows in woodland and grassland habitats and blooms between June and August.	A	No suitable habitat within the project area due to lack of woodland and grassland habitats.
Carex petasata Liddon's sedge	2B.3	Occurs in wet meadows and wetlands in yellowpine forest and riparian areas. Blooms May through July.	P	Suitable habitat present along banks of irrigation ditch within project area.

Table 3-A: Regional Species and Habitats of Concern				
Carex vallicola western valley sedge	2B.3	Occurs in both xeric and mesic habitats in both forest and grassland areas.	A	Suitable habitat not present onsite as no grassland areas occur within the project area.
Claytonia umbellate Great Basin claytonia	2B.3	Occurs in subalpine coniferous forest on talus slopes. Blooms May through August.	A	Suitable habitat not present onsite as no subalpine coniferous forest areas occur within the project area.
Glyceria grandis American manna grass	2B.3	Occurs in riparian habitats, streambanks, lake-margins, meadows, bogs/fens, edges.	P	Suitable habitat present along banks of irrigation ditch within project area.
Hymenopappus filifolius var. nanus little cutleaf	2B.3	Occurs in limestone soil, pinyon/juniper woodland, and subalpine forest. Blooms May–Aug.	A	Suitable habitat not present onsite as no pinyon/juniper woodland occurs within the project area.
Kobresia myosuroides seep kobresia	2B.2	Occurs in Alpine Fellfields, Subalpine Forest, wetland-riparian; often associated with wetlands.	P	Suitable habitat present along banks of irrigation ditch within project area.
Polygala subspinosa spiny milkwort	2B.2	Occurs in desert scrub and volcanic mesas. Blooms May through August.	A	No suitable habitat present onsite. Known occurrences to the south east in the Sweetwater mountains.
Viola purpurea ssp. Aurea golden violet	2B.2	Occurs in Sagebrush Scrub, Pinyon-Juniper Woodland. Blooms from May through July.	P	Suitable habitat present onsite in the form of Sagebrush Scrub habitat.
C- Candidate, T-Threatened, E – Endangered, SSC- Species of Special Concern, FP - Fully Protected, CNPS Rank 1B, 2.1, 2.2, 2.3, 3, 4.2 SES 2015 Source: Appendix D SEHOA Water System Improvement Project Biological Assessment Memorandum				

No special-status plants were encountered on the project site during the May 2014 survey. However, based on the information contained in Table 3-A and results of the reconnaissance survey conducted on May 12, 2014, the project area contains suitable roosting habitat for bald eagle. The Project would not have a substantial adverse effect, through habitat modifications, on species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the CDFW or USFWS because the Project would not substantially modify habitat. The Project would avoid direct effects to raptors and migratory birds through compliance with the requirements of the Migratory Bird Treaty Act (MBTA) to conduct pre-construction surveys and protect active raptor and migratory bird nest sites.

B) No Impact

According to a search of the CNDDB, no sensitive natural communities have been documented within the project area. The irrigation ditch that runs through the SEHOA property does support woody riparian habitat (*Salix sp*.) through transmissive losses, but this ditch would not be directly or indirectly affected by the Project because it is outside the area of disturbance. Of the sensitive natural communities listed in the Mono County General Plan, none are present within or adjacent to the project site. The Project will not have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, and regulations or by the CDFW or USFWS because although riparian habitat is mapped within the SEHOA property along the West Walker River, no riparian habitat or other sensitive natural communities are within proposed area of disturbance.

C) No Impact

The Project will be located entirely within the SEHOA property and although riparian habitat is mapped within the SEHOA property along the West Walker River, no riparian habitat is within proposed area of disturbance. The Project would not be located in federally-protected wetlands or waters of the United States, nor would the Project require direct removal, filling, hydrological interruption to federally-protected wetlands or jurisdictional waters of the United States. The Project would have no impacts on wetlands or waters of the United States as defined by Section 404 of the Clean Water Act.

D) Less than Significant Impact

The project area contains suitable roosting habitat for bald eagle and all eagle nests are protected under The Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c). Less than significant impacts to biological resources will occur if construction is completed outside the nesting period and if specific biological resources are avoided, as described in Subsection 1.2.J, Best Management Practices Plan/Project Design Measures. If project construction occurs during the nesting season between the months of April and August, the SEHOA will protect existing active bird nests

and/or nursery sites potentially impacted by construction activities in compliance with the Migratory Bird Treaty Act (MBTA). The SEHOA will develop an Active Raptor and Migratory Bird Protection Program to meet the requirements of the MBTA. The program will include surveys, consultation with CDFW and the USFWS (if necessary), and protective actions. Pre-construction surveys, conducted during the nesting/breeding season and immediately prior to initial Project construction (e.g., excavation, grading and vegetation removal), will be conducted to identify active raptor or migratory bird nest sites within the project area that may not have occurred previously or were not identified by prior biological surveys. During initial construction activities, a qualified biological monitor will be present to determine if raptors or migratory birds are occupying trees within the project area and immediate vicinity. The biological monitor will have the authority to stop construction near occupied trees or nursery sites if construction activities appear to be negatively impacting nursery sites, nesting raptors, migratory birds or their young. If construction must be stopped, the biological monitor will consult with CDFW and also USFWS (if applicable) staff within 24 hours to determine appropriate actions to restart construction while reducing impacts to identified nursery sites, raptor nests and/or migratory bird nests.

Construction noise will be similar to traffic and maintenance noise in the area and is not expected to impact wildlife or avian species. Operational noise will be comparable to existing conditions of the project site, as will the number of maintenance personnel trips to the project site. The Project would not interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of wildlife nursery sites.

E) No Impact

No trees are proposed to be removed as a result of the project. The Mono County General Plan identifies Goals and Policies for protection of biological resources. The Project will comply with Mono County ordinances and would not conflict with local policies or ordinances protecting biological resources.

F) No Impact

The Project does not conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan because no such plans exist for the project site.

3.5 Cultural Resources

3.5.A *Checklist*

Environmental Issues	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
Would the project:				
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	☐	☐	☐	☒
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☐	☐	☐	☒
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☐	☒
d) Disturb any human remains, including those interred outside of formal cemeteries?	☐	☐	☐	☒

3.5.B *Discussion*

A) No Impact

The project site is located entirely within the SEHOA property in an area that has been disturbed by past grading and fills activities. No known historical resource features exist within the project site. Additionally, there are no known or visible historic or prehistoric resources on the project site that are potentially eligible for the National Register of Historic Places and no unevaluated cultural resources. If historic resources are discovered during construction, construction activity will be immediately stopped, a qualified appropriate specialist will be contacted, and

measures that are detailed in Subsection 1.2.J, Best Management Practices Plan/Project Design Measures, of the project description will be followed.

Because no historical resources as defined in PRC section 15064.5 would be disturbed within the project site, the Project would not cause substantial adverse change in the significance of a historical resource.

B) No Impact

No archaeological resources have been identified within the project site, and excavation will occur in previously disturbed areas. However, a remote potential to unearth undiscovered archeological resources does exist. Requirements will be included in construction contracts to ensure that there would be no impacts to previously undiscovered resources. The Project would not cause a substantial adverse change in the significance of an archaeological resource because avoidance of such resources will occur during Project construction and long-term operations.

C) No Impact

Unique paleontological or unique geologic features are not expected in the project site. The Antelope Valley is underlain by a thick sequence of unconsolidated to moderately consolidated sedimentary materials. These sediments include alluvial fans, glacial and talus deposits, and fluvial environments and these environments do not usually contain intact fossils. The Project requires excavation and disturbance in an area that has already been disturbed and that is not a high or moderate resource potential geologic deposit, formation or rock unit. The Project would result in no impact to paleontological resources.

D) No Impact

No dedicated cemeteries or known burial sites exist within the project site, and during prior development of the project site no human remains were encountered. If human remains are unearthed, the Mono County Coroner will be contacted and disposition of Native American remains would comply with CEQA Guidelines Section 15064.5(e) and 43 CFR 10, Native American Graves Protection and Repatriation Regulations.

3.6 Geology and Soils

3.6.A *Checklist*

Environmental Issues	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
Would the project:				
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury or death involving:				
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42.	☐	☐	☒	☐
ii) Strong seismic ground shaking?	☐	☐	☒	☐
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
iv) Landslides?	☐	☐	☐	☒
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the Project and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☒	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☐	☒
e) Have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater?	☐	☐	☐	☒

3.6.B *Discussion*

A-i) Less than Significant Impact

The project site is located in seismic Zone 4 and within an Earthquake Fault Zone (EFZ) defined by Alquist-Priolo Earthquake Fault Zone Act (1993), as shown on the map for Desert Creek Peak SW ¼ Quadrangle (Hart and Byant 2007). The EFZ is associated with the Holocene-age, active Antelope Valley Fault that is mapped on the west side of US Highway 395 about 500 feet of the project site. This fault is estimated as having the potential to generate maximum earthquake magnitude of 6.7 Mm (Black Eagle Consulting 2015). Per geotechnical investigations conducted on December 18, 2014, the proposed Project components do not cross the designated fault hazard zone.

Fault trenching conducted at the project site found no evidence of faulting or ground rupture in the area of the proposed mechanical building or cooling loop. The likelihood of ground rupture is low and the exposure of people or structures to potential substantial adverse effects from rupture of a known earthquake fault will be further reduced through compliance with Mono County building codes and implementation of geotechnical recommendations outlined in Appendix D.

A-ii) Less than Significant Impact

The project site soils are mapped by the California Geological Society as Quaternary Alluvium; this geologic unit is described as streams and river alluvium, glacial outwash, and recent fan deposits. Although the likelihood of ground rupture is low, the potential for strong seismic ground shaking is high because of proximity to the active Antelope Valley Fault. Building and civil design plans will be prepared in accordance with the geotechnical engineer's recommendations outlined in Appendix D, which would reduce potential impacts from strong ground shaking to a level of less than significant.

A-iii) Less than Significant Impact

To assess the potential for seismic-related ground failure, including liquefaction, for the project site, information was obtained from the California Geologic Survey

website's Probabilistic Seismic Hazard Mapping Ground Motion page for California, and mapping conducted by the USGS in 2013 was also consulted. Ground motion for the project site, expressed as a fraction of the acceleration of gravity (g) range between peak ground acceleration (PGA), is 0.64g for the project site (Note: 2 percent probability of exceedance in 50 years). Due to the dense nature of site soils, presence of oversized particles, and a relatively deep groundwater table, the potential for soil liquefaction at the project site is negligible (Black Eagle Consulting 2015).

A-iv) No Impact

Because the project site contains no landforms that could contribute to landslide potential, the Project has no effect towards exposure of people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving landslides.

B) Less than Significant Impact

The project site is nearly level and the potential for erosion is low. The Project includes committed practices for erosion and sediment control during construction and during long-term operations, as presented in Appendix B on Plan Sheet C13 and detailed in Section 1.2, Project Description. BMPs will be used to limit erosion and reduce sediment in precipitation runoff from disturbed areas during construction. The project site will be revegeted following construction. The Project reduces impacts from substantial soil erosion or the loss of topsoil to a level of less than significant through implementation of these committed practices.

C) Less than Significant Impact

This potential is dependent upon the magnitude of the seismic event, the location of the earthquake epicenter, basin edge effects, and other factors that lead to the amplification of ground motion. There is no specific policy which requires structures or pipes to be designed to resist liquefaction. According to soils tests and fault trenching performed (Black Eagle Consulting 2015), the underlying geology suggests

a negligible potential for liquefaction. The Project will not cause geologic instability and topography is nearly flat.

No soil conditions that would preclude Project construction or operations were identified. Adherence to standard building techniques and practices ensures that Project facilities withstand probabilistic seismic hazards and localized geologic and soils conditions. Compliance with relevant local, State, and federal rules, regulations, policies, and procedures works to ensure less than significant impacts resulting from soil instability. On- or off-site landslide, lateral spreading, subsidence or collapse will not occur as a result of the Project and potential impacts would be less than significant.

D) No Impact

Soils tests conducted in the project site determined that site soils are not expansive. The proposed Project will not be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994) and would therefore not create substantial risks to life or property.

E) No Impact

The Project will not require the use of new septic tanks or alternative on-site waste water disposal systems. No impacts due to the use of septic tanks or alternative wastewater disposal systems would occur as a result of the Project.

3.7 Greenhouse Gases and Climate Change

3.7.A *Checklist*

Environmental Issues	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
Would the project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?	☐	☐	☒	☐
b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	☐	☐	☐	☒

3.7.B *Discussion*

A) Less than Significant Impact

The Project will not directly contribute to greenhouse gas (GHG) emissions because the Project includes components to control fugitive dust emissions resulting from construction. Indirectly during construction of the Project, GHG emissions will occur on a temporary and intermittent basis from construction equipment. The sources of GHG emissions for this Project will include the combustion of diesel fuel used in construction equipment and the emissions associated with daily commute of construction workers. Table 3-B compares the GHG emissions for several types of projects. This Project would be even less in terms of order of magnitude than a project involving “installation of 3 miles of telecommunications lines.”

Indirectly during operations, GHG emissions will occur from maintenance vehicles accessing the project site. Limited emissions are anticipated from vehicles of workers commuting to and from the project site for operations and maintenance. In comparison with CARB estimates for annual CO2 emissions, the worst-case scenario of one daily trip associated with long-term operations and the contribution of

the Project towards statewide GHG emissions would be nominal. Emissions from this Project would have virtually no impact on the state's goal to reduce emissions by 169 million metric tons by the year 2020. The proposed Project's cumulative impacts to global climate change due to the incremental contribution of GHGs would be less than significant.

Table 3-B: Comparison of GHG Emissions for Various Types of Projects

Project Description	CO_2-Equivalent	
	Construction Emissions (tons)	Operating Emissions (tons per year)
Typical household emissions[1]	NA	27.7
Installation of 3 miles of telecommunication lines[2]	494	0.0
1 lane-mile of road construction[3]	2,600	NA
30 MW geothermal power plant	NA	24,700
Univ. NH, Durham Campus, 2003	NA	71,100
Sunrise Powerlink Project[4]	147,000	NA
300 MW coal-fired power plant	NA	2,950,000

[1] Based on family of 4, two cars, natural gas heat, 550 mi/week total driving, 24 mpg.

[2] Based on 8 weeks of construction, 5 days a week for 10 hours a day

[3] Estimated 1,400 - 2,300 tons of CO_2 per lane-mile for construction only. Does not include increased traffic or road maintenance. CO_2-equivalent estimate assumes same ratio of CH_4 and N_2O to CO_2 as the current project.

[4] Assumes same ratio of CH_4 and N_2O to CO_2 as the current Project to estimate total CO_2-equivalent.

Sources: EPA 2008, Williams-Derry 2007, Bloomfield et al. 2003, PSC of Wisconsin 2008, UNH 2004, CPUC and BLM 2008, CARB 2008

B) <u>No Impact</u>

The Project will not conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of because such plans specific to the project site and vicinity do not yet exist. Over the long-term, the Project would support State of California plans, policies, and regulations to reduce greenhouse gas emissions and adapt Project facilities and processes to evolving legislation and best science.

3.8 Hazards and Hazardous Materials

3.8.A *Checklist*

Environmental Issues	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
Would the project:				
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the likely release of hazardous materials into the environment?	☐	☐	☒	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
d) Be located within one-quarter mile of a facility that might reasonably be anticipated to emit hazardous emissions or handle hazardous or acutely hazardous materials, substances or waste?	☐	☐	☐	☒
e) Be located on a site of a current or former hazardous waste disposal site or solid waste disposal site unless wastes have been removed from the former disposal site; or 2) that could release a hazardous substance as identified by the State Department of Health Services in a current list adopted pursuant to Section 25356 for removal or remedial action pursuant to Chapter 6.8 of Division 20 of the Health and Safety Code?	☐	☐	☐	☒
f) For a Project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project result in a safety hazard for people residing or working in the project site?	☐	☐	☐	☒

Environmental Issues	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
g) For a Project within the vicinity of a private airstrip, would the Project result in a safety hazard for people residing or working in the project site?	☐	☐	☐	☒
h) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☒	☐
i) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☒	☐

3.8.B Discussion

A) Less than Significant Impact

Hazardous materials will be transported, stored, and used in accordance with federal, state, and local regulations (e.g., Clean Air Act, Clean Water Act, Comprehensive Environmental Response, Compensation and Liability Act and the Toxic Substances Control Act). At the local level, fire departments screen inventories of substances and inspect sites; the Mono County Health Department is responsible for reviewing hazardous materials plans; and the GBUAPCD evaluates projects for possible toxic emissions and also issues permits as necessary.

The Project's main hazard concerns are two-fold: proper transport, testing and disposal of adsorption cartridges generated during the arsenic removal process and the potential for an accidental spill of the chemicals used in the arsenic oxidation process. These potential health risks are associated with the presence of sodium hypochlorite (NaOCl) or chlorine bleach, and calcium chloride (CaCl2), the ionic compound of calcium and chlorine at the arsenic removal facility. These compounds are not listed Resource Conservation and Recovery Act (RCRA) hazardous wastes. However, sodium hypochlorite and calcium chloride can both be hazardous in the

case of skin and eye contact, ingestion and inhalation, and therefore, Best Management Practices will be used in handling and storing these materials.

Transport. When transported in vehicles, activities associated with hazardous materials transportation (packaging, identifying, loading, and warning the public of the hazard) are regulated by the California Highway Patrol and the U. S. Department of Transportation (USDOT). Most of California's hazardous material safety regulations are found in Title 13 of the California Code of Regulations, Division 2, Chapter 6. The federal hazardous material safety regulations are found in 49 CFR, parts 171 through 180. A substance or material, as defined in Title 49 of the Code of Federal Regulations (49 CFR), Section 171.8, that is capable of causing an unreasonable risk to human health or safety or the environment when transported by vehicle, used incorrectly, or not properly stored or contained, is a hazardous material. Hazardous materials can be a liquid, a solid, or a gas. Examples of hazardous materials are explosives, flammables, corrosives, radioactive materials, and poisons. Transportation of such materials is highly regulated to ensure the safety of the motoring public.

Chemicals required for the arsenic removal system will be transported to the project site. Trucks for hire must meet the general requirements regarding the transportation of hazardous materials as governed by sections 31301-34510 of the Vehicle Code. The Project will not involve the transportation of explosives, inhalation hazards or radioactive materials.

Use. Employees will be trained in the proper use and disposal of hazardous materials, including Hypochlorite (NaOCl) and Calcium Chloride (CaCl), spent arsenic removal cartridges, accumulations of mercury fluorescent lights and antifreeze. Secondary containment (lined with plastic) is proposed to contain leaks or spills. Copies of the Material Safety Data Sheets for each chemical will be maintained onsite for inspection. The arsenic removal system will be located in a proposed new 24 foot by 30 foot building of cinder block construction with a slab floor with a floor drain, metal roof, roll up door, emergency power from the adjacent emergency propane generator, and areas for chemical storage as shown on Figure 1-D.

Disposal. The adsorption process for arsenic removal does not require a waste stream. Preliminary calculations, based upon the expected amount of arsenic to be removed by the active cartridge as well as the binding of the arsenic to the media and the expected pH, indicate that cartridges will not be considered a hazardous waste per California and Federal guidelines and may be disposed of as a non-regulated waste (ordinary waste). The method of disposal and the classification of the cartridges will be determined based on laboratory analysis. Based on the results, any hazardous materials will be disposed of off-site at an appropriate disposal facility in accordance with applicable regulations. Compliance with codified regulations described above avoids and minimizes potential hazards to the public or the environment through the routine transport, use, or disposal of hazardous materials.

The adsorption process does not typically require a waste stream. Preliminary calculations based upon the expected amount of arsenic to be added to the cartridge as well as the binding of the arsenic to the media and the expected pH indicate that they will not be considered a hazardous waste per California and Federal guidelines and may be disposed of as a non-regulated waste (ordinary waste). However, to be in strict compliance with regulations the media will be tested to verify that it is not considered hazardous. U.S. Ecology operates a treatment and landfill facility at Beatty Nevada located approximately 230 miles southeast of Bridgeport, which can accept the waste cartridges. Additionally, the cartridges can be returned to the manufacturer, a certified handler, for disposal.

In summary, the use, storage, and handling of minor amounts of hazardous materials would be anticipated with refueling or equipment cleaning activities during construction and the use of building materials, epoxies, and other materials to improve infrastructure. The amount of hazardous materials necessary for the Project would not be substantial enough to create a significant hazard from routine transport, use or disposal of hazardous materials.

B) Less than Significant Impact

Project design, installation of BMPs and compliance with federal and state regulations and permit programs will avoid and minimize hazards to the public or the environment involving the release of hazardous materials into the environment.

Construction equipment that utilizes gasoline, diesel, and other hazardous substances in small quantities will be associated with the Project. There is a potential for a significant impact to humans from exposure to construction materials containing hazardous materials or from potential hazardous material spills. The risk of exposure of people to construction-associated hazardous materials would be reduced to less than significant levels through the implementation of BMPs for safe handling and use. The Project contractor will be required to prepare a Health and Safety Plan prior to construction. The plan will identify methods and techniques to minimize the exposure of onsite workers and the public to potentially hazardous materials during construction and will require implementation of appropriate BMPs and approved containment and spill-control practices (e.g., spill control plan) for construction and long term operations. The plan will remain onsite along with spill clean-up kits at all times during construction and operations.

The Project operations are not anticipated to result in the creation of health hazards following compliance with health and safety regulations and the potential for release of hazardous materials during construction and operations would be reduced a level of less than significant.

C) No Impact

The Project would not be located within one-quarter mile of an existing school. The City of Coleville and Mono County have no schools proposed in the vicinity of the project site.

D) No Impact

The project site would not be located within one-quarter mile of a facility that might reasonably be anticipated to emit hazardous emissions or handle hazardous or acutely hazardous materials, substances or waste.

E) No Impact

The Project would not be located on a known hazardous waste and substance site. The project site is not identified on the Cortese List, which is updated and submitted

at least annually to the Secretary of Environmental Protection pursuant to Section 65962.5 (http://www.envirostor.dtsc.ca.gov/public/).

F) No Impact

The Project would not be located within an airport land use plan and is not within two miles of a public airport or public use airport. The Project therefore has no impact to human safety hazards in designated airport influence areas.

G) No Impact

The Project would not be located in the vicinity of a private airstrip, and therefore, creates no impact to human safety hazards in designated airstrip influence areas.

H) Less than Significant Impact

The primary evacuation route is US Highway 395. Project related activities will not interfere with any emergency response plan or emergency evacuation plan. Should project construction require US Highway 395 to be temporarily blocked for equipment access, traffic control will be provided to allow for direction of traffic and prioritization of emergency vehicles. There are no hospitals, fire, police, or sheriff stations located within or in the vicinity of the project site. The Project would comply with applicable Mono County codes for emergency vehicle access.

I) Less than Significant Impact

The Project will be constructed within an existing, developed area of the SEHOA property that has little vegetation. The project site is predominantly compacted soils with some landscaped grass cover. The risk of starting a wildfire in the project site is minimal. The Project would not expose people of structures to a significant risk involving wildfires because the project site does not contain sufficient vegetation to spread catastrophic wildfire, is not located adjacent to urbanized areas, and does not directly involve residences.

3.9 Hydrology and Water Quality

3.9.A *Checklist*

Environmental Issues	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
Would the project:				
a) Violate any water quality standards or waste discharge requirements?	☐	☐	☒	☐
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted?	☐	☐	☒	☐
c) Substantially alter the existing drainage pattern of area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	☐	☐	☒	☐
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner, which would result in flooding on- or off-site?	☐	☐	☒	☐
e) Create or contribute runoff water which would exceed the capability of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☐	☒
f) Otherwise substantially degrade water quality?	☐	☐	☒	☐
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒
h) Place within a 100-year flood hazard area structures, which would impede or redirect flood flows?	☐	☐	☒	☐

Environmental Issues	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam?	☐	☐	☒	☐
j) Inundation by seiche, tsunami, or mudflow?	☐	☐	☐	☒

3.9.B *Discussion*

A) Less than Significant Impact

The Project will bring an existing water supply system into compliance with California Department of Public Health drinking water standards for arsenic. The Project will not be constructed through any waterways or wetlands and will not violate any surface water quality standards or waste discharge requirements. The Project includes erosion and sediment control BMPs that will be installed and maintained through the construction period. Following construction, disturbed areas will be revegetated to reduce the potential for erosion from wind and surface water runoff.

Operation of the water supply and treatment systems will produce no discharge. The Project could generate hazardous spills, which if severe and because of proximity could impact the West Walker River. The Project contractor will be required to prepare a Health and Safety Plan prior to Project construction. The plan will identify methods and techniques to minimize the potential for spill and will require implementation of appropriate BMPs, approved containment and spill-control practices (e.g., spill control plan) during construction and operations. The plan will remain onsite along with spill clean-up kits at all times during construction and operations.

State Water Board Resolution No. 68-16 "Statement of Policy With Respect to Maintaining High Quality of Waters In California," known as the Nondegradation Policy, requires whenever the existing quality of water is better than the quality of water established in the Basin Plan, such existing quality will be maintained unless appropriate findings are made under Resolution No. 68-16. The Project as proposed

will not purposefully discharge waste that would degrade water quality. The potential for impacting water quality would be reduced to a level of less than significant through the proposed design of the Project.

B) Less than Significant Impact

Improvements made to the existing water supply system and the installation of the adsorption system for the removal of arsenic will not result in groundwater extractions that substantially exceed existing conditions. Presently, there are no water meters on the SEHOA water system and no records of measured rates of water consumption. The Preliminary Engineering Report, attached in appendix A, estimated existing water consumption at each of the existing wells through analysis of two years of measured kilowatt-hour (kWh) electrical consumption of the two wells. The Project has been designed to meet the existing water demand of SEHOA residents with consideration of seasonal irrigation and other non-domestic uses for determination of peak demand. The improvements are designed to meet the existing peak day demand of 27 gallons per minute (GPM).

The maximum production rate of the Cold Well is 50 GPM (CDWR Well Log No. 162959) and the maximum production rate of the Hot Well is 75 GPM (CDWR Log No. 37969). The Project will avoid substantial impacts to groundwater supplies and recharge through installation and monitoring of new water meters and installation of two 5,000 gallon storage tanks. Ultimately, the Project limits maximum production from either well or both wells in parallel to 40 GPM or less as a function of the flow control valves in the arsenic removal system. That is, maximum production rates under this Project will be less than the historic maximum production rates. No increase in the volume of pumping is expected, as based on the SEHOA being nearly built out (94%) combined with the monitoring of new water meters. Drawdown depths are not expected to interfere with the local groundwater table level, which based on water levels of the West Walker River is in excess of seven feet below ground surface.

Additionally, the Project will not create impervious surfaces that would substantially impact groundwater recharge, and there are no pre-existing wells nearby that would

have production rates affected. Potential impacts to groundwater supplies and recharge would be avoided and reduced to a level of less than significant.

C) Less than Significant Impact

The project site contains no streams or rivers. A drainage ditch is located to the west of the active project site but will not be affected by construction (See Appendix B Plan Sheet C13 – BMP Plan). The project site drains via sheet flow to the east and towards the West Walker River. The Project does not alter existing topography or create additional impervious surfaces beyond hardscape associated with the mechanical building. This additional impervious surface would not be substantial enough to alter existing drainage patterns of the project site. On or off-site erosion, siltation, or flooding would not result from Project construction or long term operations.

D) Less than Significant Impact

See checklist question C above. The Project would not increase impervious surfaces to the extent of substantially increasing the rate or amount of surface runoff in a manner that would result in flooding on or off-site.

E) No Impact

The project site does not have direct connections to existing stormwater drainage systems and contains no municipal storm water systems. Stormwater runoff is captured and infiltrated onsite. The Project would create no change to existing conditions.

F) Less than Significant Impact

See response to checklist question A above. The Project will not degrade water quality. The Project installs a closed treatment system that does not produce wastewater effluent. The Project will not cross surface waters or serve as a source of potential pollutants to local waterways or impact groundwater quality.

G) No Impact

Although much of the SEHOA is located within a FEMA 500-year floodplain, which is subject to a 0.2% chance of flooding during any given year, and portions of the SEHOA, particularly on the east side, are located within a 100-year Zone AE floodplain, the Project involves no placement of housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.

H) Less than Significant Impact

Much of the SEHOA is located within a FEMA 500-year floodplain, which is subject to a 0.2% chance of flooding during any given year. Portions of the SEHOA, particularly on the east side are located within a 100-year Zone AE floodplain, which is shown as a breakout from the West Walker River. This breakout generally flows to the north through the SEHOA streets and impacts up to eight parcels, one of which is vacant and buildable and another which is vacant and not buildable due to its location in the floodplain and restrictions placed by the owner, Mono County. The floodplain boundaries are generally depicted in Figure 2-A.

The proposed mechanical building that will house the adsorption system for arsenic removal has been sited to be located outside of the 100-year floodway. However, because of the location of the existing water supply system, the proposed structure must be located within the 100-year floodplain, as mapped by FEMA. The relocated Cold Well, because of the location of the existing water supply system, must be redrilled within the 100-year floodplain.

The 100-year base flood elevation is 5,264 feet above mean sea level (FEMA 2011). The proposed mechanical building will be elevated one to two feet above this base flood elevation to protect the new water treatment system in the event of flooding. Because of the size of the building (24 feet by 30 feet), the proposed structure would not significantly impede or redirect flood flows. The top of the Cold Well casing will be constructed at an elevation above the 100-year base flood elevation. Impacts to flood flows would be less than significant through compliance with Mono County Building Permit conditions and standards of construction for development in areas of special flood hazard (Chapter 21, Mono County General Plan, Land Use Element).

I) Less than Significant Impact

Although the new mechanical building must be constructed within the 100-year floodplain, the Project would not expose people or structures to a new significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam. The Project would also not influence or cause any flooding events.

J) No Impacts

The Project would not create risk of inundation by seiche, tsunami, or mudflow because the project site is not located in an area where these threats and hazards exist.

3.10 Land Use and Planning

3.10.A *Checklist*

Environmental Issues	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
Would the project:				
a) Physically divide an established community?	☐	☐	☐	☒
b) Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the Project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☐	☒
c) Conflict with any applicable habitat conservation plan or natural communities conservation plan?	☐	☐	☐	☒

3.10.B *Discussion*

A) No Impact

The Project would not physically divide an established community. The Project would not affect the land use or character of the existing SEHOA or surrounding areas.

B) No Impact

Projects consistent with zoning and compatible with surrounding uses result in no impacts to land use. The Project would be located in an area designated and approved as a Manufactured Housing Subdivision. This land use designation (MHS) includes manufactured housing and required infrastructure as permitted uses. The project site is surrounded by other residential land uses and properties designated Residential (RR-5), Resource Management (RM) and Agriculture (AG-10).

The new mechanical building would be permitted in the manufactured housing subdivision as an accessory use and structure through conformance to setback and

maximum lot coverage requirements. Not more than 75 percent of the area of a manufactured housing lot may be covered by the manufactured housing unit, accessory structures, paved drives and parking. The mechanical building would be located with the common area of the SEHOA and would not cause land coverage limits to be exceeded. The proposed improvements are consistent with existing and proposed land use in the area. No incompatibilities between the Project and the Mono County General Plan have been identified.

C) No Impact

Mono County's General Plan for the Antelope Valley does not identify habitat, natural community, or other conservation plans that would apply to the project site, and therefore, no conflicts would occur.

3.11 Mineral Resources

3.11.A *Checklist*

Environmental Issues	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
Would the project:				
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☒

3.11.B *Discussion*

A-B) No Impact

The project site would not be located in Mineral Resource Zones 1 through 4 classification areas. The project site does not contain an economically feasible extraction operation and no mineral resources are known to exist on the site. The Project would not have a negative impact on mineral resources. The Project will require aggregate to manufacture base for the main elements of the project, but the demand would not have an impact on the resource. The SEHOA may need to obtain fill material for some construction activities. Any borrow or disposal sites must comply with the Surface and Mining Reclamation Act of 1975. Fill material would be obtained from authorized sources. In summary, no impacts to mineral resources would occur.

3.12 Noise

3.12.A *Checklist*

Environmental Issues	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
Would the Project result in:				
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☒	☐
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☒	☐
c) A substantial permanent increase in ambient noise levels in the Project vicinity above levels existing without the project?	☐	☐	☐	☒
d) A substantial temporary or periodic increase in ambient noise levels in the Project vicinity above levels existing without the project?	☐	☐	☒	☐
e) For a Project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the Project expose people residing or working in the project site to excessive noise levels?	☐	☐	☐	☒
f) For a Project within the vicinity of a private airstrip, would the Project expose people residing or working in the project site to excessive noise levels?	☐	☐	☐	☒

3.12.B *Discussion*

A) Less than Significant Impact

Noise sources can be grouped into two categories: mobile and stationary. Mobile sources are noise producers that move within Mono County. In Mono County, these include vehicle traffic on highways and roads, railroad operations, aircraft noise from military operations, and noise from general and commercial aviation. Primary

stationary sources in the County include mining, industrial, commercial and utility land uses (Mono County General Plan Noise Element 2010). Chapter 10.16 of the Mono County Code establishes noise standards and regulates noise according to those standards.

Noise generation from the Project will be related to construction activities. Construction noise will be variable, temporary, and short-term in nature (approximately four months). Heavy trucks and machinery for concrete pouring, waste disposal, and other construction activities will generate noise. Equipment used for soil and concrete compaction will likely be the loudest machinery used. This noise generation is similar to trash removal, lawn mowing, and other maintenance noise.

The maximum outdoor noise level acceptable in multiple dwelling residential neighborhoods with public space is 55 decibels (dBA). The maximum noise levels noise levels related to construction for a single event is 85 dBA (Mono County Code Title 10.16.090.6b). The Project contractor will be limited to construction between the hours of 7 am and 7 pm. A primary contact for the contractor will be designated to respond to valid complaints about construction noise. The contact will determine the cause of the noise complaint (e.g., starting too early, bad mufflers, etc.) and institute reasonable measures warranted to correct the problem immediately and in no case longer than two hours. Additionally, contractors will be required to use properly maintained equipment that is equipped with suitable exhaust and air intake silencers, as appropriate. The Project would comply with noise standards established in the Mono County Code and create less than significant generation of noise levels.

B) Less than Significant Impact

Construction equipment will create temporary and periodic vibration effects in the project site, but would not expose persons to excessive groundborne vibration or noise levels. Vibratory rollers are routinely used to compact soils, bases, and some types of pavement. Vibration from the rollers and other ground disturbing equipment will be perceptible at the immediate project site, but the vibration from this equipment would not generate vibration that could damage houses or businesses. The Project does not include full time generator power for operations. The backup propane

generator would be utilized only during power outages. The Project would generate less than significant impacts from groundborne vibration or groundborne noise levels.

C) No Impact

The proposed arsenic removal system will be housed within the new mechanical building and following construction these improvements would not generate a source of permanent noise in the project area.

D) Less than Significant Impact

Project construction noise will be intermittent, and the level will vary depending on the type, location, and length of the activity. Project construction will generate temporary and periodic noise, but ambient noise would not increase substantially as measured at the SEHOA property boundary. Additionally, residential uses or other sensitive receptors are not located within 500 feet of the project site. Valid noise complaints by SEHOA residents living in the northern portion of the SEHOA property will be addressed by the construction contractor. The arsenic removal process will occur within the new mechanical building and as a result, will not increase ambient noise levels. The Project would not create substantial permanent increase in ambient noise levels in the project area vicinity above levels existing without the Project.

E) No Impact

The Project would not be located within an airport land use plan or within two miles of a public airport or public use airport, and therefore, would create no exposure of people working in the project site to excessive noise levels from air traffic.

F) No Impact

The Project would not be located within the vicinity of a private airstrip, and therefore, would create no exposure of people working in the project site to excessive noise levels from air traffic.

3.13 Population and Housing

3.13.A *Checklist*

Environmental Issues	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
Would the project:				
a) Induce substantial population growth in an area, either directly (e.g., by proposing new homes and businesses) or indirectly (e.g., through extension of roads or other infrastructure)?	☐	☐	☐	☒
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
c) Displace substantial numbers of people necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

3.13.B *Discussion*

A) No Impact

The Project will not directly or indirectly induce substantial growth. The Project will not require or encourage an increase in population or the construction of housing. The Project will improve the quality of the potable water supply, making the area a more desirable place to live, but no expanded infrastructure that would encourage growth is proposed.

B) No Impact

The Project displaces no existing housing and therefore would not necessitate the construction of replacement housing.

C) No Impact

The Project displaces no people and therefore would not necessitate the construction of replacement housing.

3.14 Public Services

3.14.A *Checklist*

Environmental Issues	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
Would the Project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:				
a) Fire Protection?	☐	☐	☐	☒
b) Police Protection?	☐	☐	☐	☒
c) Schools?	☐	☐	☐	☒
d) Parks?	☐	☐	☐	☒
e) Other public facilities?	☐	☐	☐	☒

3.14.B *Discussion*

A-E) No Impact

The Project will not require additional public services and therefore would create no impact to acceptable service ratios, response times or other performance objectives. Existing fire, police, and other governmental services will be sufficient to accommodate the service needs of this project. The Project will not necessitate the expansion of the equipment, facilities, or manpower of responsible fire, police, health, and school services in order to maintain current service ratios and response times. The Project also will not result in substantial adverse physical impacts associated with the provision of new or altered fire, police, health, or school facilities. There will be no need for new or physically altered governmental facilities. According to the Material Safety Data Sheets for hypochlorite and calcium chloride there are no special fire or explosion hazards associated with these chemicals. The Project would not result in negative impacts on public services.

3.15 Recreation

3.15.A *Checklist*

Environmental Issues	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
Would/Does the project:				
a) Increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
b) Include recreational facilities or require the construction or expansion of recreational facilities, which might have an adverse physical effect on the environment?	☐	☐	☐	☒

3.15.B *Discussion*

A) No Impact

The Project does not occur within a recreational facility or park and would not involve actions that would increase the use of or put at risk existing recreational facilities.

B) No Impact

The Project does not include recreational facilities or require the construction or expansion of recreational facilities, and therefore, would create no adverse physical effect on the environment from such facilities.

3.16 Transportation and Traffic

3.16.A *Checklist*

Environmental Issues	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
Would the project:				
a) Cause an increase in traffic, which is substantial in relation to the existing traffic load and capability of the street system (i.e., result in a substantial increase in either the number of vehicle trips, the volume to capability ratio on roads, or congestion at intersections)?	☐	☐	☒	☐
b) Exceed, either individually or cumulatively, a level of service standard established by the county congestion management agency for designated roads or highways?	☐	☐	☐	☒
c) Conflict with adopted policies, plans, or programs supporting alternative transportation (e.g., bus turnouts, bicycle racks)?	☐	☐	☐	☒
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☐	☒
e) Result in inadequate emergency access?	☐	☐	☐	☒
f) Result in inadequate parking capability?	☐	☐	☐	☒

3.16.B *Discussion*

A) Less than Significant Impact

The Project will cause a slight increase in traffic along US Highway 395 during construction. The increase in traffic during construction would be caused from trucks delivering materials, construction equipment, and construction workers commuting to the site. The construction traffic could cause some minor delays from larger, slower

moving vehicles; however the construction traffic would not exceed three trips per day and would be short-term. Over the life of the Project, truck deliveries for removal of adsorption cartridges and other main deliveries are expected to occur on average, once per month. Visits to the proposed facility by maintenance personnel are expected to occur on average, once monthly. The Project would not cause an increase in traffic that is substantial in relation to the existing traffic load and capability of the existing street system.

B) No Impact

During the construction period there would be a very small increase in traffic on U.S. Highway 395. The Caltrans Annual Average Daily Traffic (AADT) Count south of the project site, Mill Creek Bridge (PM 107.1), on US Highway 395 is estimated at 3,350 vehicles per day (Caltrans 2013). Data was accessed at http://trafficcounts.dot.ca.gov/docs/2013_aadt_volumes.pdf). Due to the site constraints with respect to the limited size of the SEHOA property and overall Project, the number of trucks that would travel to the project site simultaneously would be very limited. Level of Service standards on US Highway 395 would not change as a result of the Project. Any nominal increase of traffic would be consistent with the designated/allowed uses of the roads. No impacts are expected to the Level of Service and the Project would not cause exceedance, either individually or cumulatively, of the Level of Service standard established by Mono County for designated roads or highways.

C) No Impact

The Project would not cause adverse impacts to alternative transportation plans or policies. The Project would create no change in air traffic patterns.

D) No Impact

Public facilities uses have occurred on the project site since the SEHOA was developed in 1983. The design of the proposed Project will not increase hazards to the area. There are no changes in the configuration of US Highway 395, changes to

ingress or egress, or other permanent physical alterations or changes in uses that would create additional hazards.

E) No Impact

The Project contractor will notify SEHOA residents of the construction work. Construction will not block any driveways or roadway access, adequate emergency access will be maintained, and no impacts to an emergency response would occur.

F) No Impact

The Project would not result in loss of parking spaces and no impact to available parking would occur.

3.17 Utilities and Service Systems

3.17.A *Checklist*

Environmental Issues	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
Would the project:				
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☒
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☒	☐
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☒	☐
d) Have sufficient water supplies available to serve the Project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☒	☐
e) Result in a determination by the wastewater treatment provider, which serves or may serve the Project that it has adequate capability to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒
f) Be served by a landfill with sufficient permitted capability to accommodate the project's solid waste disposal needs?	☐	☐	☒	☐
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☒	☐
h) Impact electrical supplies and services	☐	☐	☐	☒

3.17.B *Discussion*

A) No Impact

The Project does not propose new sanitary sewer or connections to an existing municipal wastewater treatment plant The Project would not result in the generation of any wastewater as a result of the treatment process and existing level of service would not be affected.

B) Less Than Significant Impact

The Project will not create a demand for new water or sewer infrastructure and will not require the construction of new water or sewer or the expansion of existing facilities. The Project will rehabilitate the existing water supply system and install a water treatment facility to remove arsenic from the potable water supply in order to meet the federal MCL for arsenic and respond to Mono County Department of Health Services' cease and desist order to the SEHOA requiring compliance with the arsenic MCL. Project construction would occur in a portion of the SEHOA property that has been previously disturbed and BMPs would be installed to avoid and reduce potential environmental effects to a level of less than significant.

C) Less Than Significant Impact

The project site does not have direct connections to existing stormwater drainage systems and contains no municipal storm water systems. Stormwater runoff is captured and infiltrated onsite. The new impervious surface would be negligible and any increase in runoff would be insignificant. Existing site drainage would not be affected by the Project.

D) Less than Significant Impact

The existing water supplies will be adequate to serve the Project during construction. Water will be provided as needed for dust suppression. Water demand during construction would be less than significant and no new or expanded entitlements would be necessary. No impact to water supply would occur following construction.

E) No Impact

The Project will result in no change to wastewater volumes and no change would occur to the capability of the current wastewater treatment provider's to serve the Project's demand in addition to the provider's existing commitments.

F-G) Less than Significant Impact

The Project will not create a waste stream, with the exception of spent adsorption cartridges. Solid waste generated from day-to-day operations would be non-hazardous and would be transported to the regional landfill. The volume of solid waste is expected to be less than that generated by a typical household, and is therefore, expected to have less than significant impacts to solid waste and solid waste disposal.

Nevada and California use different criterion to determine what is to be considered hazardous materials. In Nevada, only the Federal criterion applies. In California there is a separate set of criterion that exceeds the Federal criteria for determining hazardous materials. The adsorption cartridges will be tested to assure that California's criterion are met and will then be transported through California in a manner that meets the State's standards for transporting hazardous materials. U.S. Ecology, the regional landfill, can accept the adsorption cartridges or the cartridges can be shipped back to the manufacturer, a qualified handler, for proper disposal.

The Project would not have a significant impact on the local landfill and would comply with state, federal and local policies related to solid waste.

H) No Impact

The Project would create no impact to existing electrical services nor cause electrical outages.

3.18 Mandatory Findings of Significance

3.18.A *Checklist*

Environmental Issues	Potentially Significant Impact	Less Than Significant With Mitigation	Less Than Significant Impact	No Impact
Does the project				
a) Have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, reduce the number or restrict the range of a rare or endangered plant or animal, or eliminate important examples of the major periods of California history or prehistory?	☐	☐	☒	☐
b) Have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a Project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects.)	☐	☐	☒	☐
c) Have environmental effects, which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☐	☐	☒

3.18.B *Discussion*

A) Less than Significant Impact

The Project will not substantially degrade the quality of the environment. The Project does not have the potential to degrade the quality of the environment substantially; reduce the habitat of fish or wildlife species; cause a fish or wildlife population to drop below self-sustaining levels; threaten to eliminate a plant or animal community; reduce the number or restrict the range of a rare or endangered plant or animal; or eliminate important examples of the major periods of California history or prehistory.

B) Less than Significant Impact

The Project will result in no impacts that are individually limited but would be cumulatively considerable when viewed in connection with the effects of past projects, the effects of other current projects and the effects of probably future projects in the vicinity of the SEHOA project site and across Mono County. Other projects may occur in Coleville and Walker; however, impacts would not be cumulatively considerable when evaluated in the context of the proposed project's limited environmental effects and the short duration of construction impacts.

C) No Impact

The Project will have beneficial impacts to the health and safety of human beings by removing arsenic from the potable water supply to comply with the State and Federal MCLs. Arsenic exposure can cause a variety of adverse health effects. The severity of the effect depends on how much arsenic is in the water, how much water is consumed, how long a person has been drinking the water, and a person's general health. The National Research Council's 2001 report points to a preponderance of evidence that long-term ingestion of arsenic can increase the risk of skin, bladder, lung, kidney, liver, and prostate cancer. Non-cancer effects of ingesting arsenic may include cardiovascular, pulmonary, immunological, neurological effects, and endocrine problems such as diabetes. Therefore, removal of arsenic from the water supply will have a positive overall effect to SEHOA residents and visitors.

The Project will install site-specific BMPs to avoid and minimize potential environmental impacts and would have no negative effects on human beings directly or indirectly.

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Chapter 4: References

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Chapter 5: List of Preparers

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Appendix A

SEHOA Preliminary Engineering Report

(RO Anderson Engineering, January 26, 2015)

Sierra East Homeowner Association

Preliminary Engineering Report

Water System Improvements

January 26, 2015

Prepared for:

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1 Executive Summary

The Sierra East Homeowners Association (SEHOA) is a small community in Antelope Valley about three miles south of the town of Coleville, California. Highly varied ground water quality resulting from a complex range of hydrogeological conditions in the area presents the SEHOA with various groundwater quality challenges. One of the two source wells for the SEHOA has hot water (up to 145°F) while the other source well about 500 feet away has cold water; both wells have arsenic concentrations several times the Federal Maximum Contaminant Level (MCL). After receiving a compliance order from the Mono County Department of Environmental Health which, among other items, included a cease and desist clause for supplying water with arsenic contamination in excess of the MCL, the SEHOA applied for and received grant funding to pursue available options for arsenic remediation. This preliminary engineering report has been developed to identify feasible alternatives for mitigating the arsenic levels in the SEHOA drinking water system which presently serves about 29 single family residences. Also included in this Preliminary Engineering Report are alternatives for infrastructure upgrades, opinions of probable construction costs, as well as anticipated operation and maintenance costs.

The May 28, 2014 Draft of this Preliminary Engineering Report was presented to the SEHOA as well as the California Department of Public Health and the California State Water Resources Control Board who is the funding agency for the current Planning Grant as well as the expected funding agency for future construction. Through discussions the recommended project was determined as presented below. The changes to the Draft that are presented in this report generally include the following:

- More discussion and cost analysis for infrastructure improvements that may be adversely affected by hot water and a conclusion that a Hot Well Cooling Loop is a recommended improvement.
- Updates to the water quality from the Hot Well that were received after the Draft Report was circulated.
- Updates to the recommended improvements to include water meters and exclude fire hydrants and a new water system.
- Revised discussion of water meters and a revised cost of water meters from $113,000 in the Draft to $150,800 in this report.

- Addition of services during construction (inspection, testing, contract administration, and engineering services) to the construction costs.
- Addition of discussion of an Operations Plan.

The recommended alternative includes the following components with discussion and detailed cost estimates presented in this report. The total anticipated construction cost (including a 30% contingency[1]) for Alternative 2A, including the recommended infrastructure improvements is $666,800. With 10% costs for services during construction and $15,000 for an operations plan the total cost is $748,480 as summarized below.

- Alternative 2A – Adsorption system - $140,000
- New mechanical building - $171,000
- Redrill the Cold Well - $48,000
- Rehabilitate the Hot Well - $10,000
- Hot Well Cooling Loop - $32,000
- Water Meters - $150,800
- Emergency Generator - $115,000
- **Total estimated construction cost: $666,800**
- **Services During Construction at 10%: $66,680**
- **Operations Plan: $15,000**
- **Total Cost: $748,480**

2 Introduction

2.1 Background

The Sierra East Homeowner Association (SEHOA) owns and operates a small community water system (System Number 2600622) and is responsible for providing safe drinking water to its residents. The water system receives its source water from two ground water wells and services approximately 29 single family residential connections. Historically, both source wells have tested positive for high arsenic levels. One of the

[1] Contingency is for missed items as a full design has not yet been completed.

source wells has, in addition to the high arsenic level, tested positive for bacteriological contamination on occasion. In February of 2012 the SEHOA received a compliance order (No. 02-03-12-622) from the Mono County Health Department Division of Environmental Health which required that the SEHOA cease and desist from continuing its use of the existing system's source water and provide the system with water of satisfactory quality per Section 116655 of the California Health and Safety Code. The specific conclusions of the order regarding the source water quality were that the source water failed to have arsenic levels below the primary maximum contaminant level (MCL)[2] of 10 µg/L, and that one of the source water wells was considered to be under the influence of surface water and the SEHOA did not have an adequate surface water treatment system in place to address potential bacteriological contamination concerns.

Arsenic concentrations have been tested in the source water wells at concentrations of 29 µg/L to 170 µg/L or from approximately 3 to 17 times the primary MCL of 10 µg/L. A summary of recent (July 2011 through December 2014) water quality testing is included below in section 2.5.D.

Currently residents of the SEHOA use point of use reverse osmosis water treatment, typically under the sink, to remove arsenic in the water that is consumed. In accordance with the California Health and Safety Code this is only a temporary measure until a permanent solution can be implemented that provides potable water to the entire distribution system.

SEHOA has received a planning grant, Agreement No. SRF13P120 and Project No. 2600622-001P, through the Safe Drinking Water State Revolving Fund (SDWSRF), to plan for correcting the deficiencies with the water system. As part of the planning process they have contracted with R.O. Anderson Engineering to prepare this Preliminary Engineering Report, as well as the environmental documentation and improvement plans necessary to bring the water system into compliance.

[2] The United States Environmental Protection Agency (USEPA) sets primary MCLs which are legally enforceable standards to protect the health of drinking water consumers. Secondary MCLs are non-enforceable standards for contaminants that may either cause cosmetic effects (skin discoloration) or have aesthetic effects on the water such as taste and odor (2). States may choose to enforce Federal secondary MCLs at their discretion.

2.2 Project Area

The Sierra East Homeowner Association (SEHOA) is located on the east side of Highway 395 between the towns of Coleville and Walker, California, in the southern portion of Antelope Valley. The West Walker River flows northerly towards Topaz Lake and lies immediately adjacent to the eastern boundary of SEHOA. Previous floods on the West Walker have caused property damage to some parcels in the SEHOA, and substantial bank reinforcement improvements have been made to the SEHOA's eastern boundary. The foothills of the Sierras lie just to the west of the SEHOA, with the mountains themselves being just a few miles further west. A major north-south running fault line about five miles long generally lies along the alignment of Highway 395 west of the SEHOA with several other liniments in the immediate area as illustrated in Appendix 12.

The project area includes the Sierra East Homeowners Association that is comprised of 45 parcels, bearing Mono County Assessor Parcel Numbers 0247001 through 0247044 and 0247046. The use and area of these 45 parcels is tallied Table 1:

Table 1 – Property Ownership

Number of Parcels	Use	Ownership	Approximate Area (acres)
1	Streets	SEHOA and/or Mono County	1.74
1	Vacant and unbuildable	Mono Co.	0.09
10	Some improvements such as parking areas, propane tanks, septic systems and some landscaping but no residences	SEHOA	0.96
29	Single family homes	Private Ownership	3.47
2	Vacant but could be developed with a single family home	Private Ownership	0.21
2	Greenbelt with some improvements including wells, the combination pump house and community center and some landscaping	SEHOA	1.77
45	TOTALS		8.24

The Project Area is illustrated in Figure 1 - Project Area.

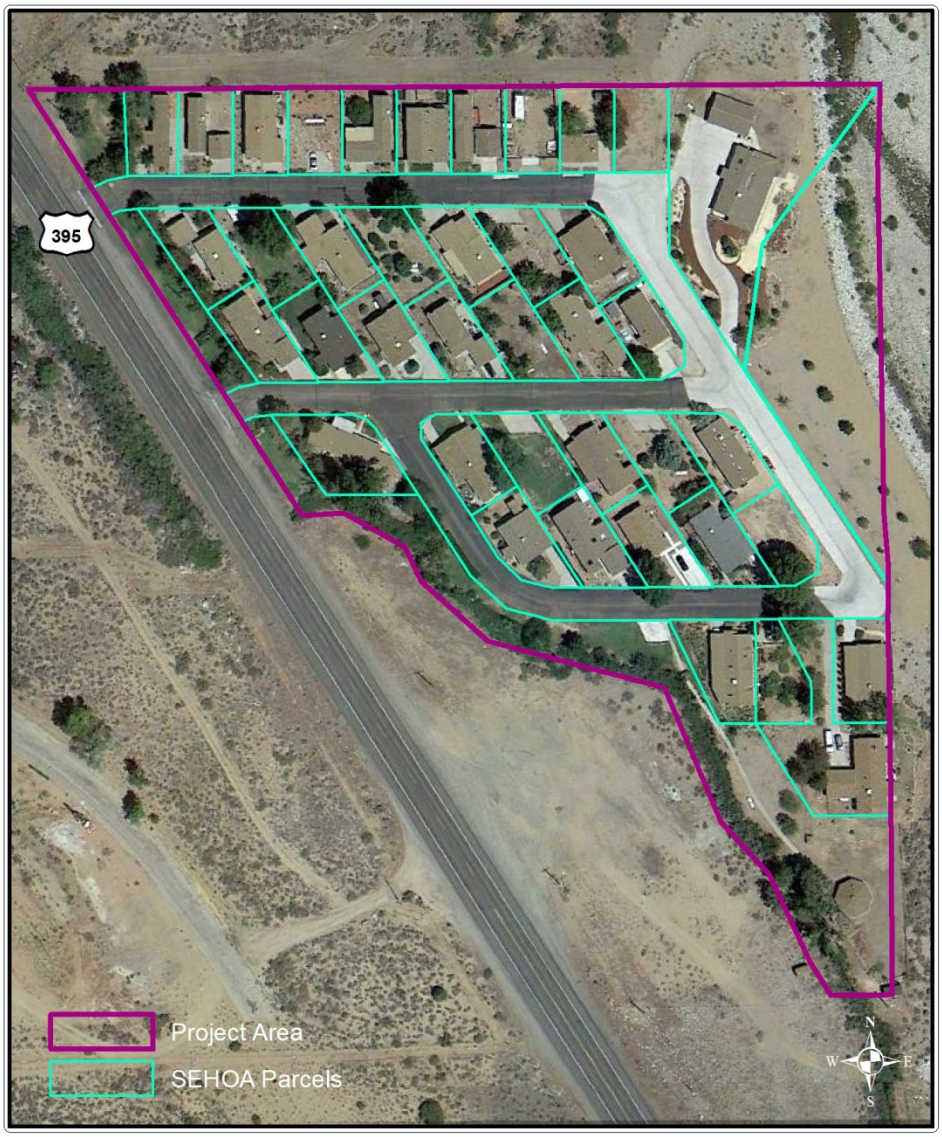


Figure 1 - Project Area

2.3 Topography and Floodplain

Topography was obtained from LiDAR data provided by the Desert Research Institute (DRI). The LiDAR data was collected as a part of the Walker Basin Project which was flown during 2010-2011. The LiDAR was available as a Digital Elevation Model (DEM)

with 1 meter cell resolution. The DEM was used to develop 1 foot contour intervals over the project area. The topography is presented in – Site Plan.

Much of the SEHOA is located within a FEMA 500 year floodplain, which is subject to a 0.2% chance of flooding during any given year. Portions of the SEHOA, particularly on the east side are located within a 100 year Zone AE floodplain which is shown as a breakout from the West Walker River. This breakout generally flows to the north through the SEHOA street and impacts up to 8 parcels, one of which is vacant and buildable and another which is vacant and not buildable due to its location in the floodplain and restrictions placed by the owner, Mono County. The floodplain boundaries are generally depicted in Figure 2.

2.4 Existing Facilities (Other than Water)

The project area is provided power through Liberty Utilities (California Pacific Electric Co.) who maintains underground lines and services. Telephone is through Frontier Communications with underground lines generally located in common trenches with the power. Gas is provided through AmeriGas Propane with storage tanks on SEHOA common area parcels and service is via underground lines with meters at each place of use. Sewer service is provided by gravity lines which feed to septic tanks on SEHOA common area parcels, with three contributing lots per septic tank being typical. Septic service is generally shown on Figure 2.

2.5 Water Facilities

Domestic water is supplied via three (3) inch mains with ¾ inch laterals connected to each home. Common area lots are supplied water for irrigation through a combination of individual services from the 3 inch main and yard hydrants connected to the water system on private lots. Most water laterals have ¾ inch stop and waste valves located underground adjacent to the streets. The distribution lines are dead end lines with no ability for flushing.

The existing water system is supplied by two wells known as Well 1 and Well 2. Well 1 yields hot water (up to145° F) and Well 2 yields cold water, which, for obvious reasons, they are also commonly referred to as “Hot Well” and “Cold Well”, respectively. The wells both pump to a common mechanical room that houses an approximate 900 gallon

hydro-pneumatic tank with distribution piping and electrical controls. Also included in the mechanical room are dual sodium hypochlorite storage tanks and metering pumps that are utilized for disinfecting the domestic water supply.

There are currently no fire hydrants in the water system and it is not designed for fire suppression with minimal storage and minimal flows. Figure 2 shows existing water facilities for the SEHOA.

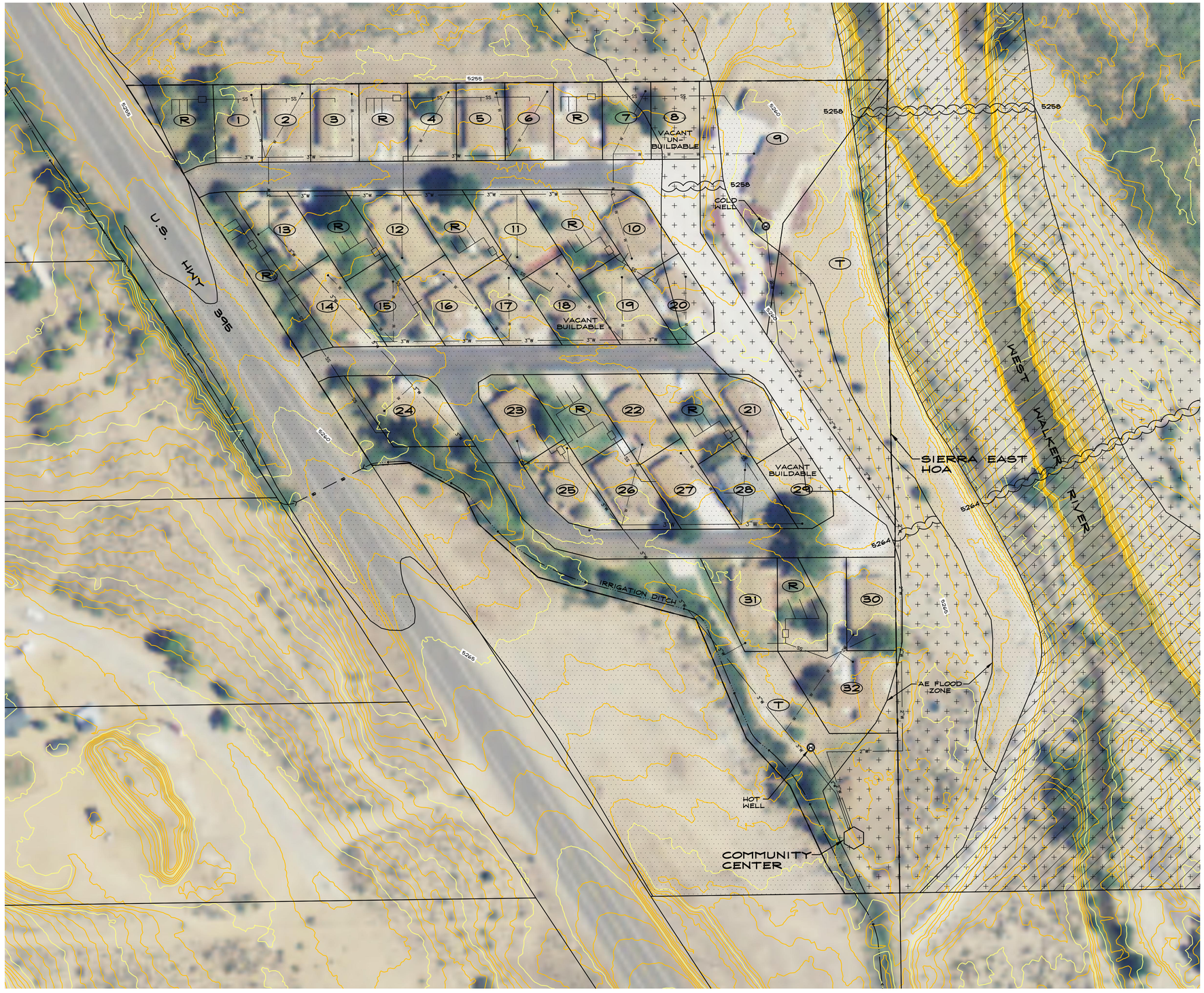
2.5.A Water Usage

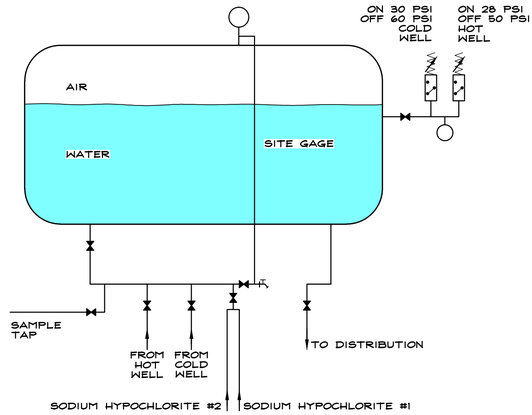
Presently there are no water meters on the SEHOA water system, and no records of measured rates of water consumption are available. It is therefore necessary to develop estimates of water usage based upon typical water consumption rates for similar areas. The average lot size for lots with existing homes or that lots that could be built upon is approximately 4,600 square feet. Homes, garages and driveways typically occupy much of each lot resulting in lesser amounts of irrigated landscaping per lot. Typical houses are moderate to small in size with typically two persons per home. Based upon a qualitative analysis of usage from similar residences in the area we would expect an annual average use of 200 gallons per day per home, however, other communities along the eastern Sierra Nevada Mountains often have large increases in water usage during summer months. This seasonal increase is most likely attributable to irrigation and other summer time activities and the water usage can be double or even triple that of winter time months.

The 10 unbuildable lots and the two lots designated as greenbelt (also referred to as common area lots) total approximately 2.7 acres. Portions of these lots are landscaped and irrigated and the overall water use of these lots is assumed to be 2 acre feet per acre over the summer season. These lots, under this assumed irrigation demand, would increase the average use per household, also referred to as equivalent dwelling unit (EDU), to approximately 540 gallons per day (annual average). The SEHOA currently has 29 EDU's, with 2 additional EDU's that could be built in the future.

The cold well was flow tested in the field by isolating the pressure tank from the system and discharging the water to the atmosphere. This field flow test

SCALE: 1" = 50'





EXISTING PRESSURE TANK SCHEMATIC

LEGEND:

- SIERRA EAST HOA BOUNDARY
- SS — EXISTING SEWER
- 3"W — EXISTING 3" WATER
- 2"W — EXISTING 2" WATER
- W — EXISTING 3/4" WATER
- EXISTING FLOWLINE
- EXISTING SEPTIC TANK
- 5264 FLOOD WATER SURFACE ELEVATION
- 500-YEAR FLOOD ZONE
- 100-YEAR FLOOD ZONE AE
- 100-YEAR FLOODWAY, ZONE AE

NO.	DATE	REVISION BLOCK	BY

1 0 1 2
50' 0 50' 100'
SCALE: 1" = 50'

R|O|Anderson
WWW.ROANDERSON.COM
NEVADA
1603 Esmeralda Ave
P.O. Box 2229
Minden, NV 89423
p 775.782.2322
f 775.782.7084
CALIFORNIA
595 Tahoe Keys Blvd
Suite A-2
South Lake Tahoe, CA 96150
p 530.600.1660
f 775.782.7084

WATER SYSTEM IMPROVEMENTS
SIERRA EAST HOMEOWNERS ASSOCIATION

EXISTING SITE PLAN
FIGURE 2

DRAWN: MAB	JOB: 2088-001
ENGINEER: KRN	DRAWING: SEE PLOT STAMP
SCALE: 1"=50'	SHEET: 1
DATE: 05/23/14	OF: 1 SHEETS

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indicated that the cold well produced approximately 12 gallons per minute (GPM) under atmospheric pressure conditions. The average production from the cold well while pumping into the water system with an assumed average system pressure of 45 psi is estimated to be about 9 GPM based upon pump curves (i.e. the system pressure of 45 psi adds 104 feet of head to the pump which would likely reduce output by about 3 to 4 GPM). For reference, 9 GPM is equal to about 13,000 gallons per day, or roughly 430 gallons per EDU per day.

Electrical meters located at each well measure the kilowatt-hour (kWh) electrical consumption used by the well pumps. The cold well has a meter that is dedicated generally to the well pump with minor power consumed by an irrigation controller, while the hot well has a meter dedicated to well pump and electrical service within the existing mechanical room, including lights and chlorine metering pumps. The actual amp draw for the cold well was measured while the pump was running during a normal evening, and the average amperage was measured at 7.9 amps and the voltage was measured at 231 volts. This would indicate a power consumption of 1.82 kW. Two years of electrical consumption data were analyzed (December 2011 to December 2013) for both meters to try and better estimate the water usage, which data is included in Table 2 below.

The Mono County Drinking Water Source Assessment (DWSA) performed on the cold well in 2002 indicates that the well can produce 50 GPM. It is understood from communication with residents that this well was originally equipped with a 30 GPM pump. In approximately 2008 it was determined that the well screen was badly corroded and clogged and could no longer produce 30 GPM and the pump was over drawing the well. At that time the screen was cleaned, a 6 inch PVC insert was installed, and the well was reequipped with a nominal 10 GPM pump.

Table 2 – Electrical Consumption as Shown on Monthly Billing from Liberty Utilities

Electrical Billing Dates		Monthly kWh Usage		Total kWh	Total Est. Gallons per EDU-Day[1,3]
From	To	Cold Well	Hot Well		
12/20/2011	1/19/2012	333	2	335	138
1/19/2012	2/21/2012	508	1	509	189
2/21/2012	3/20/2012	360	3	363	161
3/20/2012	4/19/2012	340	10	350	150
4/19/2012	5/18/2012	719	259	978	596
5/18/2012	6/19/2012	834	503	1337	835
6/19/2012	7/19/2012	880[2]	299	1179	686
7/19/2012	8/20/2012	987	293	1280	678
8/20/2012	9/19/2012	959	246	1205	660
9/19/2012	10/18/2012	934	126	1060	537
10/18/2012	11/19/2012	335	24	359	153
11/19/2012	12/19/2012	253	0	253	103
12/19/2012	1/18/2013	298	7	305	129
1/18/2013	2/20/2013	279	14	293	117
2/20/2013	3/20/2013	261	13	274	129
3/20/2013	4/18/2013	326	32	358	174
4/18/2013	5/20/2013	778	199	977	502
5/20/2013	6/19/2013	921	257	1178	657
6/19/2013	7/18/2013	929	293	1222	724
7/18/2013	8/19/2013	933	302	1235	667
8/19/2013	9/18/2013	823	270	1093	631
9/18/2013	10/18/2013	614	135	749	398
10/18/2013	11/18/2013	454	31	485	212
11/18/2013	12/18/2013	303	0	303	124

[1] The total estimated gallons per day for the cold well is based upon measured amp draw at the meter. The total esitamted gallons per day for the hot well is based upon an assumed pump-system head, motor & pump efficiencies, and the required kilowatt-hours to pump 1 gallon of water.

[2]Usage for this month was estimated from graph in following month's billing.

[3]A Factor of Safety (FOS) of 1.20 has been applied to the total gallons per EDU-day.

Since the average kilowatt power consumption for the cold well was developed from field measurements, determining the hours of pump operation during a month can be found by dividing the kilowatt-hours of power consumption by the average kilowatts used by the pump. The resulting daily water consumption per EDU estimate is found by the following equation:

$$\frac{\frac{\boldsymbol{kWh}}{\boldsymbol{kW}} * \boldsymbol{GPM(Est.)} * \frac{\boldsymbol{60\ min}}{\boldsymbol{hr}}}{\boldsymbol{No.of\ Days\ in\ Billing\ Cycle} * \boldsymbol{No.of\ EDU's}} = \frac{\boldsymbol{Gallons}}{\boldsymbol{EDU - Day}} * \boldsymbol{1.2\ FOS_a}$$

$\boldsymbol{a - Factor\ of\ Safety}$

It is possible to estimate water consumption based upon electrical use for the hot well by making reasonable assumptions. These assumptions include the pumping system head in feet, as well as motor and pump efficiencies. For the purpose of estimating water consumption for SEHOA, the following assumptions were made:

- Pump system head – hot well: 152 ft
    - Based upon friction & minor losses, drawdown, static water level, and average system pressure
- Pump motor efficiency – 88%
- Pump efficiency – 45%
    - Typical of small horsepower residential submersible pumps

The equation below generally describes the process by which the electrical consumption in kWh for the hot well has been translated into an estimate for water consumption in gallons per EDU per day.

$$\frac{\boldsymbol{kWh} * \left(\boldsymbol{Motor_{eff\%}} * \boldsymbol{Pump_{eff\%}}\right)}{\left(\boldsymbol{8.34}\frac{\boldsymbol{lbs}}{\boldsymbol{gal}}\right) * \left(\boldsymbol{Head(ft)}\right) * \left(\boldsymbol{3.77 * 10^{-7}}\left(\frac{\boldsymbol{kWh}}{\boldsymbol{ft - lb}}\right)\right) * \boldsymbol{EDU} * \boldsymbol{Days}} = \frac{\boldsymbol{Gallons}}{\boldsymbol{EDU - Day}} * \boldsymbol{1.2\ FOS}$$

Figure 3 below shows a graphical representation of the estimated daily water consumption in gallons per EDU per day, as well as the annual average consumption in gallons per EDU per day which has been estimated at about 390 gallons per EDU per day. Generally, during the winter months and the irrigation offseason (roughly October through March), the estimated average water usage is around 150 gallons per EDU day. As can be seen from the graph in Figure 3, the irrigation season including summer time months (April through September) have estimated water consumption rates as high as 835 gallons per EDU per day and a seasonal average of about 630 gallons per EDU-Day. While this is generally higher than would be expected it is not unheard of in similar

communities studied in eastern California. In addition to the obvious water uses for irrigation during summer months, the SEHOA is also subject to a population influx by seasonal residents which is partially why the difference between irrigation season and offseason water consumption is so large.

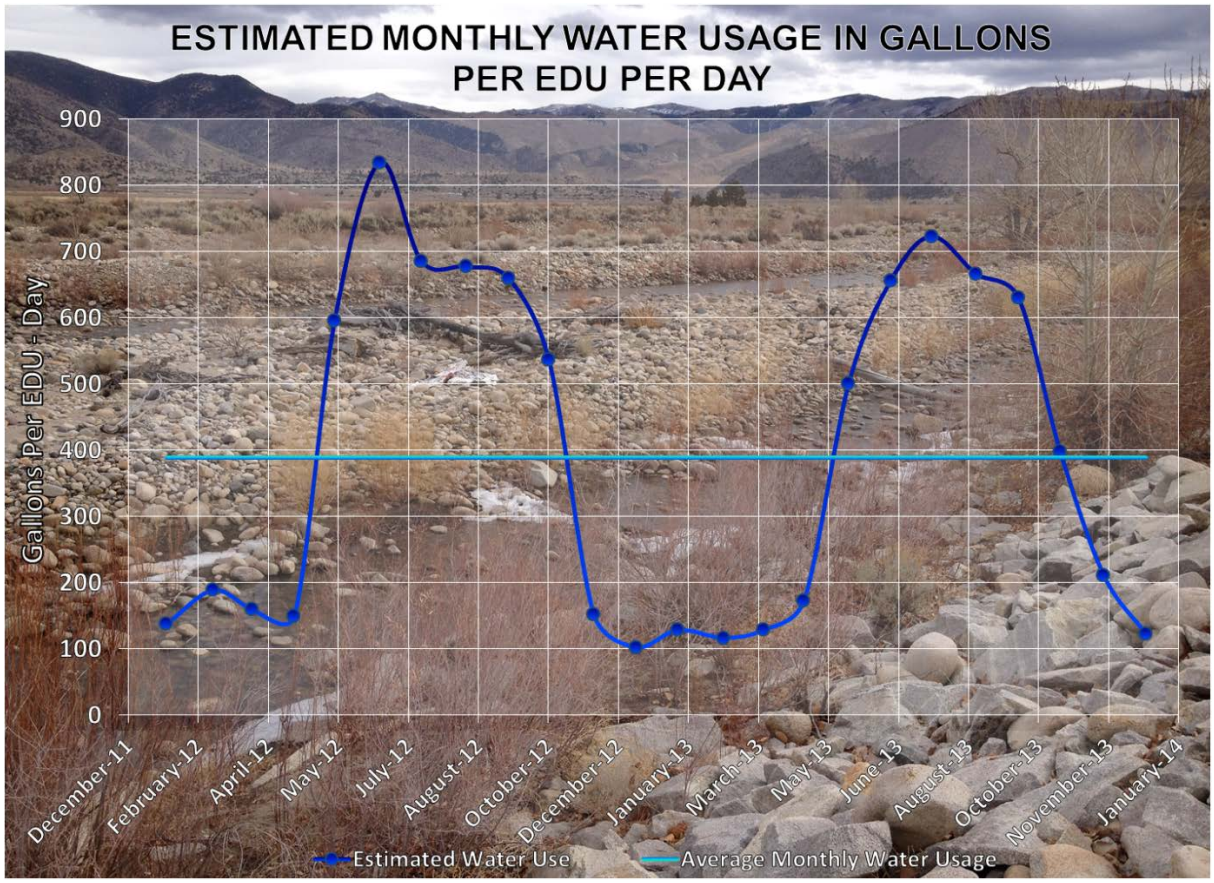

Figure 3 – Estimated Water Consumption

2.5.B Existing Water Demand

It is expedient to consider what the domestic water demand is for SEHOA in order to size any appropriate water system treatment alternative. Typical domestic water usage can vary dramatically between various communities and is dependent upon many factors; however, a reasonable baseline is about 80 to 100 gallons per person per day (1). This baseline would translate into a range of about 160 to 200 gallons per EDU per day at the SEHOA, assuming an average of two people per EDU.

Based upon the estimated historic water consumption at the SEHOA as described above, the domestic water use can generally be considered as the consumption during the irrigation off season, or from about October through March in a calendar year. The average estimated water usage per EDU per day during the irrigation off season at SEHOA is about 150 gallons. Therefore, any preferred alternative for supplying potable water should be capable of supplying greater than 150 gallons per EDU per day and a minimum of 200 gallons per EDU per day is recommended.

Presently, considering that there are 29 current EDUs estimated for SEHOA, the recommended *minimum domestic daily demand* at 200 gallons per EDU per day is 5,800 gallons, or an equivalent constant demand of about 4.2 gallons per minute (GPM). Only two future additional EDUs are estimated based upon unoccupied lots available for building as described in 2.2 above, which would bring the future SEHOA estimated minimum total daily domestic demand to 6,200 gallons per day. The total estimated average daily demand based upon average month data, including irrigation and other non-domestic uses, is about 11,300 gallons per day. This is an equivalent constant demand of 8 GPM, or 390 gallons per EDU per day. The existing average total demand during summer months (June – August) is estimated to be 20,500 gallons per day, or an equivalent constant demand of about 14 GPM. The average daily demand during the maximum month is 835 gallons per EDU per day (June, 2012). Table 3 below includes estimated existing water demands as well as the recommended minimum demand.

Table 3 – Water Demands

Demand Interval	Daily Total (gal)	Per EDU (gal)	GPM
Recommended Min.	5,800	200	4
Annual Average	11,300	390	8
Non-Irrigation Average	4,300	148	3
Maximum Month	24,200	835	17
Summer Average	20,500	708	14
Irrigation Season Avg.	18,300	631	13

2.5.C Design Capacity

The design capacity is based upon the anticipated maximum demand which would occur during the peak hour of the peak day. The peak day for SEHOA is estimated from the maximum month average daily demand of 835 GPD per EDU. From experience in similar communities along the Eastern Sierras in California, the peak hour is generally about 1.5 times the maximum month average daily demand, or about 1,250 gallons per EDU per day or 27 GPM (based upon a future total of 31 EDU's). The peak hour is then found by multiplying the peak day demand by a factor of 1.7, which is based off of an assumed diurnal curve as presented in Figure 4 below. The estimated peak hour demand is therefore 46 GPM, or 1.48 GPM per EDU.

It is therefore recommended that the water supply meet the peak day demand of 27 GPM, and that supplemental storage be designed to supply the balance during the peak hour. From volumetric calculations based upon the assumed diurnal in Figure 4 below, the required storage volume necessary to supply the peak hour demand is 4,300 gallons. When demand is less than 100%, the pump will, in addition to supplying demand, fill the storage volume, and when the demand is greater than 100%, the storage volume will contribute the balance of the demand in excess of the pump capacity.

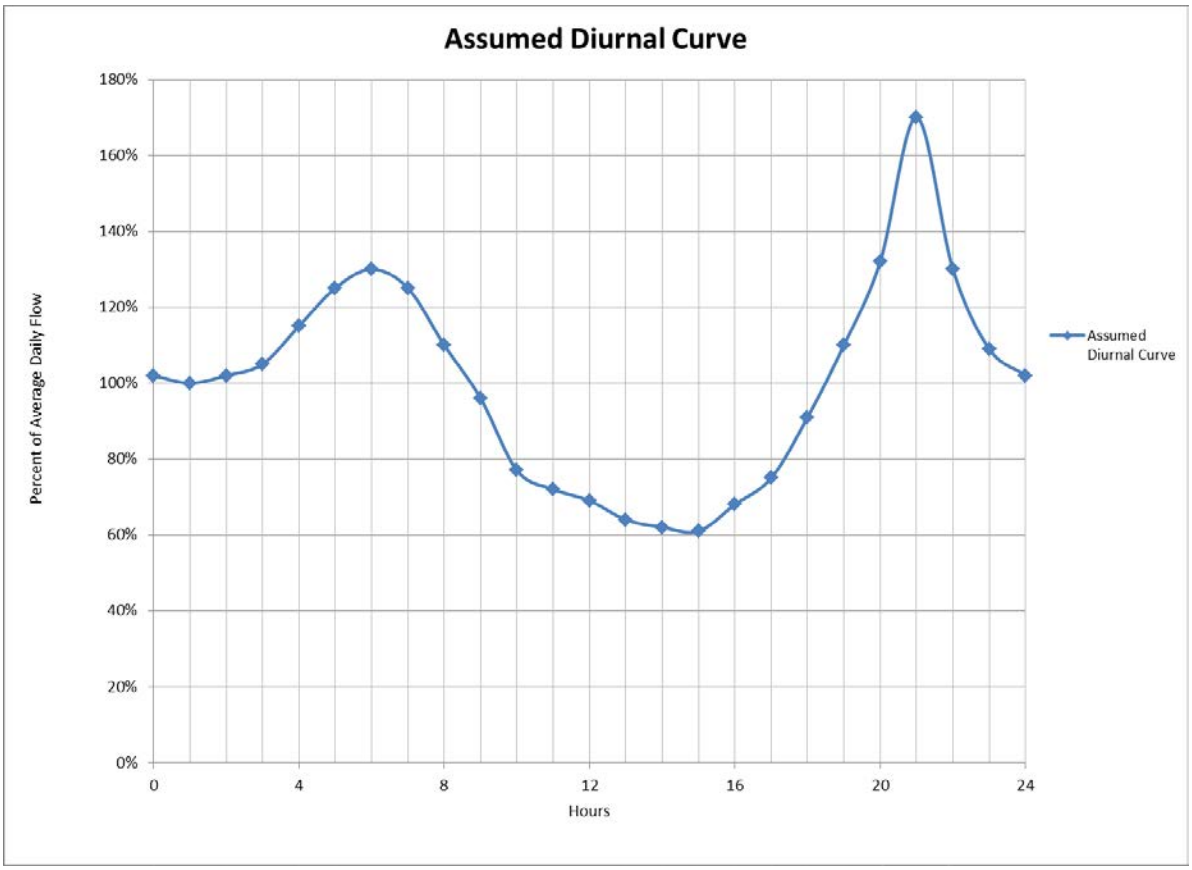

Figure 4 – Assumed Diurnal Curve

Another consideration for supplying peak demand via storage is that various arsenic treatment systems will have limited throughput rates at which they are designed to operate on a consistent basis. By having storage volume available, an efficient and economic arsenic removal system can be selected without requiring excessive capital costs or jeopardizing the overloading of the treatment system to meet peak demands.

It is also prudent to provide emergency storage in addition to regulating storage as described above. Emergency storage should be selected such that the average day non-irrigation demand can be supplied. From Table 3 above, this demand is 148 gallons per EDU per day, for an equivalent storage volume of 4,600 gallons (based upon a future total of 31 EDU's). The total minimum recommended design storage, including regulating and emergency storage, is 8,900 gallons. This storage should be provided by two identical storage tanks operating in parallel so that one tank could be taken out of service for repairs and maintenance while maintaining water service in the system.

2.5.D Water Quality

A brief summary of the SEHOA water quality is presented below as Table 4, and a more detailed summary of water quality is included as Appendix 10. As previously discussed, the main water quality concern for the SEHOA is the presence of elevated arsenic above the MCL of 10 µg/L. Arsenic is a toxic substance and as such its ingestion may result in adverse health conditions (2). While the concentrations of arsenic in both of the SEHOA source wells vary, the last several tests (since July of 2011) have all shown arsenic concentrations substantially higher than the MCL. Arsenic is typically present in ground water as two naturally occurring species – arsenite (As III) and arsenate (As V). The latter specie, arsenate, is the oxidized form of the former, and is more readily removed via various treatment systems. Arsenite, on the other hand, tends to be much more difficult to remove in its natural condition and subsequently must be oxidized into Arsenate prior to removal from water. Testing indicates that arsenic present in SEHOA's source water from the Cold Well is almost entirely (>99%) in the oxidized form, i.e. – *Arsenate.* The source water from the Hot Well is approximately 86% oxidized in the form of arsenate. Therefore, oxidation by chlorination prior to removal is beneficial.

Table 4 – Summary of Water Quality Data in the SEHOA Area

Source	Strong Well	Vandebrake Well	Kraft Well	Codtz Well	West Walker River	SEHOA Cold Well	SEHOA Hot Well
TDS (mg/L)	240	98	130	79	86	140	340
Chloride (mg/L)	60	8.9	3	1.7	5	33 +/-	110
Arsenic (mg/L)	**0.057**	**0.028**	**0.015**	0.0012	0.0065	**0.038**	**0.041**
Uranium (mg/L)	0.0012	0.0025	0.0012	ND	unknown	0.0034	0.0012
Depth	100' +/-	90'	100' to 150'	425' +/-	N/A	65'	130'
Temperature	89 F	cold	cold	cold	N/A	cool	118 to 145 F
Seal	50' +/-	unknown	none	unknown	N/A	20'	20'
Static Water Level	10' +/-	11'	26'	unknown	N/A	27'	38'

Bold text indicates parameter in excess of MCL

In addition, there are bacteriological concerns associated with the water quality from the cold well. Previous water samples taken from the Cold Well tested positive for the presence of bacteria, which caused the well to be considered as potentially *groundwater under the influence of surface water* according to the Mono County Health Department (MCHD) Division of Environmental Health (3).

It is possible that the previous tests were actually false-positives due to errors caused by improper sampling techniques. The last several bacteriological tests for the cold well since July of 2011 have all been negative. Recent enumeration testing for bacteriological contamination has been conducted monthly since July of 2012, and had been performed previously on a quarterly basis. The following Table 5 demonstrates the available bacteriological test results for the SEHOA:

Table 5 – Bacteriological Testing at SEHOA

Sample Date	Total Coliform	MPN
3/26/2012	Negative	-
4/23/2012	-	<1.0
7/2/2012	-	<1.1
7/30/2012	Negative	-
8/10/2012	Negative	<1.1
9/4/2012	Negative	<1.1
10/3/2012	Negative	<1.1
11/5/2012	Negative	<1.1
12/6/2012	Negative	<1.1
1/2/2013	Negative	<1.1
2/4/2013	Negative	<1.1
3/4/2013	Negative	<1.1
4/3/2013	Negative	<1.1
5/15/2013	Negative	-
6/10/2013	Negative	-
7/1/2013	Negative	-
8/1/2013	Negative	-
9/9/2013	Negative	-

- Indicates Test Not Taken On Date

MPN = Most Probable Number, varies between 1.0 & 1.1 due to laboratory detection limits.

The total coliform tests are all negative indicating the absence of bacteria in cold well. This is further supported by the enumeration testing shown in the most probable number (MPN) column, which all had results below the laboratory detection limit as indicated by the “less than” symbol (<). Essentially, the enumeration testing indicates the absence of any bacteriological contamination at the cold well, and since the total coliform tests also include sample points downstream in the system at various residential taps this indicates that the water

system does not have a localized bacteriological contamination either. Given the results in Table 5, there is a strong indication that the cold well is not actually under the influence of surface water. Initial conversations with MCHD indicate that the County may be willing to accept the test results listed as sufficient for determination regarding the influence of surface water on the cold well. It is recommended that confirmation in writing be obtained from the County on this matter if the Cold Well is to be used.

One previous water quality sample taken from the Hot Well tested for fluoride in excess of the California MCL of 2.0 mg/L (Federal Secondary MCL) at a concentration of 3.0 mg/L. While the water temperature of the Hot Well requires blending with water from the Cold Well or time to cool before consumption, there are not any other water quality parameters impairing the existing SEHOA source water.

2.6 Hydrogeology

The hydrogeology in the area surrounding the SEHOA is obviously complex as ground water quality can change dramatically in very short distances. This is made most obvious by the presence of groundwater at varying temperatures between the two SEHOA source wells which are located only about 500 feet apart from each other (4). This complexity is discussed in more detail in the local hydrogeology and well siting analysis performed by Andy Zdon and included here as Appendix 12. In the Zdon report, several faults and lineaments are identified in close proximity to the SEHOA which generally indicate zones for which water quality varies in the area. This information is highly useful for identifying potential areas where improved groundwater quality may be found, and the report lists three locations where the sampled groundwater quality is generally better than that found in the two SEHOA source wells.

3 Alternatives for Potable Water Supply

3.1 Alternative 1 – New Well in New Location

Finding a source of potable groundwater near the SEHOA is a desirable alternative to addressing the prior-discussed water quality issues and achieving compliance with the

Order issued by MCHD. This is because a new potable water well, if found, would not require additional infrastructure and equipment to address water quality issues, and perhaps more importantly, a new well would not require the ongoing maintenance and monitoring of such water treatment equipment.

In an effort to determine preliminarily the water quality adjacent to the SEHOA, four additional wells were sampled, primarily for arsenic concentrations. Three of these wells are situated to the north of the SEHOA, and one well is situated to the south. The geographic constraints of the West Walker River to the east and the foothills of the Eastern Sierras to the west generally precluded looking laterally from the SEHOA for new groundwater sources. From conversations with the landowner of a parcel just west of Highway 395 adjacent to the SEHOA it was noted that the ground water was both very hot and high in arsenic at approximately 99 µg/L.

The three wells to the north, shown in Table 2 as the Strong, Vandebrake, and Kraft Well, all tested for arsenic in excess of 10 µg/L, although the Kraft Well, furthest north was only slightly higher than the MCL with an arsenic concentration around of 15 µg/L. The southern well, known as the Codtz Well, was the only well sampled that did not have arsenic above the MCL. The Codtz Well generally has very good water quality, and the arsenic level at 1.2 µg/L is substantially below the MCL. The water quality sample from this well indicates that a very promising source of potable water exists near the SEHOA. However, the parcel upon which the Codtz well is located shares a common corner with the SEHOA property, meaning that easements will be required from at least two property owners if the SEHOA is to pursue placing a new well in this area.

Easements will include both temporary construction easements as well as permanent access easements for maintenance of the well and pipeline. It is anticipated that the pipeline will typically be set within a trench at an average excavated depth of 4 feet. Greater depth could be required in areas subject to potential erosion from flood waters. An exhibit for alternative 1 is included in Appendix 1.

3.1.A Construction Cost Analysis – New Well

Table 3 below contains an estimate of the probable cost associated with Alternative 1, including the cost to construct a new, water main, and obtain the necessary easements is estimated to cost about $389,000. It is noted that this is

only for one well and not two wells that would provide a redundant supply as discussed later in this report.

Table 6 – Estimate of Cost for Alternative 1

ENGINEER'S PRELIMINARY ESTIMATE OF PROBABLE COSTS R|O Anderson

Client:	**SIERRA EAST HOMEOWNERS ASSOCIATION**	**Estimated:**	**JEL**
Project:	**Water System Improvements**	**Checked:**	
Description:	**Alternative 1 - New Well**	**Date:**	**7-May-14**
File:	**Y:\Client Files\2088\2088-001\Documents\[Cost Analysis.xlsx]Alt. 1 - New Well**		

DIVISION 1 - GENERAL REQUIREMENTS

ITEM	DESCRIPTION	QUANTITY		UNIT COST		TOTAL
1	Mobilization, Demobilization, BMPs (15% of construction costs)	1	Lump Sum	$25,300.00	/LS	$25,300
2	Testing - Including Water Quality, Disinfection & Startup	1	Lump Sum	$5,000.00	/LS	$5,000
3	Easement and ROW Acquistion (Assumed, Subject to Negotiation)	1	Lump Sum	$100,000.00	/LS	$100,000
					SUB TOTAL	**$130,300**

DIVISION 2 - SITE CONSTRUCTION

ITEM	DESCRIPTION	QUANTITY		UNIT COST		TOTAL
1	Demolition & Abandonment	1	Lump Sum	$4,000.00	/LS	$4,000
2	Trenching	2,100	Feet	$20.00	/FT	$42,000
3	Well Drilling and Development	1	Lump Sum	$25,000.00	/LS	$25,000
4	Utility Locating	1	Lump Sum	$2,500.00	/LS	$2,500
					SUB TOTAL	**$73,500**

DIVISION 3 - CONCRETE

ITEM	DESCRIPTION	QUANTITY		UNIT COST		TOTAL
1	Vaults & Valve Cans	1	Lump Sum	$2,000.00	/LS	$2,000
2	Thrust and Restraining Blocks	1	Lump Sum	$2,000.00	/LS	$2,000
					SUB TOTAL	**$4,000**

DIVISION 5 - METALS

ITEM	DESCRIPTION	QUANTITY		UNIT COST		TOTAL
1	Well Casing, Screen	450	Feet	$45.00	/FT	$20,250
					SUB TOTAL	**$20,250**

DIVISION 6 - WOOD & PLASTICS

ITEM	DESCRIPTION	QUANTITY		UNIT COST		TOTAL
1	4" C-900 PVC Water Pipe Pressure Class 165 PSI	2,200	Feet	$4.00	/FT	$8,800
					SUB TOTAL	**$8,800**

DIVISION 11 - EQUIPMENT

ITEM	DESCRIPTION	QUANTITY		UNIT COST		TOTAL
1	Submersible Well Pump and Motor Combination	1	Lump Sum	$5,000.00	/LS	$5,000
2	Pump Controller, Pressure Switch	1	Lump Sum	$2,000.00	/LS	$2,000
					SUB TOTAL	**$7,000**

DIVISION 15 - MECHANICAL

ITEM	DESCRIPTION	QUANTITY		UNIT COST		TOTAL
1	4" Valves & Fittings	1	Lump Sum	$5,000.00	/LS	$5,000
2	Misc. Small Valves & Connections	1	Lump Sum	$3,000.00	/LS	$3,000
					SUB TOTAL	**$8,000**

DIVISION 16 - ELECTRICAL

ITEM	DESCRIPTION	QUANTITY		UNIT COST		TOTAL
1	New Electrical Service Connection to Well Pump, Pole, and Transformer	1	Lump Sum	$15,000.00	/LS	$15,000
					SUB TOTAL	**$15,000**

DIVISION 17 - CONTROLS

ITEM	DESCRIPTION	QUANTITY		UNIT COST		TOTAL
1	Control System, Either Buried Wire in Conduit or Telemetry	1	Lump Sum	$32,000.00	/LS	$32,000
					SUB TOTAL	**$32,000**

CONSTRUCTION SUB TOTAL	**$298,900**
CONTINGENCY AT 30%[1]	**$89,700**
ENGINEERS PRELIMINARY ESTIMATE OF PROBABLE COSTS	**$388,600**

[1]Contingency is for missing items because a full design has not been completed.

3.1.B Operation and Maintenance Considerations – New Well

Alternative 1 is desirable due to the very low operation and maintenance costs. It is anticipated that a new well would have O&M costs nearly commensurate with those previously experienced by the SEHOA. Periodic well and pump repairs will be necessary, as well as maintenance of the water main to the SEHOA system, however, these would be similar in scope and magnitude to those costs already realized for the hot and cold wells. Ongoing, consistent maintenance is not expected, nor are additional materials such as chemicals or filters. Additional O&M costs for a new well (over those for an existing well) are limited to maintenance of the pipeline and easement and are approximately $1,000 annually or approximately $32 per EDU per year. However, this additional O&M cost is only for one source of water supply and as discussed a redundant supply is desirable that will have additional O&M costs.

3.2 Alternative 2 – Arsenic Removal System

If a new well with a potable water source is determined to not be feasible then an arsenic removal system should be considered. An arsenic removal system will address the SEHOA water quality issues (for arsenic) near where the source water enters the system upstream of any domestic connections. There are a number of various arsenic removal systems that are commercially available and ongoing advances in the removal technology continue to make treatment both more effective and more economical. Since the SEHOA is a relatively small system with a design capacity of 27 GPM and a limited maintenance and operations budget, only two types of arsenic removal systems are considered in this preliminary engineering report: adsorption and reverse osmosis (RO). Other arsenic removal systems, such as coagulation and filtration, are considered to be too expensive both in capital and O&M costs and therefore are not presented in this report.

3.2.A Adsorption – Arsenic Removal System

Adsorption for arsenic removal is the process by which arsenic is physically and/or chemically removed from water and attached to a porous media. Adsorption can be an effective treatment process for removing both arsenic and

fluoride, however, the adsorption media is non-selective and therefore competing ions in the feed water will tend to 'compete' for adsorption sites on the media. Significant competing ions include silica and phosphorous (as orthophosphate), and recommended feed water levels for these ions are less than 30 mg/L and less than 1 mg/L, respectively (4). As demonstrated in Appendix 10, the Cold Well has silica and orthophosphate present at 23 mg/L and 0.023 mg/L, respectively while the Hot Well has concentrations of 47 mg/L and 0.025 mg/L respectively. Except the silica concentration in the Hot Well these concentrations are below the recommended levels which makes adsorption an operationally viable alternative for arsenic removal. It is possible to extend the useful life of the adsorption media by adding calcium chloride via a chemical injection pump. Increasing the hardness of the water in relation to the silica concentration will help decrease media fouling by the silica and make this technology acceptable for the Hot Well silica concentrations. Fortunately, the pH of the Cold Well water is approximately 6.9 and that of the Hot Well is approximately 7.4 and pH adjustment is not necessary which will tend to increase the adsorptive media life.

A typical adsorption system would involve taking pumped water directly from the well and diverting it through a pre-filter to remove large particles, sediment, and debris. After passing through the pre-filter the water would enter the adsorptive media canisters where arsenic and other contaminants such as fluoride would be removed. Prior to the adsorptive media, calcium chloride would be injected to increase hardness and mitigate the presence of silica. Once the water has passed through the adsorptive media it would be stored in tanks and subsequently delivered to any downstream point of use. It is necessary to store the treated water as described in 2.5.C above since the cost and uncertainty of sizing a new pumping system to meet the peak demand exceeds that of providing for water storage infrastructure. Adsorption, as with nearly all arsenic removal processes, requires that the incoming arsenic be oxidized into arsenate (AS V). As mentioned previously in 2.5.D, the SEHOA source water arsenic contaminant is mainly oxidized arsenic V but there is some unoxidized arsenic III, and therefore oxidizing by chlorination prior to treatment is recommended. An exhibit for alternative 2A is included in Appendix 2.

Adsorption is a passive process and in most cases does not require a substantial pressure differential in order to operate. Depending on the pressure drop across the treatment system determined during final design a booster pump may not be necessary upstream of an adsorption system. However, if the treated water is stored in gravity tanks, rather than a hydropneumatic tank booster pumps are required to deliver the stored water to the distribution system. Adsorption does not require a waste stream. Preliminary calculations based upon the expected amount of arsenic to be added to the cartridge as well as the binding of the arsenic to the media and the expected pH indicate that they will not be considered a hazardous waste per California and Federal guidelines and may be disposed of as a non-regulated waste (ordinary waste). However, to be in strict compliance with regulations the media should be tested at least once to verify that it is not considered hazardous. The following Construction Cost Analysis includes the initial test to verify the spent media is ordinary waste.

3.2.A.1 Construction Cost Analysis – Adsorption

Table 4 below contains an estimate of the probable construction costs associated with Alternative 2A. Since the SEHOA is already actively engaged in the process of ongoing water sampling and monitoring, and employs the services of an independent water system administrator, no considerations for water testing or operator costs are included as these costs are presently realized by the SEHOA. The estimated cost of construction for an adsorption system is about $140,000. The bulk of this cost is for the treatment, storage and distribution equipment.

Table 7 - Estimate of Cost for Alternative 2A

ENGINEER'S PRELIMINARY ESTIMATE OF PROBABLE COSTS R|O Anderson

Client:	**SIERRA EAST HOMEOWNERS ASSOCIATION**	**Estimated:**	**JEL**
Project:	**Water System Improvements**	**Checked:**	
Description:	**Alternative 2A - Adsorption Arsenic Removal System**	**Date:**	**27-May-14**
File:	C:\Users\jlesperance\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.MSO\[Copy of Cost Analysis.xlsx]Cost Summary		

ITEM	DESCRIPTION	QUANTITY		UNIT COST		TOTAL
DIVISION 1 - GENERAL REQUIREMENTS						
1	Mobilization, Demobilization, BMPs (15% of construction costs)	1	Lump Sum	$13,400.00	/LS	$13,400
2	Testing, Disinfection & Startup	1	Lump Sum	$5,000.00	/LS	$5,000
				SUB TOTAL		**$18,400**
DIVISION 2 - SITE CONSTRUCTION						
1	Demolition & Abandonment	1	Lump Sum	$2,000.00	/LS	$2,000
				SUB TOTAL		**$2,000**
DIVISION 6 WOOD & PLASTICS						
1	PVC Piping, Fittings	75	Feet	$33.65	/FT	$2,500
				SUB TOTAL		**$2,500**
DIVISION 11 - EQUIPMENT						
1	20 GPM Commercial Arsenic Adsorption Unit Lead-Lag System	2	Each	$20,000.00	/EA	$40,000
2	Arsenic Removal Cartridge	16	Lump Sum	$253.00	/LS	$4,000
3	Flow Meter	2	Each	$1,000.00	/EA	$2,000
4	New Well Pump	1	Lump Sum	$3,000.00	/EA	$3,000
5	Chemical Feed System	1	Lump Sum	$6,000.00	/EA	$6,000
				SUB TOTAL		**$55,000**
DIVISION 15 - MECHANICAL						
1	Misc. Valves & Connections	1	Lump Sum	$5,000.00	/LS	$5,000
				SUB TOTAL		**$5,000**
DIVISION 16 - ELECTRICAL						
1	Electrical	1	Lump Sum	20	%	$12,900
				SUB TOTAL		**$12,900**
DIVISION 17 - CONTROLS						
1	Control System	1	Lump Sum	$12,000.00	/LS	$12,000
				SUB TOTAL		**$12,000**
				CONSTRUCTION SUB TOTAL		**$107,800**
				CONTINGENCY AT 30%[1]		**$32,300**
ENGINEERS PRELIMINARY ESTIMATE OF PROBABLE COSTS						**$140,100**

[1]Contingency is for missing items because a full design has not been completed.

3.2.A.2 Operation and Maintenance Considerations – Adsorption

Since the SEHOA is already actively engaged in the process of ongoing water sampling and monitoring, and employs the services of an independent certified water system operator, only the additional operational and maintenance costs are considered for each alternative discussed in this report. The adsorption filter life is estimated to be on the order of 55,000 to 65,000 bed volumes (or about 540,000 to 630,000 gallons), which if serving the annual average daily demand at 390 gallons

per EDU per day for a future total of 31 EDUs, is expected to last 1.4 to 1.7 months. The adsorption filters cost on average $253 each (4 required for each change) and therefore the anticipated annual cost for replacing the adsorption filters is between $7,100 and $8,700, annually. Since the filter cartridge replacement can be performed in conjunction with regular water quality testing only a minimal increase in operator time is expected – less than 10 hours annually, and due to the simplicity of the system repairs and spare parts are expected to be minor, less than $900 annually. The additional cost per 1,000 gallons of treated water is estimated to range from about $1.8 to $2.1, or about $260 to $300 per EDU per year.

3.2.B Reverse Osmosis – Arsenic Removal System

Reverse Osmosis (RO), is the process by which contaminants are removed from water via the application of a pressure differential – often requiring a booster pump, to a selective filter membrane. Water permeates across this membrane after shedding various contaminants which are rejected by the filter membrane, including arsenic. RO typically requires soft water to function well, with a recommended hardness concentration of less than 17 mg/L, which is less than half of that present in SEHOA's source water at 38 mg/L. Additionally RO requires low iron (0.1 mg/L preferred), silica, and turbidity (0.5 NTU). Hardness can scale and reduce the efficaciousness of the filter membrane, while silica can abrade and damage the filter membrane. Despite the constituent concentrations in SEHOA's source water being higher than typically recommended, RO may still be a viable option for SEHOA, especially if a pretreatment system is used in conjunction with the RO filter.

Pretreatment for RO systems typically consist of a multimedia sand filter to remove sediment and other filterable constituents. Typically chlorine injection is required to oxidize arsenic from arsenite (As III) to arsenate (As V) due to the relative propensity for rejection at the RO membrane (50% As III rejection vs. 90% As V rejection). Chlorine injection would take place upstream of the multimedia filter which would, in addition to oxidizing the arsenic, assist with keeping the multimedia filter disinfected. However, since the arsenic in SEHOA's

water is primarily present as As V, chlorine injection is not expected to be required. If chlorine injection is required, a carbon pre-filter must also be included to remove chloride, which can damage the RO membrane. Finally, an antiscalant injection system will be required to prevent scale on the membrane. An exhibit for alternative 2B is included in Appendix 3.

RO does involve a waste stream. Permeate, or filtered water is delivered to the water system for potable use, while concentrate is shed to a drain along with all of the rejected constituents, including arsenic. Typical permeate ratios can be as low as 25 to 30% of the feed water amount, so special consideration will need to be given to sizing the source pump to ensure a sufficient quantity of water is available for the anticipated consumption demand. Additionally, the supplemental waste stream from the RO unit will likely be diverted to a new septic system which will need to be assessed for sufficient capacity to dispose of the increased wastewater stream. This can be difficult to permit because the waste stream will have concentrations of arsenic and TDS that are greater than the groundwater concentrations. Additionally, the antiscalant will be discharged in the waste stream.

3.2.B.1 Construction Cost Analysis – RO

Table 8 below contains an estimate of the probable cost associated with Alternative 2B. The major costs associated with an RO system are for the necessary treatment equipment and installation. Much of the equipment necessary for an RO system is the same as that for an adsorption system, with the major differences being in the actual arsenic removal equipment. The estimated construction costs for an RO system is about $252,000.

Table 8 - Estimate of Cost for Alternative 2B

ENGINEER'S PRELIMINARY ESTIMATE OF PROBABLE COSTS						
Client:	**SIERRA EAST HOMEOWNERS ASSOCIATION**			**Estimated:**		**JEL**
Project:	**Water System Improvements**			**Checked:**		
Description:	**Alternative 2B - Reverse Osmosis Arsenic Removal System**			**Date:**		**27-May-14**
File:	C:\Users\jlesperance\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.MSO\[Copy of Cost Analysis.xlsx]Cost Summary					
DIVISION 1 - GENERAL REQUIREMENTS						
ITEM	**DESCRIPTION**	**QUANTITY**		**UNIT COST**		**TOTAL**
1	Mobilization, Demobilization, BMPs (15% of construction costs)	1	Lump Sum	$21,400.00	/LS	$21,400
2	Testing, Disinfection & Startup	1	Lump Sum	$5,000.00	/LS	$5,000
3	Environmental Permitting for New Septic System	1	Lump Sum	$25,000.00	/LS	$25,000
				SUB TOTAL		**$51,400**
DIVISION 2 - SITE CONSTRUCTION						
ITEM	**DESCRIPTION**	**QUANTITY**		**UNIT COST**		**TOTAL**
1	Demolition & Abandonment	1	Lump Sum	$2,000.00	/LS	$2,000
2	New Septic System for RO Watste Steam	1	Lump Sum	$10,000.00	/LS	$10,000
				SUB TOTAL		**$12,000**
DIVISION 6 WOOD & PLASTICS						
ITEM	**DESCRIPTION**	**QUANTITY**		**UNIT COST**		**TOTAL**
1	PVC Piping, Fittings	75	Feet	$33.65	/FT	$2,500
				SUB TOTAL		**$2,500**
DIVISION 11 - EQUIPMENT						
ITEM	**DESCRIPTION**	**QUANTITY**		**UNIT COST**		**TOTAL**
1	Skid Mounted Reverse Osmosis System	2	Each	$36,000.00	/EA	$72,000
2	Chemical Feed System	1	Lump Sum	$6,000.00	/LS	$6,000
3	Multimedia Pre-Filter	1	Lump Sum	$2,200.00	/LS	$2,200
4	Water Softener System	1	Lump Sum	$6,000.00	/LS	$6,000
5	New Well Pump	1	Lump Sum	$3,000.00	/EA	$3,000
				SUB TOTAL		**$89,200**
DIVISION 15 - MECHANICAL						
ITEM	**DESCRIPTION**	**QUANTITY**		**UNIT COST**		**TOTAL**
1	Misc. Valves & Connections	1	Lump Sum	$5,000.00	/LS	$5,000
				SUB TOTAL		**$5,000**
DIVISION 16 - ELECTRICAL						
ITEM	**DESCRIPTION**	**QUANTITY**		**UNIT COST**		**TOTAL**
1	Electrical	1	Lump Sum	20	%	$21,700
				SUB TOTAL		**$21,700**
DIVISION 17 - CONTROLS						
ITEM	**DESCRIPTION**	**QUANTITY**		**UNIT COST**		**TOTAL**
1	Control System	1	Lump Sum	$12,000.00	/LS	$12,000
				SUB TOTAL		**$12,000**
				CONSTRUCTION SUB TOTAL		**$193,800**
				CONTINGENCY AT 30%[1]		**$58,100**
ENGINEERS PRELIMINARY ESTIMATE OF PROBABLE COSTS						**$251,900**

[1]Contingency is for missing items because a full design has not been completed.

3.2.B.2 Operation and Maintenance Considerations – RO

Similar to the O&M costs for an adsorption system described previously, regular maintenance and water quality testing costs have not been included in this report. Increased electrical usage, as well as the chemical costs for the softener, antiscalant, and additional chlorine injection, (if required), are not expected to exceed $2,500 annually. Increased operator time is anticipated to be about 100 hours per year and including repairs this is estimated to cost about $7,500 annually, for a

total annual increase in O&M cost of $10,000. Assuming a future total of 31 EDU's the additional cost per 1,000 gallons of treated water is $2.30 at the annual average day demand of 390 gallons per EDU per day, or $320 per EDU per year.

3.2.C Surface Water Treatment System

In the event that an onsite arsenic removal system is the preferred alternative it may be necessary to perform additional enumeration bacteriological tests to definitively determine if the cold well is indeed under the influence of surface water, depending on the disposition of MCHD relative to the findings summarized in Table 5 above. It is the determination of this report, based upon the results of several months of testing by state certified laboratories which indicate an absence of bacteriological contamination that the cold well is not under the influence of surface water. This section regarding surface water treatment has only been included for completeness and to provide a reference of the capital as well as the operational costs to SEHOA for implementing such a system should it be required.

Surface water treatment (SWT) requirements are described under the EPA's Long Term 2 Enhanced Surface Water Treatment Rule (LT2). The LT2 rule generally requires thresholds for removal and/or inactivation of viruses and the pathogens *Cryptosporidium* and *Giardia Lamblia* (5). Since the SEHOA presently operates a chlorination system consisting of dual sodium hypochlorite metering pumps, it is anticipated that a new filtration system, in conjunction with a modified chlorination system that includes chlorine residual and turbidity monitoring, could reasonably achieve the surface water treatment requirements. Such a SWT system will not address the arsenic contamination, however, and will therefore have to be complimentary to an arsenic removal system such as those described in 3.2.A and 3.2.B above. An exhibit for alternative 2C is included in Appendix 4.

Table 6 below contains an estimate of the probable cost associated with Alternative 2C, which is estimated to have capital costs for equipment and

construction (in conjunction with one of the arsenic removal systems above) approximately $88,000.

Table 9 - Estimate of Cost for Alternative 2C

ENGINEER'S PRELIMINARY ESTIMATE OF PROBABLE COSTS						R O Anderson
Client:	**SIERRA EAST HOMEOWNERS ASSOCIATION**				**Estimated:**	**JEL**
Project:	**Water System Improvements**				**Checked:**	
Description:	**Alternative 2C - Surface Water Treatment System**				**Date:**	**7-May-14**
File:	**Y:\Client Files\2088\2088-001\Documents\[Cost Analysis.xlsx]Alt. 1 - New Well**					
DIVISION 1 - GENERAL REQUIREMENTS						
ITEM	**DESCRIPTION**	**QUANTITY**		**UNIT COST**		**TOTAL**
1	Mobilization, Demobilization, BMPs (2% of construction costs)	1	Lump Sum	$1,224.00	/LS	$1,278
2	Testing, Disinfection & Startup	1	Lump Sum	$2,500.00	/LS	$2,500
					SUB TOTAL	**$3,778**
DIVISION 6 WOOD & PLASTICS						
ITEM	**DESCRIPTION**	**QUANTITY**		**UNIT COST**		**TOTAL**
1	PVC Pipe and Fittings	30	Feet	$33.65	/FT	$1,010
					SUB TOTAL	**$1,010**
DIVISION 11 - EQUIPMENT						
ITEM	**DESCRIPTION**	**QUANTITY**		**UNIT COST**		**TOTAL**
1	Water Filtration 6 Unit Skid - Complete	1	Lump Sum	$40,000.00	/LS	$40,000
2	Chlorine Residual Analyzer and Turbidty Meter	1	Lump Sum	$15,000.00	/LS	$15,000
					SUB TOTAL	**$55,000**
DIVISION 15 - MECHANICAL						
ITEM	**DESCRIPTION**	**QUANTITY**		**UNIT COST**		**TOTAL**
1	Misc. Valves & Fittings	1	Lump Sum	$2,000.00	/LS	$2,000
					SUB TOTAL	**$2,000**
DIVISION 16 - ELECTRICAL						
ITEM	**DESCRIPTION**	**QUANTITY**		**UNIT COST**		**TOTAL**
1	Electrical	1	Lump Sum	5	%	$2,900
					SUB TOTAL	**$2,900**
DIVISION 17 - CONTROLS						
ITEM	**DESCRIPTION**	**QUANTITY**		**UNIT COST**		**TOTAL**
1	Additional Control System Integration	1	Lump Sum	$3,000.00	/LS	$3,000
					SUB TOTAL	**$3,000**
					CONSTRUCTION SUB TOTAL	**$67,700**
					CONTINGENCY AT 30%[1]	**$20,300**
ENGINEERS PRELIMINARY ESTIMATE OF PROBABLE COSTS						**$88,000**

Note: This estimate assumes that any surface water treatment system will be used in conjunction with an arsenic removal system and therefore the cost is substantially less in this estimate than if a standalone filtration system was put in place.

[1]Contingency is for missing items because a full design has not been completed.

3.2.C.1 Operations and Maintenance Considerations - SWT

The primary costs for operating a filtration system to treat surface water are for the filter changes themselves. It is anticipated that the filters (pre and post filters) will have an effective life of 200,000 gallons. At the annual average daily demand of 390 gallons per EDU per day, this would require changing the filters about 22 times a year at an estimated amount of $660 per filter change (assuming the future total of 31 EDU's). This equates to about $14,500 annually in new filter materials. The increase in operator time and miscellaneous repairs is estimated at about $12,000

annually, for a total annual cost of $6 per 1,000 gallons of filtered water or $855 per EDU per year.

3.2.D New Mechanical Building

If an onsite arsenic removal system is the preferred alternative, it is recommended to construct a new mechanical building to house the water treatment equipment and water storage tanks because the existing building is not large enough. The building would need to be large enough to house the two tanks and elevated to a foot above the floodplain. A 24' by 24' CMU (concrete block) building with 10' walls is recommended. The estimated cost to construct a new mechanical building is included in Table 10.

An HVAC system would be included with the new building, consisting of an electric or propane fired heater, exhaust fan, and louver(s). A metal roll up door to facilitate moving the storage tanks in and out would also be necessary, as well as lighting, electric service and control systems for alarm and climate control. The cost to construct a mechanical building would be the same for either of the alternatives involving an onsite arsenic removal system. An exhibit for the proposed mechanical building is included in Appendix 6.

Table 10 – Estimate of Cost for New Mechanical Building

ENGINEER'S PRELIMINARY ESTIMATE OF PROBABLE COSTS R O Anderson

Client:	**SIERRA EAST HOMEOWNERS ASSOCIATION**	**Estimated:**	**JEL**
Project:	**Water System Improvements**	**Checked:**	
Description:	**New Pump and Mechanical Building**	**Date:**	**27-May-14**
File:	C:\Users\jlesperance\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.MSO\[Copy of Cost Analysis.xlsx]Cost Summary		

ITEM	DESCRIPTION	QUANTITY		UNIT COST		TOTAL
DIVISION 1 - GENERAL REQUIREMENTS						
1	Mobilization, Demobilization, BMPs, Site Maintenance, Record Drawings	1	Lump Sum	$16,600	/LS	$16,600
2	Testing	1	Lump Sum	$2,500.00	/LS	$2,500
3	Mono County Building Permit	1	Lump Sum	$1,000.00	/LS	$1,000
4	Flood Elevation Certificate	1	Lump Sum	$800.00	/LS	$800
				SUB TOTAL		**$20,900**
DIVISION 2 - SITE CONSTRUCTION						
1	Demolition & Abandonment	1	Lump Sum	$5,000.00	/LS	$5,000
2	Trenching	200	Feet	$20.00	/FT	$4,000
3	Building Footprint Site Preparation & Floodplain Fill for Foundation	1	Lump Sum	$10,000.00	/LS	$10,000
				SUB TOTAL		**$19,000**
DIVISION 3 - CONCRETE						
1	Foundation and Building Pad	1	Lump Sum	$10,000.00	/LS	$10,000
				SUB TOTAL		**$10,000**
DIVISION 4 MASONRY						
1	24 ft X 24 ft CMU Mechanical Building	1	Lump Sum	$15,000.00	/LS	$15,000
				SUB TOTAL		**$15,000**
DIVISION 5 - METALS						
1	New Building Roof System	1	Lump Sum	$12,000.00	/LS	$12,000
				SUB TOTAL		**$12,000**
DIVISION 6 WOOD & PLASTICS						
1	Plastic Pipe	1	Lump Sum	$2,500.00	/LS	$2,500
2	Roof Trusses	1	Lump Sum	$7,500.00	/LS	$7,500
				SUB TOTAL		**$10,000**
DIVISION 7 - THERMAL & MOISTURE PROTECTION						
1	Joint Sealers & Insulation	1	Lump Sum	$2,500.00	/LS	$2,500
				SUB TOTAL		**$2,500**
DIVISION 8 - DOORS & WINDOWS						
1	12 ft Roll Up Door	1	Lump Sum	$3,000.00	/LS	$3,000
2	Access Door	1	Lump Sum	$1,500.00	/LS	$1,500
				SUB TOTAL		**$4,500**
DIVISION 11 - EQUIPMENT						
1	5,000 Gallon Polyethylene Water Storage Tank	2	Each	$5,000.00	/EA	$10,000
2	Booster Pumps with VFDs	1	Lump Sum	$8,000.00	/LS	$8,000
				SUB TOTAL		**$18,000**
DIVISION 15 - MECHANICAL						
1	HVAC System	1	Lump Sum	$5,000.00	/LS	$5,000
2	New Plumbing Including Floor Drains	1	Lump Sum	$5,000.00	/LS	$5,000
				SUB TOTAL		**$10,000**
DIVISION 16 - ELECTRICAL						
1	Lighting & Electrical Service Including High Voltage	7	Percent	7%	/%	$7,100
				SUB TOTAL		**$7,100**
DIVISION 17 - CONTROLS						
1	Alarm System & Climate Controls	1	Lump Sum	$2,500.00	/LS	$2,500
				SUB TOTAL		**$2,500**
				CONSTRUCTION SUB TOTAL		**$131,500**
				CONTINGENCY AT 30%[1]		**$39,500**
ENGINEERS PRELIMINARY ESTIMATE OF PROBABLE COSTS						**$171,000**

[1]Contingency is for missing items because a full design has not been completed.

3.3 Alternative 3 – Interconnection with Coleville High School

Coleville High School, which is located approximately 2.8 miles to the north of SEHOA, presently operates a potable water system that could potentially be modified to accommodate a new connection to serve the SEHOA. The Coleville High School water system is currently equipped with a uranium removal system, which will require expansion in order to serve the additional demand by SEHOA.

Table 7 below contains an estimate of the probable cost associated with Alternative 3. Due primarily to the distance between the school and SEHOA and the cost to increase the existing treatment capacity this is the most expensive alternative; it is believed to be cost prohibitive especially when considering the fact that substantially less expensive alternatives exist. The estimate of probable cost for connecting to the Coleville High School is $970,000. An exhibit for Alternative 3 is included in Appendix 5.

Operations and maintenance considerations have not been investigated in any detail for this alternative due to the substantial capital costs required. Likely O&M costs would include a cost sharing with the Coleville High School at a rate proportional to each entity's water consumption, as well as maintenance of the pipeline between the school and the SEHOA. It is estimated that these costs might be in the range of $10,000 to $15,000 annually.

Table 11 - Estimate of Cost for Alternative 3

ENGINEER'S PRELIMINARY ESTIMATE OF PROBABLE COSTS R|O Anderson

Client:	**SIERRA EAST HOMEOWNERS ASSOCIATION**	**Estimated:**	**JEL**
Project:	**Water System Improvements**	**Checked:**	
Description:	**Alternative 1 - Connection to Coleville High School**	**Date:**	**27-May-14**
File:	C:\Users\jlesperance\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.MSO\[Copy of Cost Analysis.xlsx]Cost Summary		

ITEM	DESCRIPTION	QUANTITY		UNIT COST		TOTAL
DIVISION 1 - GENERAL REQUIREMENTS						
1	Mobilization, Demobilization, BMPs (15% of construction costs)	1	Lump Sum	$96,645.00	/LS	$96,645
2	Testing, Disinfection & Startup	1	Lump Sum	$5,000.00	/LS	$5,000
				SUB TOTAL		**$101,645**
DIVISION 2 - SITE CONSTRUCTION						
1	Demolition & Abandonment	1	Lump Sum	$2,000.00	/LS	$2,000
2	Trenching	15,000	Feet	$15.00	/FT	$225,000
3	Utility Locating	1	Lump Sum	$5,000.00	/LS	$5,000
				SUB TOTAL		**$232,000**
DIVISION 3 - CONCRETE						
1	Vaults & Valve Cans	1	Lump Sum	$7,500.00	/LS	$7,500
2	Thrust and Restraining Blocks	1	Lump Sum	$5,000.00	/LS	$5,000
				SUB TOTAL		**$12,500**
DIVISION 6 WOOD & PLASTICS						
1	4" C-900 PVC Water Pipe Pressure Class 165 PSI	15,000	Feet	$4.00	/FT	$60,000
				SUB TOTAL		**$60,000**
DIVISION 11 - EQUIPMENT						
1	Flow Meter	1	Lump Sum	$1,500.00	/LS	$1,500
				SUB TOTAL		**$1,500**
DIVISION 15 - MECHANICAL						
1	Large Valves & Fittings	1	Lump Sum	$50,000.00	/LS	$50,000
2	Misc. Valves & Connections	1	Lump Sum	$10,000.00	/LS	$10,000
3	Capacity Improvements and Upgrades to Existing System	1	Lump Sum	$200,000.00	/LS	$200,000
				SUB TOTAL		**$260,000**
DIVISION 16 - ELECTRICAL						
1	Electrical	1	Lump Sum	5	%	$28,300
				SUB TOTAL		**$28,300**
DIVISION 17 - CONTROLS						
1	Buried Control Cable or Telemetry	1	Lump Sum	$50,000.00	/LS	$50,000
				SUB TOTAL		**$50,000**
				CONSTRUCTION SUB TOTAL		**$745,900**
				CONTINGENCY AT 30%[1]		**$223,800**
ENGINEERS PRELIMINARY ESTIMATE OF PROBABLE COSTS						**$969,700**

[1]Contingency is for missing items because a full design has not been completed.

4 Infrastructure Improvements

4.1 Water Distribution System

The existing infrastructure for the SEHOA water system is approximately 32 years old, although minor portions of the system may have been installed more recently. Representatives of the SEHOA have indicated that pipe leaks are an issue which may

be recurring due to the age of the materials. In addition, the water temperature from the hot well at up to 145° is high enough to substantially de-rate the working pressure of the polyvinyl chloride (PVC) pipe materials. This exposure to the hot water may have contributed to premature wear on the pipes, fittings, and other system appurtenances.

The SEHOA water system is presently arranged as a single path or "tree" system with 3 inch mains and ¾ inch service laterals for each domestic connection. In this type of arrangement, if a portion of the system needs to be isolated for repairs or any other reason, the entire portion of the system downstream from the point of isolation (e.g. valve) is also isolated and without water service for the duration of the isolation event. A more desirable and versatile system arrangement is a "loop" system, where water service can be maintained to each part of the system by more than one direction. The cost to modify the existing water system into a looped distribution system is included in Table 12.

Table 12 – Estimated Cost to Modify Water System into a Loop system

ENGINEER'S PRELIMINARY ESTIMATE OF PROBABLE COSTS R|O Anderson

Client:	**SIERRA EAST HOMEOWNERS ASSOCIATION**			**Estimated:**	**JEL**
Project:	**Water System Improvements**			**Checked:**	
Description:	**System Infrastructure Modification - Distribution System Loop**			**Date:**	**7-May-14**
File:	**Y:\Client Files\2088\2088-001\Documents\[Cost Analysis.xlsx]Loop System**				

DIVISION 1 - GENERAL REQUIREMENTS					
ITEM	**DESCRIPTION**	**QUANTITY**		**UNIT COST**	**TOTAL**
1	Mobilization, Demobilization, BMPs, Site Maintenance, Record Drawings	1	Lump Sum	$7,100.00 /LS	$7,100
2	Testing & Disinfection	1	Lump Sum	$5,000.00 /LS	$5,000
3	Mono County Building Permit	1	Lump Sum	$1,000.00 /LS	$1,000
				SUB TOTAL	**$13,100**

DIVISION 2 - SITE CONSTRUCTION					
ITEM	**DESCRIPTION**	**QUANTITY**		**UNIT COST**	**TOTAL**
1	Demolition & Abandonment	1	Lump Sum	$2,000.00 /LS	$2,000
2	Trenching & Subgrade Preparation	750	Lineal Feet	$25.00 /FT	$18,800
3	Landscape Repair	1	Lump Sum	$2,000.00 /FT	$2,000
				SUB TOTAL	**$22,800**

DIVISION 3 - CONCRETE					
ITEM	**DESCRIPTION**	**QUANTITY**		**UNIT COST**	**TOTAL**
1	Concrete & Asphalt Patching	750	Lineal Feet	$20.00 /LF	$15,000
				SUB TOTAL	**$15,000**

DIVISION 6 WOOD & PLASTICS					
ITEM	**DESCRIPTION**	**QUANTITY**		**UNIT COST**	**TOTAL**
1	3" PVC Pipe	750	Lineal Feet	$3.00 /LF	$2,300
				SUB TOTAL	**$2,300**

DIVISION 15 - MECHANICAL					
ITEM	**DESCRIPTION**	**QUANTITY**		**UNIT COST**	**TOTAL**
1	3" Isolation Valves	14	Each	$500.00 /EA	$7,000
				SUB TOTAL	**$7,000**

CONSTRUCTION SUB TOTAL	**$60,200**
CONTINGENCY AT 30%[1]	**$18,100**
ENGINEERS PRELIMINARY ESTIMATE OF PROBABLE COSTS	**$78,300**

[1]Contingency is for missing items because a full design has not been completed.

Within a loop system, if it becomes necessary to isolate a portion of the system for any reason, the balance of the system can be kept in service, minimizing the impact to residents. This could be accomplished by tying into the existing 3 inch water mains at the end of each street and running a common 3 inch line between them so that three new loops are formed as shown in Appendix 7. By placing appropriate isolation valves at each loop junction, the impacts to the water system are substantially reduced in the event that a portion of the system needs to be isolated and taken off line.

If funding is available, it is strongly recommended to replace the entire existing water system infrastructure with a new looped distribution system and piping materials as shown in Appendix 8. The existing infrastructure for the water system is now over 30 years old and showing signs deterioration. The SEHOA has cited recurring leaks and uncertainty for the integrity of the water system in general. Repair costs directly attributable to leaks and other issues with the system have averaged over $1,000 per year since 2007, and have been as much as $2,100 in a year. The frequency of repairs has been constant over the last seven years and will likely continue. Possibly, this is due to exposure of the PVC pipes to hot water from the Hot Well which can have a dramatic degrading of working pressure for the pipe material. Also, the construction practices in use when the system was first built may have been less than ideal. This is evidenced by the presence of glued joints on the pipes where slip joint bell and spigot connections would have been more appropriate. Finally, the system has no way of being flushed, and the accumulation of sediment that is typical of well systems may have accumulated to substantial levels in parts of the system. Given all of these considerations, a new water system is very appropriate and highly recommended. The estimated cost to construct and install a new water system is included in Table 13.

A dual system for supplying treated water to domestic connections and an untreated water system for supplying irrigation and other non-potable uses was briefly considered. This dual system would have the advantage of reducing the demand and costs associated with an arsenic removal system by only treating the domestic portion of the SEHOA water demand and was an attractive option initially for that reason. However, given the poor condition of the existing water system, a dual system would likely need two new, independent systems with backflow prevention and set back distances required on the untreated system. The SEHOA would also be required to maintain two systems in parallel, with the added time and cost associated to do so. Given the substantial

infrastructure costs, construction difficulties to accommodate set back distances, and increased operation and maintenance, this dual system option was dismissed and not considered further.

Table 13 – Estimated Cost for Installing a New Water System

ENGINEER'S PRELIMINARY ESTIMATE OF PROBABLE COSTS							R O Anderson
Client:	**SIERRA EAST HOMEOWNERS ASSOCIATION**				**Estimated:**	**JEL**	
Project:	**Water System Improvements**				**Checked:**		
Description:	**System Infrastructure Improvements**				**Date:**		**7-May-14**
File:	**Y:\Client Files\2088\2088-001\Documents\[Cost Analysis.xlsx]Loop System**						
DIVISION 1 - GENERAL REQUIREMENTS							
ITEM	**DESCRIPTION**	**QUANTITY**		**UNIT COST**		**TOTAL**	
1	Mobilization, Demobilization, BMPs, Site Maintenance, Record Drawings	1	Lump Sum	$24,500.00	/LS	$24,500	
2	Testing & Disinfection	1	Lump Sum	$10,000.00	/LS	$10,000	
3	Mono County Building Permit	1	Lump Sum	$1,000.00	/LS	$1,000	
					SUB TOTAL	**$35,500**	
DIVISION 2 - SITE CONSTRUCTION							
ITEM	**DESCRIPTION**	**QUANTITY**		**UNIT COST**		**TOTAL**	
1	Demolition & Abandonment	1	Lump Sum	$5,000.00	/LS	$5,000	
2	Trenching & Subgrade Preparation	3,600	Lineal Feet	$25.00	/FT	$90,000	
3	Landscape Repair	1	Lump Sum	$10,000.00	/FT	$10,000	
					SUB TOTAL	**$105,000**	
DIVISION 3 - CONCRETE							
ITEM	**DESCRIPTION**	**QUANTITY**		**UNIT COST**		**TOTAL**	
1	Concrete & Asphalt Patching	2200	Lineal Feet	$20.00	/LF	$44,000	
					SUB TOTAL	**$44,000**	
DIVISION 6 WOOD & PLASTICS							
ITEM	**DESCRIPTION**	**QUANTITY**		**UNIT COST**		**TOTAL**	
1	3" PVC Pipe	2,600	Lineal Feet	$3.00	/LF	$7,800	
2	3/4" PVC Laterals	1,000	Lineal Feet	$1.25	/LF	$1,300	
					SUB TOTAL	**$9,100**	
DIVISION 15 - MECHANICAL							
ITEM	**DESCRIPTION**	**QUANTITY**		**UNIT COST**		**TOTAL**	
1	3" Isolation Valves	11	Each	$500.00	/EA	$5,500	
					SUB TOTAL	**$5,500**	
					CONSTRUCTION SUB TOTAL	**$199,100**	
					CONTINGENCY AT 30%[1]	**$59,700**	
ENGINEERS PRELIMINARY ESTIMATE OF PROBABLE COSTS						**$258,800**	

[1]Contingency is for missing items because a full design has not been completed.

4.2 Water Supply System

Good engineering practice requires redundant water supply sources where if one source is out of service for maintenance, repairs or other reasons the redundant source can supply water. Ideally full redundancy is desired where both sources can meet the maximum day demand of 27 GPM. Alternatively, the redundant supply should be as high as reasonably possible and at least meet the domestic demand. If the 27 gallons per minute cannot be met water restrictions would be put in place to stop or reduce irrigation during the emergency. In Table 3 the domestic demand is estimated to be 4 GPM.

4.2.A Hot Well

The Hot Well can meet the maximum day demand of 27 GPM but as described above, the water temperature of the hot well may be detrimental to the piping materials in the water system.

The Hot Well is also in need of maintenance, which would include at a minimum the cleaning of the casing and screen. During the writing of this report the well drawdown was measured in the Hot Well with a data-logging pressure transducer. The draw down was found to be in greater than 30 feet, exceeding the depth of the transducer. Historic drawdown on this well is listed at seven (7) feet, substantially less than that measured in the field. Presumably this is most likely the result of the blinding off of the well screen due to corrosion and or sediment deposition. In addition to the observation of the drawdown, the temperature was also measured in the Hot Well at 100° F which may indicate that the geological strata bearing hotter water has been hindered somewhat from entering the well due to plugging and corrosion of the well screen. However, ground water is often dynamic in character and residents of the SEHOA have indicated that even recently the Hot Well produced water that was almost too hot for comfort which would be hotter than the measured 100° F. Based upon the discoveries relative to the Hot Well during this report, a cleaning of the Hot Well and further evaluation is recommended.

The cleaning and rehabilitation of the Hot Well is estimated to be around $10,000.00.

4.2.A.1 Design and Cost Considerations of Hot Water

Plastics are commonly used in treatment systems and hot water up to 145° F will have detrimental effects on plastics. Therefore, if there is no cooling and the treatment system might be exposed to these temperatures this must be designed for. The paragraphs below address the major components of the treatment system where plastics are proposed.

- Piping – PVC (polyvinyl chloride) pipe is extensively used in the existing system and is proposed for the upgrades to the system. This is because of its corrosion resistance and lower initial cost. Standard classes of PVC are rated for 150 psi working pressure at 73° F. Above 73° F PVC is de-rated in accordance with the following table. Additionally PVC should not be used for temperatures over 140° F:

Operating Temp (°F)	De-Rating Factor
73	1.00
80	0.88
90	0.75
100	0.62
110	0.51
120	0.40
130	0.31
140	0.22

Without cooling standard PVC cannot be used. Both metal pipe and CPVC (chlorinated polyvinyl chloride) can be used at temperatures up to 145° F. CPVC is the best option because of its lower cost and corrosion resistance. At 145° F the allowable pressure of CPVC pipe is approximately 45% of the pressure rating with cold water or approximately 68 psi. The system will have a working pressure less than this.

CPVC is available in standard sizes and fittings and also is available with a NSF 61 rating. Through research we find that CPVC pipe, valves, fittings, and appurtenances cost 4 to 6 times more than similar PVC components. The estimates later in this report include $2,500 for installed PVC pipe for the treatment and an additional $2,500 for installed pipe PVC pipe in the mechanical building. Material costs are a part of these estimates. If CPVC is

used instead of PVC we expect that the estimated costs for each of these will increase $2000 for a total increase of $4,000 for using CPVC.

- Treatment System – The envisioned treatment system uses PVC housings for adsorptive media cartridges. Similar to piping both metal pipe and CPVC can be used at temperatures up to 145° F. CPVC is again the best option because of its lower cost and corrosion resistance. Through informal correspondence with a treatment manufacturer the proposed PVC housings may be changed to CPVC housings at an additional estimated cost of $2,000.

- Water Storage Tanks – The Mechanical Building houses two 5,000 gallon storage tanks that are required for the system. The proposed tanks are polyethylene that is rated for temperatures between 120° F or 140° F, depending upon the manufacturer. Without the Hot Well Cooling Loop different tanks are required. Possibly fiberglass, polypropylene, or stainless steel. A determination of which type of tank would be used without the Hot Well cooling has not been made and there will be difficulty in obtaining a NSF61 Certification. However, we expect the cost of these tanks will be at least three times what was estimated, adding $20,000 to the project.

After adding 30% contingency to these additional cost in a manner similar to all estimates the added cost of improvements to account for no hot well cooling is $33,800.

4.2.A.2 Design and Cost Considerations of Hot Well Cooling Loop

While there is no official water quality standard for water temperature and the hot well presently does not have scalding temperatures that would make it dangerous for consumption, it is generally recommended to reduce the water temperature to a maximum of 100°F, with 80°F being the preferred maximum temperature prior to the treatment system.

Different options to cool the proposed 27 gpm from the Hot Well from the maximum temperature of 145° F to a maximum temperature of 100° F have been considered. It was determined that a ground source heat sink (cooling) loop is the reasonable best option. Hot water would be pumped through a buried manifold of small diameter pipes in an effort to maximize the convective surface area by which heat may dissipate into the adjacent ground. The proposed cooling loop is illustrated in Appendix 9.

The estimated cost for installing the ground source cooling loop is shown in Table 14.

Table 14 – Estimate of Costs for Ground Source Cooling Loop

ENGINEER'S PRELIMINARY ESTIMATE OF PROBABLE COSTS R|O Anderson

Client:	**SIERRA EAST HOMEOWNERS ASSOCIATION**			**Estimated:**	**JEL**
Project:	**Water System Improvements**			**Checked:**	
Description:	**Ground Source Cooling Loop**			**Date:**	**7-May-14**
File:	**Y:\Client Files\2088\2088-001\Documents\[Cost Analysis.xlsx]Loop System**				

DIVISION 1 - GENERAL REQUIREMENTS					
ITEM	**DESCRIPTION**	**QUANTITY**		**UNIT COST**	**TOTAL**
1	Mobilization, Demobilization, BMPs (15% of construction costs)	1	Lump Sum	$3,000.00 /LS	$3,000
2	Testing & Disinfection	1	Lump Sum	$1,500.00 /LS	$1,500
				SUB TOTAL	**$4,500**

DIVISION 2 - SITE CONSTRUCTION					
ITEM	**DESCRIPTION**	**QUANTITY**		**UNIT COST**	**TOTAL**
1	Demolition & Abandonment	1	Lump Sum	$2,000.00 /LS	$2,000
2	Excavation, Subgrade Preparation & Bedding, Recompaction	200	Cubic Yards	$50.00 /CY	$10,000
3	Utility Locating	1	Lump Sum	$1,500.00 /LS	$1,500
				SUB TOTAL	**$13,500**

DIVISION 6 WOOD & PLASTICS					
ITEM	**DESCRIPTION**	**QUANTITY**		**UNIT COST**	**TOTAL**
1	PEX Piping	1,000	Feet	$2.00 /FT	$2,000
				SUB TOTAL	**$2,000**

DIVISION 15 - MECHANICAL					
ITEM	**DESCRIPTION**	**QUANTITY**		**UNIT COST**	**TOTAL**
1	Large Valves & Fittings	1	Lump Sum	$2,500.00 /LS	$2,500
2	Misc. Valves & Connections	1	Lump Sum	$2,000.00 /LS	$2,000
				SUB TOTAL	**$4,500**

CONSTRUCTION SUB TOTAL	**$24,500**
CONTINGENCY AT 30%[1]	**$7,400**
ENGINEERS PRELIMINARY ESTIMATE OF PROBABLE COSTS	**$31,900**

[1]Contingency is for missing items because a full design has not been completed.

4.2.B Cold Well

The Cold Well can currently meet the minimum domestic demand but as stated above it is desirable that this well produce the maximum daily demand of 27 GPM. After reviewing the available information we are unsure of the maximum capacity of this well and its condition. It is understood that the well driller did a

limited test and determined a capacity of 50 GPM and based on this test the well was equipped with a 30 GPM pump. Then in approximately 2008 it was determined that the Cold Well was overdrawing. The well was investigate and it was determined that the screen was both severely corroded and clogged. The well was cleaned, a 6 inch PVC Insert was placed inside the 8 inch corroded casing and the well was reequipped with a 10 GPM pump. Today the well produces approximately 9 GPM.

Considering the relative shallow depth of the well (64 feet); the reported sever corrosion (requiring a PVC insert); the marginal sanitary seal (only 20 foot depth); existing clogging of the screen (from 30 gallons per minute to 15 gallons per minute); possible ineffectiveness of the sanitary seal (recent tests have shown no contamination however there past tests did show contamination); and the well is located on private property with no apparent easement we recommend abandoning this well and redrilling it approximately 25 feet to the south east on property owned by the HOA. Then equipping the new well with a new pump sized for the maximum capacity up to 27 GPM. The estimated cost for redrilling the Cold Well is shown in Table 15.

Table 15 – Cost Estimate for Redrilling the Cold Well

ENGINEER'S PRELIMINARY ESTIMATE OF PROBABLE COSTS R|O Anderson

Client:	**SIERRA EAST HOMEOWNERS ASSOCIATION**	**Estimated:**	**JEL**
Project:	**Water System Improvements**	**Checked:**	
Description:	**Redrilling of the Cold Well**	**Date:**	**27-May-14**
File:	C:\Users\jlesperance\AppData\Local\Microsoft\Windows\Temporary Internet Files\Content.MSO\[Copy of Budget.xls]Sheet1		

DIVISION 1 - GENERAL REQUIREMENTS

ITEM	DESCRIPTION	QUANTITY		UNIT COST		TOTAL
1	Mobilization, Demobilization, BMPs (15% of construction costs)	1	Lump Sum	$4,100.00	/LS	$4,100
2	Testing - Including Water Quality, Disinfection & Startup	1	Lump Sum	$5,500.00	/LS	$5,500
					SUB TOTAL	**$9,600**

DIVISION 2 - SITE CONSTRUCTION

ITEM	DESCRIPTION	QUANTITY		UNIT COST		TOTAL
1	Demolition & Abandonment	1	Lump Sum	$2,000.00	/LS	$2,000
3	Well Drilling and Development	1	Lump Sum	$15,000.00	/LS	$15,000
					SUB TOTAL	**$17,000**

DIVISION 5 - METALS

ITEM	DESCRIPTION	QUANTITY		UNIT COST		TOTAL
1	Well Casing, Screen	70	Feet	$45.00	/FT	$3,150
					SUB TOTAL	**$3,150**

DIVISION 11 - EQUIPMENT

ITEM	DESCRIPTION	QUANTITY		UNIT COST		TOTAL
1	Submersible Well Pump and Motor Combination	1	Lump Sum	$5,000.00	/LS	$5,000
2	Pump Controller, Pressure Switch	1	Lump Sum	$2,000.00	/LS	$2,000
					SUB TOTAL	**$7,000**

CONSTRUCTION SUB TOTAL	**$36,800**
CONTINGENCY AT 30%[1]	**$11,000**
ENGINEERS PRELIMINARY ESTIMATE OF PROBABLE COSTS	**$47,800**

[1]Contingency is for missing items because a full design has not been completed.

4.3 Water Meters

As discussed previously, the SEHOA is presently an un-metered system. Water consumption for this report has been estimated from measured amp draw at the cold well electrical meter and from kWh consumption on the monthly bills from Liberty Utilities for the Hot Well. Meters are an infrastructure upgrade that can used to assess fees for the use of water and promote water conservation; and they may also help identify the presence and magnitude of system leakage. Meters are not considered to be an urgent need for the SEHOA, however they would be a benefit.

Water meters would be placed on the ¾ inch service laterals to each residence and common area service with an isolation valve within the water meter vault. A touch read system is proposed where the operator would touch the lid of each meter vault with an instrument and the meter reading would be transferred electronically to the instrument. This saves the labor of opening each vault, removing the insulation, reading the meter and writing it down. Then the instrument would be connected to a computer and the

readings downloaded to view the readings. Finally, this data would be transferred to a billing software that would generate the monthly bills.

The total estimated cost to add meters to the SEHOA are included in Table 16 below. Note that this estimate has increased since the draft of this report to include the touch read device, software, a computer and printer.

Table 16 – Cost Estimate for System Water Meters

ENGINEER'S PRELIMINARY ESTIMATE OF PROBABLE COSTS — R O Anderson

Client:	SIERRA EAST HOMEOWNERS ASSOCIATION			Estimated:	KN
Project:	Water System Improvements			Checked:	
Description:	Water Meters			Date:	28-Jan-15
File:	Y:\Client Files\2088\2088-001\Documents\[Cost Analysis.xlsx]Cost Summary				

DIVISION 1 - GENERAL REQUIREMENTS

ITEM	DESCRIPTION	QUANTITY		UNIT COST	TOTAL
1	Mobilization, Demobilization, BMPs (10% of construction costs)	1	Lump Sum	$9,800.00 /LS	$9,800
2	Testing & Disinfection	1	Lump Sum	$7,500.00 /LS	$7,500
3	Mono County Building Permit	1	Lump Sum	$1,000.00 /LS	$1,000
				SUB TOTAL	$18,300

DIVISION 15 - MECHANICAL

ITEM	DESCRIPTION	QUANTITY		UNIT COST	TOTAL
1	3/4" Single Water Meters w/ Isolation Valve and Meter Box	11	Each	$1,900.00 /EA	$20,900
2	3/4" Double Water Meters w/ Isolation Valve and Meter Box	17	Each	$2,500.00 /EA	$42,500
3	2" Well Water Meters w/ Isolation Valve	2	Each	$4,000.00 /EA	$8,000
4	Hand Held Touch Reader w/ training & software (used for monthly meter readings)	1	Each	$22,000.00 /EA	$22,000
5	Billing Software (TAK Quickwater Rural or equilavent)	1	Each	$1,800.00 /EA	$1,800
6	laptop Computer & Printer w/touchreader software (used to view readings and print billing)	1	Each	$2,500.00 /EA	$2,500
				SUB TOTAL	$97,700

CONSTRUCTION SUB TOTAL	$116,000
CONTINGENCY AT 30%[1]	$34,800
ENGINEERS PRELIMINARY ESTIMATE OF PROBABLE COSTS	$150,800

[1]Contingency is for missing items because a full design has not been completed.

4.4 Fire Protection Improvements

Currently the existing water system has no fire hydrants or water storage for fire protection and the original subdivision was approved with no water system improvements for fire protection. In accordance with the International Fire Code (IFC) a new residential development similar to SEHOA would require fire flows of 1000 GPM for a two hour duration with fire hydrants throughout the development unless lesser

requirements are approved by the local fire marshal. A preliminary investigation has determined that to strictly meet the IFC a 120,000 gallon storage tank would be required along with large booster pumps, a large backup emergency generator, and a new distribution system of 8 inch mains with fire hydrants. The budgetary cost of these improvements is in excess of $400,000. Because of the high cost and fire protection improvements are outside of the primary scope of this Preliminary Engineering Report a fire system in accordance with the IFC has not been considered further. However, it is recommended that reasonable accommodations be made to provide some fire water storage and fire flows. Under the general design considerations described in this report, if small hydrants were added to the system with the recommended storage tanks and booster pumps, it is anticipated that the SEHOA could be provided with approximately 200 GPM for up to 40 minutes. While far less than ideal, this would still be a substantial improvement over the existing conditions for both SEHOA and the local volunteer fire department (VFD). Potentially this fire flow would allow enough time for the VFD to set up and appropriate river water in the event of fire emergency. Additionally, small fire hydrants throughout the system would allow for flushing of the lines. The anticipated cost to provide some fire protection improvements is included in Table 17 below.

Table 17 – Cost Estimate for Fire Hydrants

ENGINEER'S PRELIMINARY ESTIMATE OF PROBABLE COSTS R|O Anderson

Client:	**SIERRA EAST HOMEOWNERS ASSOCIATION**			**Estimated:**	**JEL**
Project:	**Water System Improvements**			**Checked:**	
Description:	**Fire Hydrants**			**Date:**	**23-May-14**
File:	**Y:\Client Files\2088\2088-001\Documents\[Cost Analysis.xlsx]Fire Hydrants**				
DIVISION 1 - GENERAL REQUIREMENTS					
ITEM	**DESCRIPTION**	**QUANTITY**		**UNIT COST**	**TOTAL**
1	Mobilization, Demobilization, BMPs (15% of construction costs)	1	Lump Sum	$3,000.00 /LS	$3,000
				SUB TOTAL	**$3,000**
DIVISION 15 - MECHANICAL					
ITEM	**DESCRIPTION**	**QUANTITY**		**UNIT COST**	**TOTAL**
1	Fire Hydrants, Isolation Valves and Laterals	5	Each	$4,000.00 /EA	$20,000
				SUB TOTAL	**$20,000**
				CONSTRUCTION SUB TOTAL	**$23,000**
				CONTINGENCY AT 30%[1]	**$6,900**
ENGINEERS PRELIMINARY ESTIMATE OF PROBABLE COSTS					**$29,900**

[1]Contingency is for missing items because a full design has not been completed.

4.5 Emergency Power

The water system currently has no provision for supplying water in a power outage other than the small volume of less than 900 gallons in the hydropneumatic tank. The

SEHOA is a rural community and receives electricity via a single line which is subject to multiple service interruptions annually, some of which are extended outages lasting more than a day. An emergency generator that will ensure a continuous water supply in a power interruption is generally used for similar water systems and is highly recommended for the SEHOA. It is recommended that an emergency generator be propane fueled for ease of infrastructure and to maintain the same fuel supplier. The SEHOA also prefers propane to diesel to avoid the potential problems fuel leaks and storage. The total estimated cost to add an emergency generator to the SEHOA is included in Table 18 below. The proposed emergency generator will be generally in accordance with standards for water systems but will not meet the stricter NFPA standards for fire protection systems.

Table 18 – Cost Estimate for Emergency Generator

ENGINEER'S PRELIMINARY ESTIMATE OF PROBABLE COSTS R|O Anderson

Client:	**SIERRA EAST HOMEOWNERS ASSOCIATION**			**Estimated:**	**JEL**
Project:	**Water System Improvements**			**Checked:**	
Description:	**Emergency Generator**			**Date:**	**23-May-14**
File:	Y:\Client Files\2088\2088-001\Documents\[Cost Analysis.xlsx]E. Generator				
DIVISION 1 - GENERAL REQUIREMENTS					
ITEM	**DESCRIPTION**	**QUANTITY**		**UNIT COST**	**TOTAL**
1	Mobilization, Demobilization, BMPs (15% of construction costs)	1	Lump Sum	15.00% /LS	$10,845
2	Testing & Startup	1	Lump Sum	$5,000.00 /LS	$5,000
				SUB TOTAL	**$15,845**
DIVISION 2 - SITE CONSTRUCTION					
ITEM	**DESCRIPTION**	**QUANTITY**		**UNIT COST**	**TOTAL**
1	Pad Preparation Including Floodplain Elevation (Fill)	1	Lump Sum	$5,000.00 /LS	$5,000
2	Trenching	50	Feet	$20.00 /FT	$1,000
				SUB TOTAL	**$6,000**
DIVISION 3 - CONCRETE					
ITEM	**DESCRIPTION**	**QUANTITY**		**UNIT COST**	**TOTAL**
1	Generator Pad	1	Lump Sum	$1,500.00 /LS	$1,500
				SUB TOTAL	**$1,500**
DIVISION 11 - EQUIPMENT					
ITEM	**DESCRIPTION**	**QUANTITY**		**UNIT COST**	**TOTAL**
1	50 kW 208 Volt 3 Phase Emergency Propane Generator with 500 Gallon Tank	1	Lump Sum	$40,000.00 /LS	$40,000
2	Automatic Transfer Switch	1	Lump Sum	$3,000.00 /LS	$3,000
				SUB TOTAL	**$43,000**
DIVISION 16 - ELECTRICAL					
ITEM	**DESCRIPTION**	**QUANTITY**		**UNIT COST**	**TOTAL**
1	New Electrical Service Connection, Conduit, Wire, Panels	1	Lump Sum	30.00% /LS	$15,200
				SUB TOTAL	**$15,200**
DIVISION 17 - CONTROLS					
ITEM	**DESCRIPTION**	**QUANTITY**		**UNIT COST**	**TOTAL**
1	Control System Integration & Alarms	1	Lump Sum	10.00% /LS	$6,600
				SUB TOTAL	**$6,600**
				CONSTRUCTION SUB TOTAL	**$88,100**
				CONTINGENCY AT 30%[1]	**$26,400**
ENGINEERS PRELIMINARY ESTIMATE OF PROBABLE COSTS					**$114,500**

[1]Contingency is for missing items because a full design has not been completed.

5 Permitting

5.1 Environmental Permitting

The proposed alternatives for arsenic removal and surface water treatment systems discussed above are not expected to be contrary to existing land use at the SEHOA, viz. – single family residential and substantial master plan and zoning modifications are not expected. However, building permits and special use permits could be required for some of the facilities.

Because the proposed facilities will be developed only for the existing development of SEHOA there are not expected to be any growth inducing impacts.

The estimated annual water consumption will not change from the existing consumption rate, especially since the SEHOA is 97% built out. The change to water consumption is expected to have a less than significant effect on water resources and the flows in the down gradient West Walker River.

A waste discharge permit will be required through the Lahontan Regional Water Quality Control Board (LRWQCB) to handle the RO waste stream under Alternative 2B. The RO waste stream will have much higher concentrations of contaminants, including total dissolved solids (TDS) and arsenic. LRWQCB requires that any discharge to ground water – in this case the RO waste stream being sent to a septic, must not degrade the ground water quality unless such degradation is in the best interest of the people. It is expected that a permit to discharge would likely be issued for an RO system; however, substantial documentation on the geohydrology; existing groundwater quality; and process chemicals involved will need to be submitted with a permit application. Depending on LRWQCB's findings relative to a proposed RO waste stream discharge, additional surface water quality studies may be necessary and this process could cost as much as $25,000 in permitting.

All proposals include new facilities and therefore will not be categorically exempt from the California Environmental Quality Act (CEQA) and must be examined in an environmental document. The environmental document will elaborate on the above discussions as well as the other environmental considerations (biological, cultural, etc.) required to be considered under CEQA and the National Environmental Policy Act

(NEPA). It is noted that compliance with NEPA is expected to be required because a portion of the funding may come from federal sources.

6 Evaluation of Alternatives and Infrastructure Improvements

6.1 Evaluation of Alternatives

The Alternatives primarily address arsenic and it is anticipated that the majority of the costs for any capital improvements will be grant funded through the same SRF planning grant described in 2.1 above. Therefore it is recommended that the preferred alternative with the lowest O&M costs be weighed more than the alternative with the lowest capital cost, since there is no expected funding assistance for annual O&M costs which will be borne solely by the SEHOA. The cost for treating water will likely continue to increase with market trends over time, which also is a consideration for long term O&M costs.

Table 19 below summarizes the alternatives identified in this report. As can be seen, the lowest capital cost alternative is 2A – Adsorption Arsenic Removal System, and the lowest O&M cost alternative is 1 – New Well.

Table 19 – Alternatives Matrix

Alternative	Description	Estimated Capital Cost	Expected Annual O&M Costs	Annual Cost per 1,000 Gallons	Advantages	Disadvantages
1	New Potable Water Supply Well	$389,000	$1,000	$0.23	Lowest O&M Costs, No Treatment	High Capital Cost, Requires Easements, Does Not Provide Redundant Water Source, Uncertainty That New Well Will Meet Drinking Water Standards
2A	Adsoprtion Arsenic Removal System	$140,000 + $171,000 New Building; $311,000 Total	$8,000 - $9,600	$1.80 - $2.00	Removes Arsenic, No Waste Stream, Simple, Lowest Capital Cost	Medium O&M Costs for Media, Needs Pretreatment
2B	Reverse Osmosis Arsenic Removal System	$286,000 + $171,000 New Building; $457,000 Total	$10,000	$2.30	Removes Arsenic	Waste Stream, Medium O&M Cost, Needs Pretreatment
3	Connection to Coleville High School	$976,000	$10,000 - $15,000	$2.30 - $3.40	Water Does Not Have Arsenic	Highest Capital Cost, High O&M Cost, Treat for Uranium

6.2 Evaluation of Infrastructure Improvements

In addition to the Alternatives that are focused primarily on addressing arsenic there are several infrastructure improvements that should be considered. These include improvements to the distribution system, improvements to the redundancy in supply, and water meters as discussed in Section 4.3. These improvements are not necessary for arsenic mitigation but all except water meters are recommended in order to comply with violation number 2 of the compliance order in that these improvements will help to ensure a reliable and adequate supply of water. Further, there is expected to be an economy of scale where if all improvements are constructed at one time it will be less costly than constructing them at separate times. Table 20 below summarizes and evaluates the infrastructure improvements.

Table 20 – Infrastructure Improvements Matrix

Description	Estimated Capital Cost	Priority	Advantages
New Mechanical Building	$171,000	Mandatory for Arsenic Treatment Alternatives	Would house and secure water treatment and storage
Emergency Generator	$115,000	High	Would provide emergency power to water system.
Hot Well Cooling Loop System	$32,000	High, if Hot Well is to be Used for Redundant Supply	Allows for cheaper piping materials and longevity of pipe
New Water System	$259,000	Preferred - Moderate Due to Cost	Address recurring leaks, improved operational performance, flexibility, system robustness and security, long system life
Distribution System Loop	$78,000	High	Substantially improved operational flexibility, system robustness and security
Water Meters	$150,800	Low	Equitable cost sharing capabilities and leak detection
Redrilling the Cold Well	$48,000	High, if Cold Well is to be Used as Redundant Supply	Required for redundant supply
Rehabilitate Hot Well	$10,000	High, if Hot Well is to be Used for Redundant Supply	Improve hot well capacity and performance
Fire Hydrants	$30,000	High	Allows for flushing of the water system and some fire protection

7 Conclusions & Additional Considerations

Alternative 3 – Connection to Coleville High School is immediately dismissed because of its highest capital and O&M costs. While Alternatives 2A and 2B are similar, 2B is generally dismissed because it has a higher capital cost than Alternative 2A as well as

the disadvantage of a waste stream which will require increasing the water supply rate to account for the waste stream. Given the relative complexity of the treatment process equipment of 2B compared to 2A, this alternative is further dismissed. The remaining alternatives are considered further.

Alternative 2A is estimated to cost a total of $311,000 including the new mechanical building to house the treatment system and water storage tanks. Alternative 1 costs $249,000 more in capital costs for a total of $560,000 (including a new mechanical building). While this seems like a large disparity in capital costs, it may yet be reasonable from an economic standpoint to select Alternative 1. This is because the difference in capital costs will be substantially reduced in impact to the SEHOA through grants, and the perceived savings in capital cost may be exceeded in a few years by higher O&M costs. For example, if 80% of the capital costs were reimbursed through a grant, the actual cost difference for SEHOA between alternatives 1 and 2A would be about $78,000. The higher O&M costs for Alternative 2A could exceed this amount in as little as 9 years.

However, there is a greater uncertainty with Alternative 1. It is not known with certainty that a new well will consistently produce the good water that the estimate assumes. Further, it is not known if an easement on an adjacent property can be obtained for the estimated cost. Finally, implementation of Alternative 1 will result in no redundancy of a water supply, that is, a new well will only provide a single source of water. To provide redundancy will substantially increase the cost of this alternative because it will involve either providing arsenic treatment on an existing well or including two new wells, making this alternative much less attractive.

Based upon these considerations, Alternative 2A is the recommended preferred alternative for SEHOA.

The proposed improvements were discussed with SEHOA, California Department of Public Health as well as the potential funding agency of the California Water Boards as part of the review of the Draft Preliminary Engineering Report. It was determined that Alternative 2A (Adsorption Arsenic Removal System) along with the infrastructure improvements of: New Mechanical Building; Emergency Generator; Hot Well Cooling Loop System; Water Meters; Redrilling of the Cold Well; and Rehabilitation of the Hot

Well are potentially eligible for grant funding. However, Fire Hydrants and either a new water system or improvements to the distribution system are not eligible.

If Alternative 2A is constructed we recommend the following infrastructure improvements also be constructed:

1. Redrilling the Cold Well:

    a. The new cold well will be designed and equipped to produce a minimum of 27 GPM and address the concerns with the existing Cold Well that are corrosion and clogging of the screen and inferior sanitary seal. This will be the primary water supply. Grant funding for redrilling the Cold Well is possible.

2. Rehabilitate the Hot Well:
    a. In order to provide for a redundant system, the Hot Well should be kept in use as an auxiliary water source. Clean and maintain the screen in the Hot Well to restore its capacity. This will be the backup water supply. Grant funding for rehabilitating the Hot Well is possible.

3. Hot Well Cooling Loop System:

    a. In order to provide for a redundant system, the hot well should be kept in use as an auxiliary water source and the proposed cooling loop or some other cooling system should be used to reduce the water temperature prior to the treatment and distribution system. Reducing the water temperature will reduce the cost of treatment equipment materials and generally provide for greater longevity of the system. Grant funding for the Hot Well cooling loop is possible.

4. Water Meters:

    a. Water meters are recommended as they would promote conservation, allow for equitable billing, and allow leak detection. Although meters are a low priority there are advantages to having meters and grant funding is possible for water meters.

5. Emergency Generator:

    a. This would allow the water system to remain operational during power outages, preventing system pressure losses and gaps in service. Grant funding for an emergency generator is possible.

The total anticipated construction cost (including a 30% contingency[3]) for Alternative 2A, including the recommended infrastructure improvements is as follows:

- Alternative 2A – Adsorption system - $140,000
- New mechanical building - $171,000
- Redrill the Cold Well - $48,000
- Rehabilitate the Hot Well - $10,000
- Hot Well Cooling Loop - $32,000
- Water Meters - $150,800
- Emergency Generator - $115,000
- **Total estimated construction cost: $666,800**

The plans, specifications, contract documents, and environmental services are included under the current planning grant. Once these are complete the selected project will move into the construction phase. In addition to the previous estimated construction costs services during construction will be necessary. These include the following. Generally services during construction are approximately 10% of the construction cost or $66,680 for the recommended project.

- Bidding Services – advertising the project for competitive bid; responding to questions from potential bidders including addendums as necessary; conduct pre bid job walk; bid opening; review of bids including contractor's qualifications, bonds and insurance; and recommendation of award.
- Pre-Construction Services – Prepare notice of award; secure signatures on construction contract; review pre construction submittals including insurance, bonds,

[3] Contingency is for missed items as a full design has not yet been completed.

and schedules; respond to contractor's requests for information; and issue notice to proceed.

- Construction Services – conduct pre construction conference; respond to Contractor's requests for information; respond to Contractors requests for substitutions; review and approve submittals and shop drawings; review updates to schedules; periodic observations of the work by the engineer; work directive changes as required; prepare and negotiate change orders and recommend approval as required; inspection of the work by a qualified inspector (not necessarily the engineer); testing of materials and construction; startup; review record drawings; prepare notice of substantial completion with punch lists; perform final inspection and notice of completion; 11 month warranty inspection; and investigate warranty issues.
- Contract Administration – prepare and process progress payments; review prevailing wage statements; address claims from Contractor, suppliers, and workmen; address pre-leans and leans; prepare and process final payment; release bonds as appropriate; and ensure compliance with contract documents and grant/loan requirements.

Additionally, an operations plan will be required for the new water system. Given the complexity of the system we estimate this will cost $15,000. Therefore, the total cost of the recommended project is:

Construction	$666,800
Services During Construction	$ 66,680
Operations Plan	$ 15,000
Total Project Cost	**$748,480**

The O&M cost for the arsenic removal system is estimated to be an additional $8,000 to $9,600 per year. The other infrastructure improvements including the new mechanical building, water meters and emergency generator will have some additional O&M costs. However, these will be approximately the same as the savings on O&M that are realized by new and rehabilitated wells and savings from water conservation with the addition of meters. Therefore, the additional O&M for the recommended improvements is estimated to be approximately $8,800 per year.

8 Appendices

Appendix 1: **Alternative 1 – New Potable Water Well**

Appendix 2: **Alternative 2A – Adsorption Arsenic Removal System**

Appendix 3: **Alternative 2B – Reverse Osmosis Arsenic Removal System**

Appendix 4: **Alternative 2C – Surface Water Treatment System**

Appendix 5: **Alternative 3 – Connection to Coleville High School**

Appendix 6: **New Mechanical Building**

Appendix 7: **Proposed Modifications to Existing Water System**

Appendix 8: **New Proposed Water System**

Appendix 9: **Ground Source Heat Sink Loop for Hot Well**

Appendix 10: **Detailed Water Quality Data**

Appendix 11: **Mono County Health Compliance Order**

Appendix 12: **Hydrogeology Report & Well Siting Analysis**

Appendix 13: **Cost Summary Breakdown**

9 Works Cited

1. **USGS.** The USGS Water Science School. [Online] March 17, 2014. [Cited: April 4, 2014.] http://water.usgs.gov/edu/qa-home-percapita.html.

2. **United States Environmental Protection Agency (US EPA).** water.epa.gov. [Online] May 21, 2012. [Cited: July 31, 2013.] http://water.epa.gov/.

3. **Mono County Health Department.** *Compliance Order.* Bridgeport : Division of Environmental Health, 2012. Compliance Order No. 02-03-12-622.

4. **United States Environmental Protection Agency.** *Arsenic Treatment Technology Evaluation Handbook for Small Systems.* 2003.

5. —. National Primary Drinking Water Regulations: Long Term 2 Enhanced Surface Water Treatment Rule. *Federal Register.* [Online] 2006. [Cited: 4 9, 2014.] https://www.federalregister.gov/articles/2006/01/05/06-4/national-primary-drinking-water-regulations-long-term-2-enhanced-surface-water-treatment-rule.

6. **Zdon, Andy.** *Recommended Well Locations, Sierra East HOA.* Walnut Creek : Andy Zdon & Associates, Inc., 2014. 06.

APPENDIX 1
ALTERNATIVE 1 – NEW WELL

SCALE: 1" = 100'

NO.	DATE	REVISION BLOCK	BY

SCALE: 1" = 100'

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NEVADA
1603 Esmeralda Ave
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WATER SYSTEM IMPROVEMENTS
SIERRA EAST HOMEOWNERS ASSOCIATION

ALTERNATIVE 1
NEW WELL

DRAWN: MAB	JOB: 2088-001
ENGINEER: JEL	DRAWING: SEE PLOT STAMP
SCALE: 1"=100'	SHEET: 1
DATE: 04/09/14	OF: 1 SHEETS

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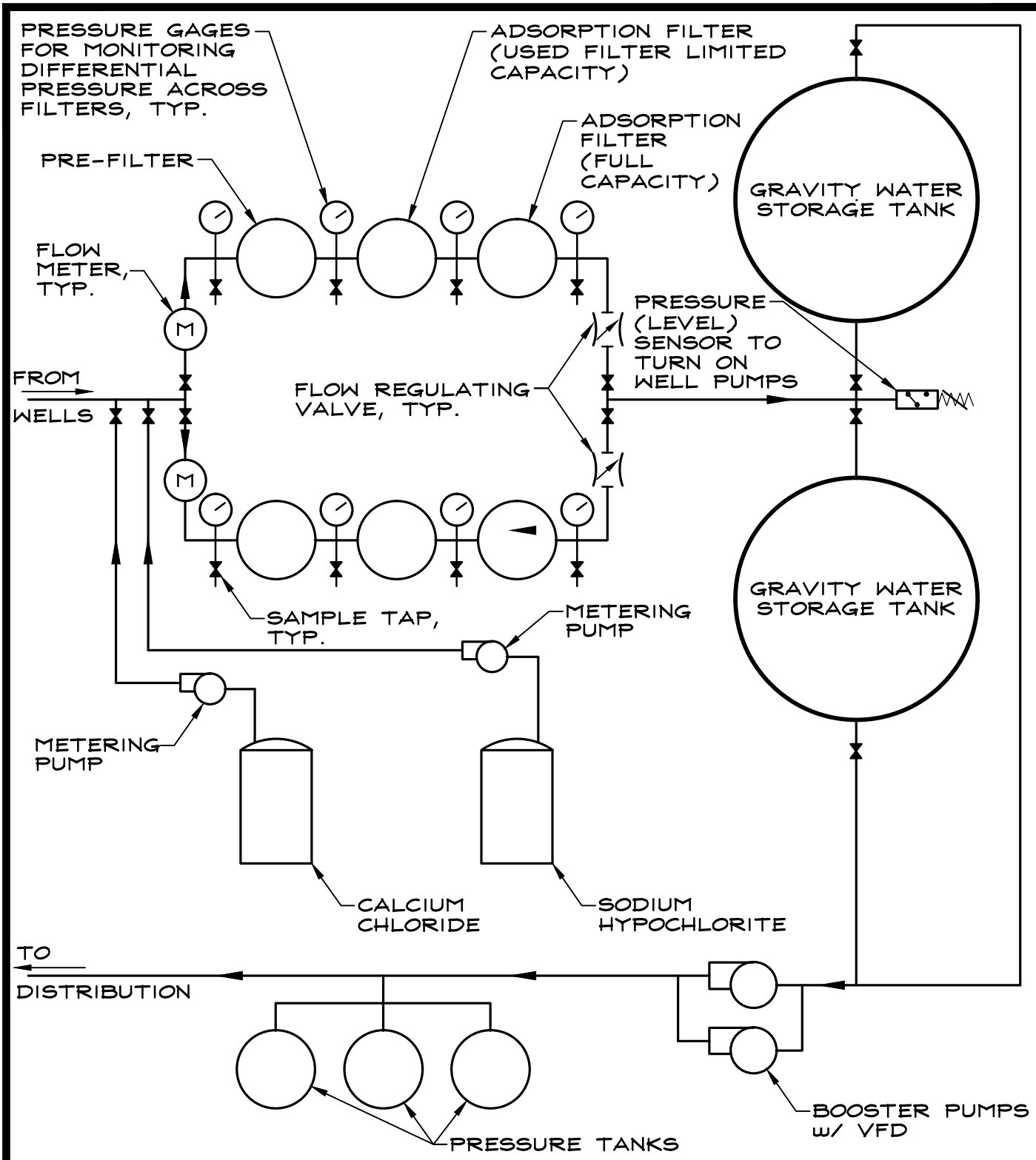
APPENDIX 2
ALTERNATIVE 2A – ADSORPTION ARSENIC REMOVAL SYSTEM



SCHEMATIC - ALTERNATIVE 2A

SCALE: N.T.S.

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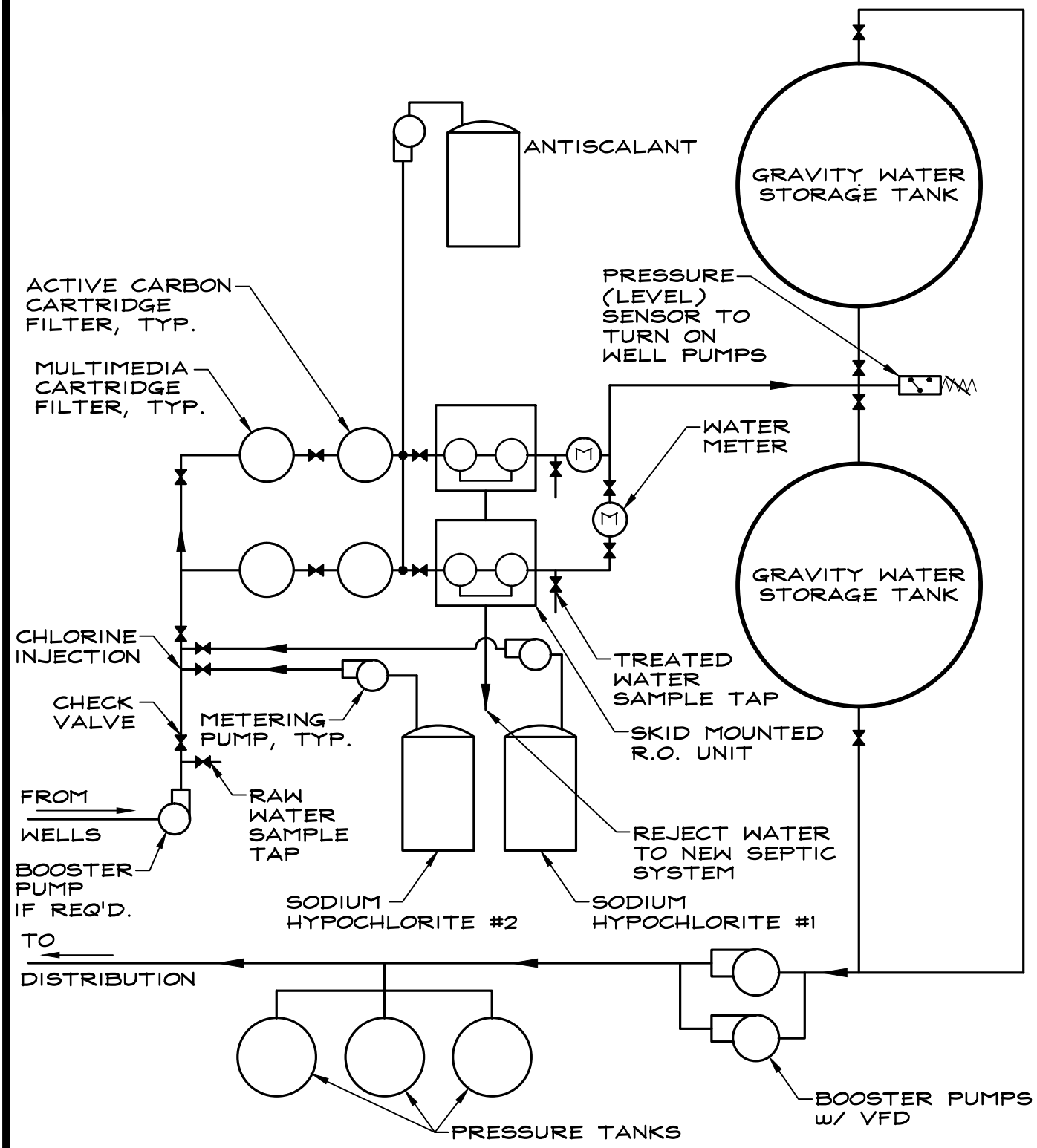
ALTERNATIVE 2A ADSORPTION ARSENIC REMOVAL SYSTEM

2088-001

01/22/15

APPENDIX 3
ALTERNATIVE 2B – REVERSE OSMOSIS ARSENIC REMOVAL SYSTEM



SCHEMATIC - ALTERNATIVE 2B

SCALE: N.T.S.

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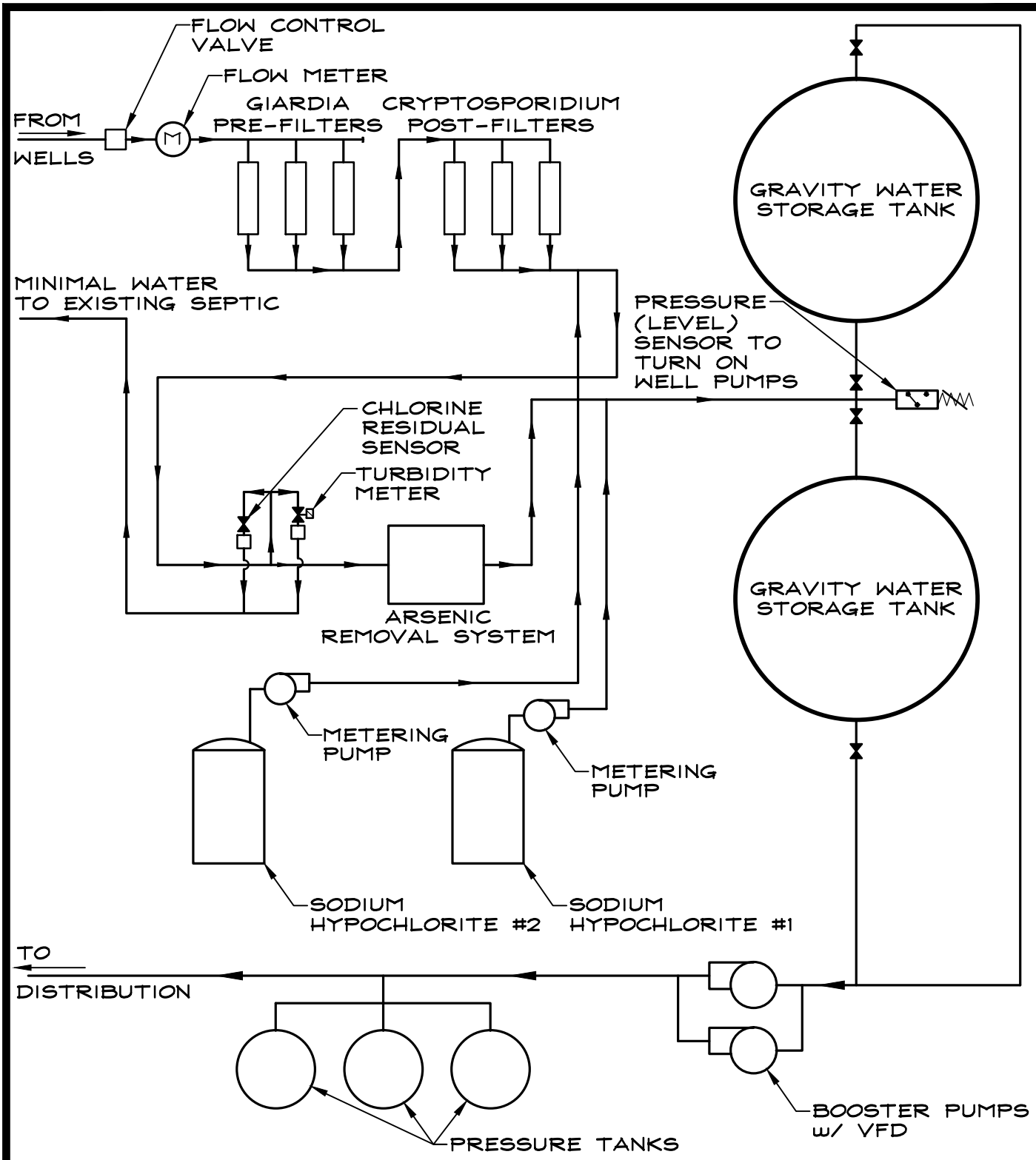
ALTERNATIVE 2B REVERSE OSMOSIS ARSENIC REMOVAL SYSTEM

2088-001

01/22/15

APPENDIX 4
ALTERNATIVE 2C – SURFACE WATER TREATMENT SYSTEM



SCHEMATIC - ALTERNATIVE 2C

SCALE: N.T.S.

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SIERRA EAST H.O.A.

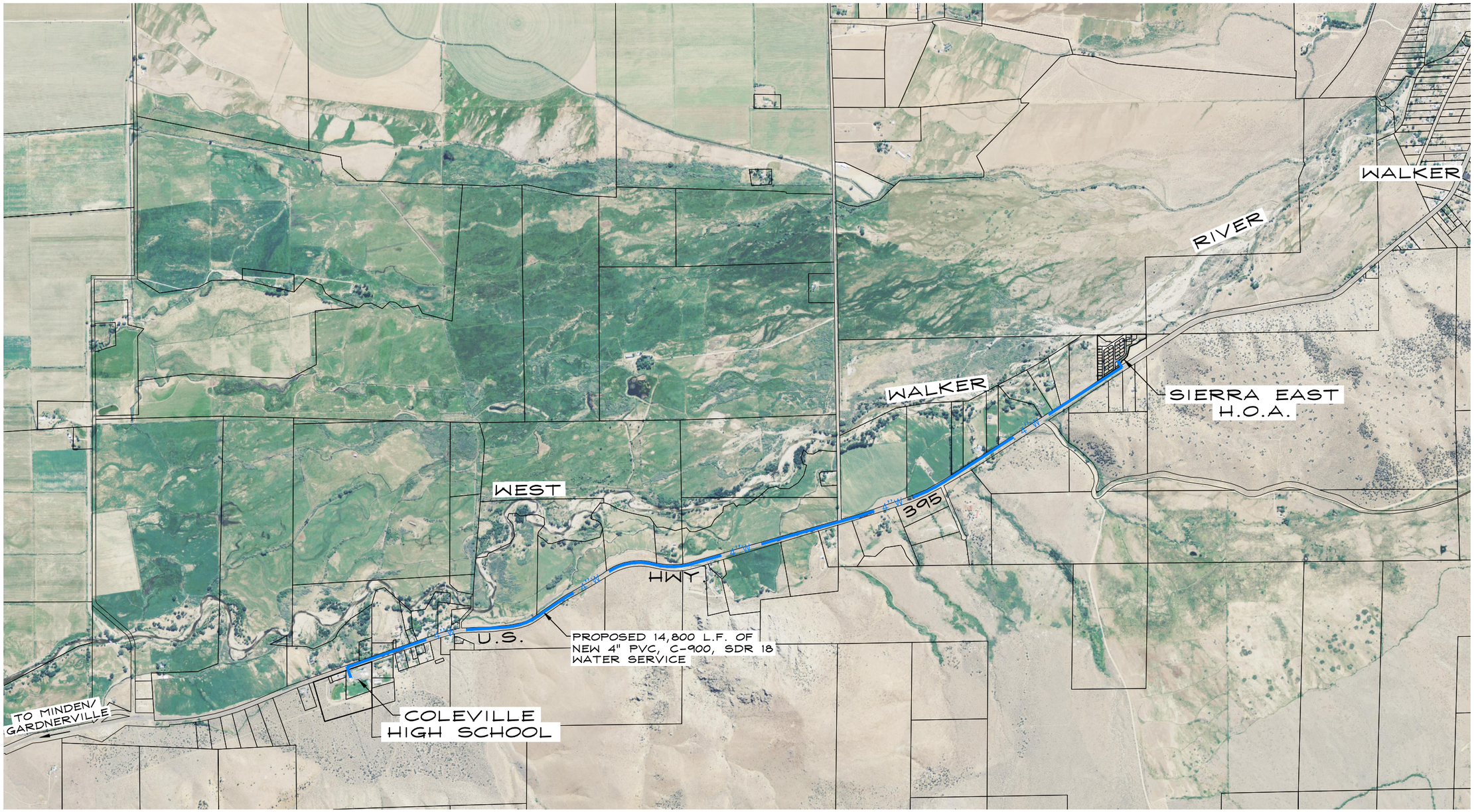
ALTERNATIVE 2C
SURFACE WATER TREATMENT SYSTEM

2088-001

05/06/14

APPENDIX 5
ALTERNATIVE 3 – CONNECTION TO COLEVILLE HIGH SCHOOL

SCALE: 1" = 800'



NO.	DATE	REVISION BLOCK	BY

1 0 1 2
800' 0 800' 1600'
SCALE: 1" = 800'

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WATER SYSTEM IMPROVEMENTS
SIERRA EAST HOMEOWNERS ASSOCIATION

ALTERNATIVE 3
CONNECTION TO COLEVILLE HIGH SCHOOL

DRAWN: MAB	JOB: 2088-001
ENGINEER: KRN	DRAWING: SEE PLOT STAMP
SCALE: 1"=800'	SHEET: 1
DATE: 03/03/14	OF: 1 SHEETS

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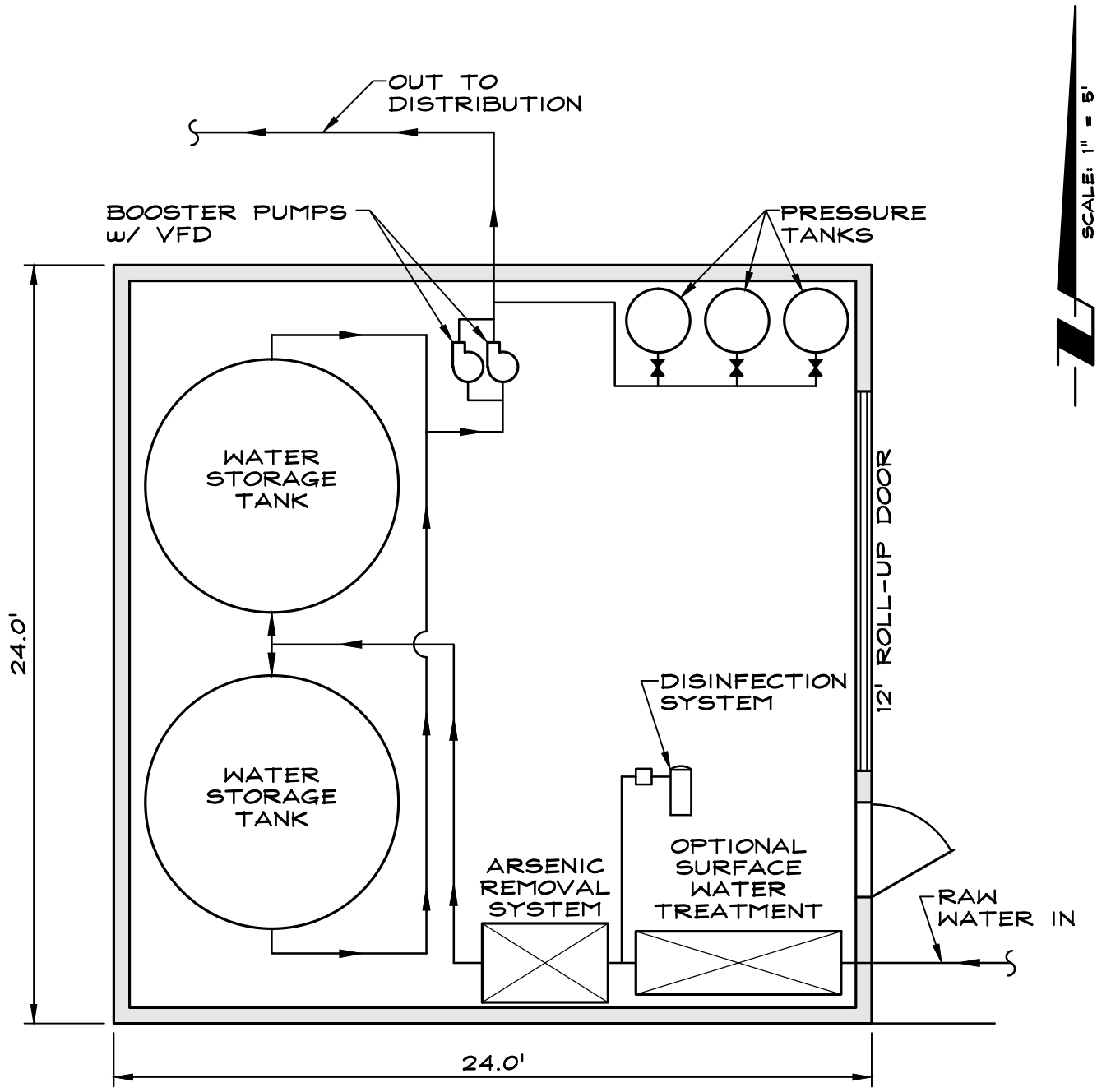
APPENDIX 6
NEW MECHANICAL BUILDING



FLOOR PLAN

SCALE: 1"=5'

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SIERRA EAST H.O.A.

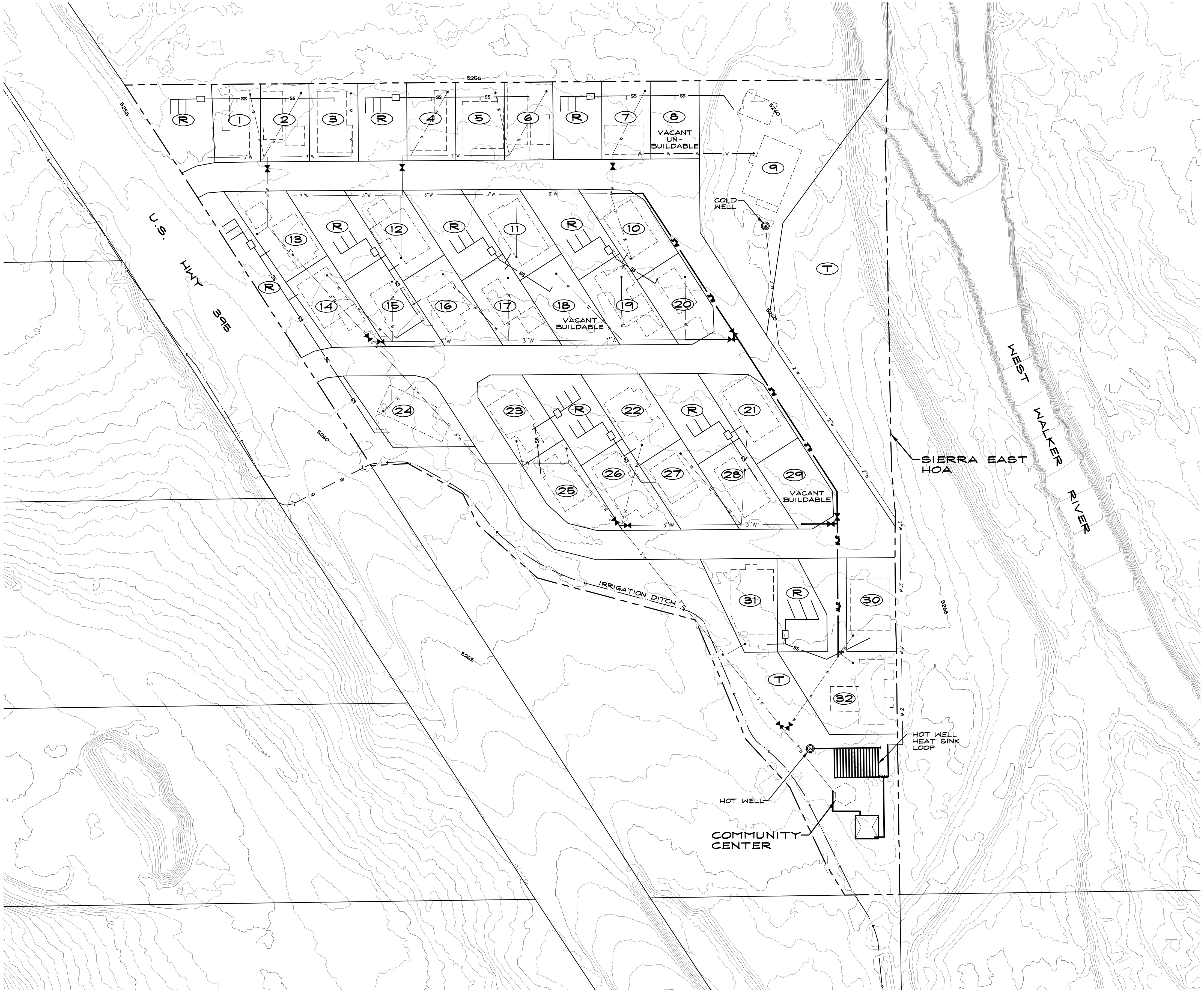
NEW PUMP/MECHANICAL BUILDING

2088-001

01/22/15

APPENDIX 7
PROPOSED MODIFICATIONS TO EXISTING WATER SYSTEM

SCALE: 1" = 50'



LEGEND:

- SIERRA EAST HOA BOUNDARY
- SS — EXISTING SEWER
- 2"W — EXISTING 2" WATER (TO REMAIN)
- 3"W — PROPOSED 3" WATER
- PROPOSED 3/4" WATER
- EXISTING FLOWLINE
- EXISTING SEPTIC TANK
- PROPOSED ISOLATION VALVE

NO.	DATE	REVISION BLOCK	BY

SCALE: 1" = 50'

R|O|Anderson
WWW.ROANDERSON.COM
NEVADA
1603 Esmeralda Ave
P.O. Box 2229
Minden, NV 89423
p 775.782.2322
f 775.782.7084
CALIFORNIA
595 Tahoe Keys Blvd
Suite A-2
South Lake Tahoe, CA 96150
p 530.600.1660
f 775.782.7084

WATER SYSTEM IMPROVEMENTS
SIERRA EAST HOMEOWNERS ASSOCIATION

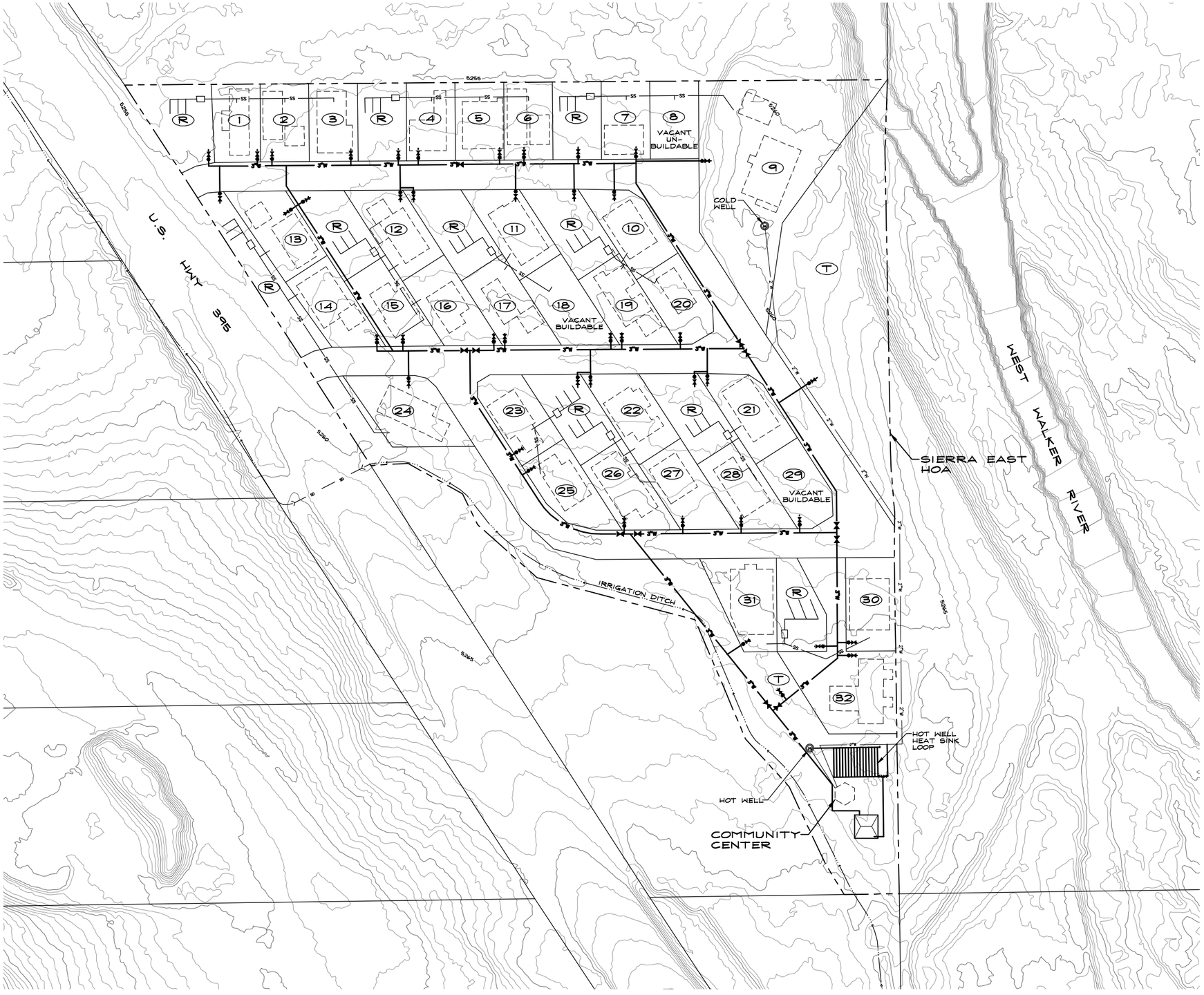
PROPOSED MODIFICATIONS
TO EXISTING SYSTEM
DISTRIBUTION SYSTEM LOOP

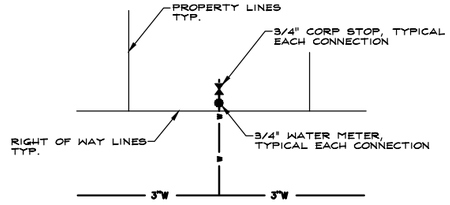
DRAWN: MAB	JOB: 2088-001
ENGINEER: KRN	DRAWING: SEE PLOT STAMP
SCALE: 1"=50'	SHEET: 1
DATE: 05/05/14	OF: 1 SHEETS

Y:\Client Files\2088\2088-001\CAD\Engineering\Exhibits\2088-001-PRO-MODS-EXIST.dwg 5/7/2014 10:58:16 AM Mark Bray

APPENDIX 8
NEW PROPOSED WATER SYSTEM

SCALE: 1" = 50'





WATER METER DETAIL

LEGEND:

- SIERRA EAST HOA BOUNDARY
- SS — EXISTING SEWER
- 2"W — EXISTING 2" WATER (TO REMAIN)
- 3"W — PROPOSED 3" WATER
- PROPOSED 3/4" WATER
- EXISTING FLOWLINE
- EXISTING SEPTIC TANK
- PROPOSED ISOLATION VALVE

NO.	DATE	REVISION BLOCK	BY

SCALE: 1" = 50'

R|O|Anderson
WWW.ROANDERSON.COM
NEVADA
1603 Esmeralda Ave
P.O. Box 2229
Minden, NV 89423
p 775.782.2322
f 775.782.7084
CALIFORNIA
595 Tahoe Keys Blvd
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p 530.600.1660
f 775.782.7084

WATER SYSTEM IMPROVEMENTS
SIERRA EAST HOMEOWNERS ASSOCIATION

PROPOSED INFRASTRUCTURE UPGRADES
NEW LOOPED DISTRIBUTION SYSTEM

DRAWN: MAB	JOB: 2088-001
ENGINEER: KRN	DRAWING: SEE PLOT STAMP
SCALE: 1"=50'	SHEET: 1
DATE: 05/05/14	OF: 1 SHEETS

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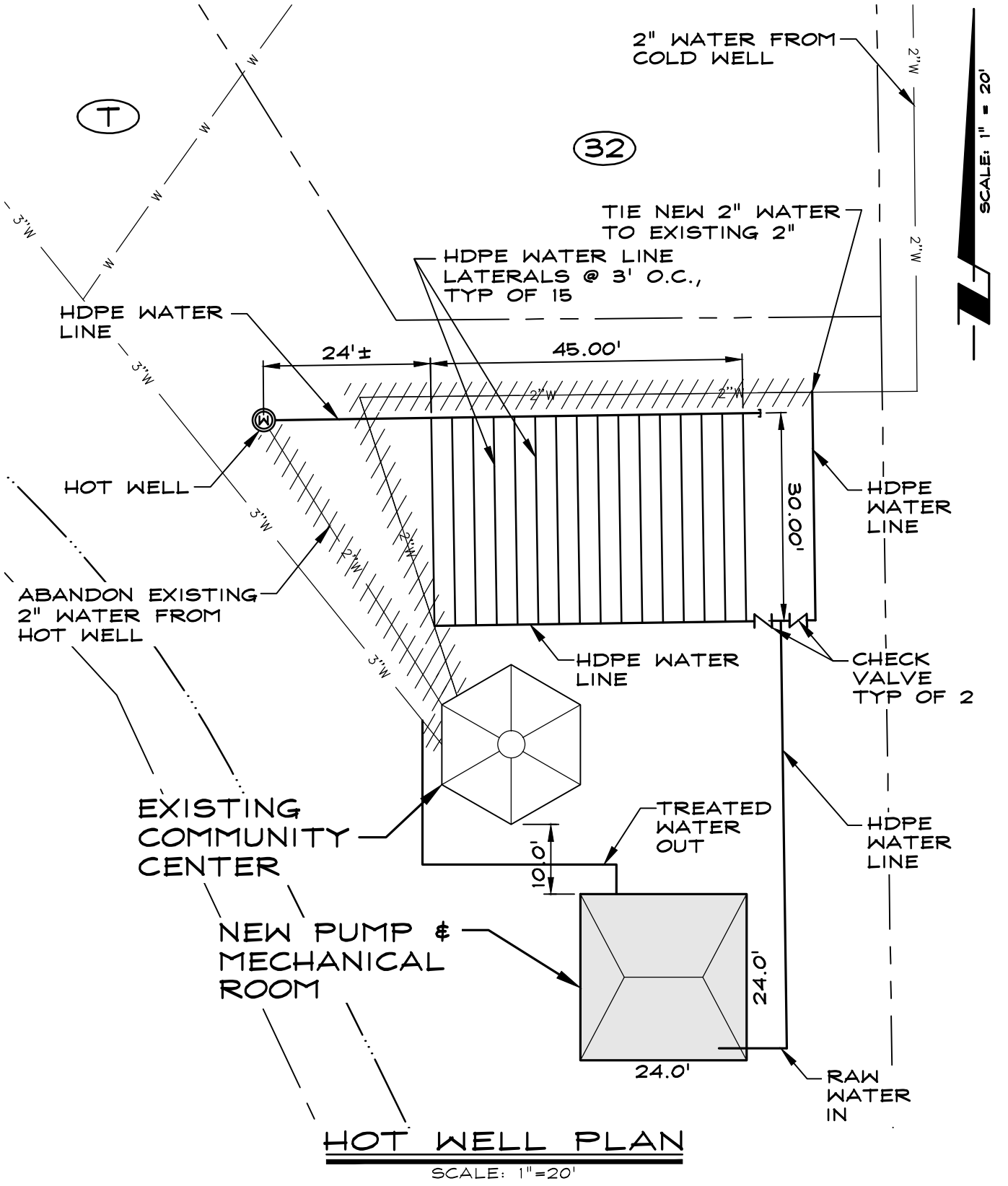
APPENDIX 9
GROUND SOURCE HEAT SINK LOOP FOR HOT WELL



HOT WELL PLAN

SCALE: 1"=20'

R|O|Anderson
WWW.ROANDERSON.COM

NEVADA
1603 Esmeralda Ave
P.O. Box 2229
Minden, NV 89423
p 775.782.2322
f 775.782.7084

CALIFORNIA
595 Tahoe Keys Blvd
Suite A-2
South Lake Tahoe, CA 96150
p 530.600.1660
f 775.782.7084

SIERRA EAST H.O.A.

HOT WELL GROUND SOURCE HEAT SINK LOOP

HOT WELL

2088-001

04/22/14

APPENDIX 10
DETAILED WATER QUALITY DATA

Date	Total Coliform	Fluoride	Total Arsenic	Uranium	Silica	Calcium	Chloride	Iron	Manganese	Sulfate	Sulfide	Total Organic Carbon	Turbidity	Total Dissolved Solids	Total Alkalinity	Hydroxide (OH)	Carbonate (CO_3)	Bicarbonate	Total Suspended Solids (TSS)	Total Hardness	Dissolved Orthophosphate as P	Arsenic V	Arsenic III	Nitrate as N
mm/dd/yy	*mpn*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*NTU*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*	*mg/L*
Cold Well #2																								
07/13/11		0.5	0.024																					0.16
03/26/12		1.4	0.088																					<1.0
04/23/12	<1.1		0.17																					
07/02/12	<1.1																							
07/09/12			0.037																					
07/27/12			0.037																					
08/10/12	<1.1																							
09/04/12	<1.1																							
09/17/12			0.031																					
10/03/12	<1.1																							
11/05/12	<1.1																							0.92
12/06/12	<1.1																							
01/02/13	<1.1		0.047																					
02/04/13	<1.1																							
03/04/13	<1.1		0.038																					
04/03/13	<1.1																							
05/15/13	<1.1																							
06/10/13	<1.1		0.041																					
06/25/13			0.041																					
07/01/13																								
09/08/13			0.03																					
09/20/13			0.03																					
09/23/13			0.03																					
12/02/13			0.048																					
01/23/14			0.056	0.0034	23	11		0.31	ND	14	ND	ND	1.7	140	59	ND	ND	72	2	38	0.023	0.056	0.000	
Median	<1.1	0.95	0.038	0.0034	23	11		0.31	ND	14	ND	ND	1.7	140	59	ND	ND	72	2	38	0.023	0.056	0	0.54
Hot Well #1																								
07/13/11		3																						0.37
07/14/11			0.029																					
03/26/12		2	0.034																					<1.0
04/23/12			0.034																					
07/02/12	<1.1																							
07/09/12			0.037																					
07/27/12			0.037																					
09/17/12			0.043																					
01/02/13			0.052																					
03/04/13			0.031																					
06/10/13			0.035																					
06/25/13			0.035																					
09/08/13			0.041																					
09/20/13			0.041																					
09/23/13			0.041																					
12/02/13			0.041																					
10/13/14			0.044	0.0012	47	21	110	0.85	0.007	29	ND	ND		340	66	ND	ND	66		69	0.025	0.038	0.0064	
Median	<1.1	2.5	0.037	0.0012	47	21	110	0.85	0.007	29	ND	ND		340	66	ND	ND	66		69	0.025	0.038	0.0064	0.37
01/02/00																								
01/23/14			0.015	0.0012			3							130										
Strong Well																								
01/23/14			0.057	0.0012			60							240										
Vandebrake Well																								
01/29/14			0.028	0.0025			8.9							98										
Codtz Well																								
01/29/14			0.0012	ND			1.7							79										
Composit of Hot and Cold Well (contributions from each well not determined)																								
02/20/03		1.5	0.03			13	33	0.05	0.001				0.3	170	62					48				0.24
02/13/00		1.7	0.25					0.06	0.001	14.8				165										0.4
12/19/95		1	0.041			18	58	0.06	0.001	14.8			0.9	215		3	3	79		62				1
09/26/94		1.6	0.05			14	38	0.04	0.01	17			0.45	190	65	3	3	79		52				1.6
Median		1.55	0.0455			18	38	0.06	0.004	17			0.45	180	65.5	3	3	72.5		62				0.4

Above mcl

APPENDIX 11
MONO COUNTY COMPLIANCE ORDER

MONO COUNTY HEALTH DEPARTMENT Environmental Health
P.O. BOX 476, BRIDGEPORT, CA 93517 PHONE (760) 932-5580 • FAX (760) 932-5284
P.O. BOX 3329, MAMMOTH LAKES, CA 93546 PHONE (760) 924-1830 • FAX (760) 924-1831

Compliance Order No. 02-03-12-622

MONO COUNTY HEALTH DEPARTMENT
DIVISION OF ENVIRONMENTAL HEALTH

IN RE: SIERRA EAST HOMEOWNERS ASSOCIATION
Water System No. 2600622

TO: Ms. Priscila Estes
108952 Highway 395
Coleville, CA
96107

COMPLIANCE ORDER
FOR VIOLATION OF:
1. ARSENIC MAXIMUM CONTAMINANT LEVEL
2. FAILURE TO MONITOR FOR ROUTINE WATER QUALITY
3. FAILURE TO COMPLY WITH SURFACE WATER TREATMENT RULE

Issued on February 03, 2012

Section 116655, Chapter 4 of the California Health and Safety Code authorizes the issuance of an Order for failure to comply with a requirement of the California Safe Drinking Water Act, or any regulation, standard, permit, or order issued thereunder.

FINDINGS

The Sierra East Homeowner Association (Hereafter "SEHA") water system is a Community water system located on East side of Hwy 395 in Coleville. The SEHA is a facility that serves approximately 30 mobile homes. The SEHA operates under a domestic water supply permit issued by the Mono County Health Department (hereinafter "Department"). The MHP's water system is supplied by two groundwater wells. The main

well, Well 2, referred to as the "cold well" is located approximately 100 feet from the high bank of the Walker River. Based on historical positive bacteriological results and the location of the well to the river, this well may be under the influence of surface water. Well 1 referred to as the "Hot Well" serves as the secondary well and operates in the evening/night. The water from this well alone is too hot to drink and must be blended with water from Well 2 prior to distribution. Well 1 has historically exceeded the State Law limit of 10ppb arsenic. Beginning January 23, 2006, the U.S. Environmental Protection Agency (USEPA) adopted a revised maximum contaminant level (MCL) for arsenic of 10ppb. The arsenic MCL of 10ppb was recently adopted for California and became effective November 28, 2008. Prior to this date, any non-compliance issues were referred to U. S. EPA for enforcement action.

Currently, this Department has not received a copy of up to date water quality monitoring results. The last monitoring results on file with this Department are dated March, 2003. A letter sent to SEHA from this Department dated April 1st, 2002 outlined the monitoring frequency for inorganic, organic, radiological, lead and copper, testing. Monitoring samples shall be collected from both Well 1 and Well 2. Arsenic monitoring from Well 1 shall be conducted on a quarterly basis due to elevated arsenic levels in the water. The water quality monitoring frequency is as follows:

Table 1.

Parameter	Required Frequency	Last Analysis	Next Analysis Due
Inorganic Chemicals	Once/3 years	2/03	Past Due
Organic Chemicals	Once/6 years	1/02	Past Due
Radiological	Once/ 4 years	9/03	Past Due
Lead Copper	Once/year	10/01	Past Due

The SEHA is required to conduct water quality monitoring for the following contaminants listed in the tables below:

Table 64431-A
Maximum Contaminant Levels
Inorganic Chemicals

Chemical	*Maximum Contaminant Level, mg/L*
Aluminum	1.
Antimony	0.006
Arsenic	0.010
Asbestos	7 MFL*
Barium	1.
Beryllium	0.004
Cadmium	0.005
Chromium	0.05
Cyanide	0.15
Fluoride	2.0
Mercury	0.002
Nickel	0.1
Nitrate (as NO3)	45.
Nitrate+Nitrite (sum as nitrogen)	10.
Nitrite (as nitrogen)	1.
Perchlorate	0.006
Selenium	0.05
Thallium	0.002

Table 64442
Radionuclide Maximum Contaminant Levels (MCLs)
and Detection Levels for Purposes of Reporting (DLRs)

Radionuclide	*MCL*	*DLR*
Radium-226	5 pCi/L (combined radium-226 & -228)	1 pCi/L
Radium-228		1 pCi/L
Gross Alpha particle activity (excluding radon and uranium)	15 pCi/L	3 pCi/L
Uranium	20 pCi/L	1 pCi/L

Table 64444-A
Maximum Contaminant Levels
Organic Chemicals

Chemical	*Maximum Contaminant Level, mg/L*
(a) Volatile Organic Chemicals (VOCs)	
Benzene	0.001
Carbon Tetrachloride	0.0005
1,2-Dichlorobenzene	0.6
1,4-Dichlorobenzene	0.005
1,1-Dichloroethane	0.005
1,2-Dichloroethane	0.0005
1,1-Dichloroethylene	0.006
cis-1,2-Dichloroethylene	0.006
trans-1,2-Dichloroethylene	0.01
Dichloromethane	0.005
1,2-Dichloropropane	0.005
1,3-Dichloropropene	0.0005
Ethylbenzene	0.3

Methyl-*tert*-butyl ether	0.013
Monochlorobenzene	0.07
Styrene	0.1
1,1,2,2-Tetrachloroethane	0.001
Tetrachloroethylene	0.005
Toluene	0.15
1,2,4-Trichlorobenzene	0.005
1,1,1-Trichloroethane	0.200
1,1,2-Trichloroethane	0.005
Trichloroethylene	0.005
Trichlorofluoromethane	0.15
1,1,2-Trichloro-1,2,2-Trifluoroethane	1.2
Vinyl Chloride	0.0005
Xylenes	1.750*

Table 64444-A (continued)
Maximum Contaminant Levels
Organic Chemicals

Chemical	*Maximum Contaminant Level, mg/L*
(b) Non-Volatile Synthetic Organic Chemicals (SOCs)	
Alachlor	0.002
Atrazine	0.001
Bentazon	0.018
Benzo(a)pyrene	0.0002
Carbofuran	0.018
Chlordane	0.0001
2,4-D	0.07
Dalapon	0.2
Dibromochloropropane	0.0002
Di(2-ethylhexyl)adipate	0.4
Di(2-ethylhexyl)phthalate	0.004
Dinoseb	0.007
Diquat	0.02
Endothall	0.1
Endrin	0.002
Ethylene Dibromide	0.00005
Glyphosate	0.7
Heptachlor	0.00001
Heptachlor Epoxide	0.00001
Hexachlorobenzene	0.001
Hexachlorocyclopentadiene	0.05
Lindane	0.0002
Methoxychlor	0.03
Molinate	0.02
Oxamyl	0.05
Pentachlorophenol	0.001
Picloram	0.5
Polychlorinated Biphenyls	0.0005
Simazine	0.004
Thiobencarb	0.07
Toxaphene	0.003
2,3,7,8-TCDD (Dioxin)	3×10^{-8}
2,4,5-TP (Silvex)	0.05

*MCL is for either a single isomer or the sum of the isomers.

All water quality sample testing must be conducted by a California State certified laboratory.

The SEHA installed an unapproved automatic chlorination system that treats water prior to distribution. Per the inspection report dated 7/8/2010, the operator was instructed that the in-line chlorination system alone was not an approved method of treatment. Chlorination must be used in conjunction with approved filtration methods and this treatment system must meet the Surface Water Treatment requirements outlined in State law. At the time of inspection, the operator was advised that a study using enumeration bacteriological testing should be conducted to determine if the cold water well was under the influence of surface water. To accomplish this, water samples must be collected directly from the well, prior to distribution and prior to chlorination. To date, no such study or sampling has been conducted to verify the bacteriological enumeration of Well 2.

The SEHA was previously working with the California Department of Public Health (CDPH) to secure Safe Drinking Water State Revolving Fund (SDWSRF) opportunities to address the existing water quality issues. However, CDPH understands that SEHA is currently unwilling to participate in the SDWSRF and will be bypassed for project funding opportunities. An Application Bypass Warning Letter dated January 5, 2012 was sent to the SEHA which outlined the status of the application for funding. This letter notified the SEHA that failure to address the water quality issues may result in the initiation of enforcement action against SEHA until the water quality problems are resolved.

CONCLUSIONS OF LAW

Based on the above Findings, the Department has determined that the SEHA water system has violated provisions contained in the California Health and Safety Code and Title 22, California Code of Regulations (CCR). These violations include, but are not limited to the following:

1. Health and Safety (H&S) Code Section 116555(a)(1). Specifically, the SEHA is operating Wells No. 1 and 2 that produce water that does not comply with the primary drinking water standards.

2. H&S Code Section 116555(a)(3). Specifically, the SEHA water system failed to ensure that a reliable and adequate supply of pure, wholesome, healthful, and potable water is provided to all of its consumers.

3. CCR Section 64431(a). Specifically, the water produced by the SEHA water system exceeds the maximum contaminant level of 10 ppb for arsenic, and therefore, does not comply with a primary drinking water standard.

4. CCR Section 64432(a)(c)(2). Specifically, the SEHA water system has failed to monitor for routine water quality testing per the scheduled testing intervals. (a) Monitoring shall be conducted in the year designated by the Department of each compliance period beginning with the compliance period starting January 1, 1993. (c)(2) Arsenic samples shall be conducted and analyzed on a quarterly basis based on historical results that indicate a continuous or persistent trend toward higher levels of arsenic levels in the source water from Well 1.

5. CCR Section 64652. Specifically, the SEHA water system is not meeting the surface water treatment requirements and associated technologies to treat groundwater under the influence of surface water. The SEHA water system is operating an unapproved chlorination system and is treating water prior to distribution. Chlorination alone is not a sufficient form of surface water treatment. All surface water treatment requirements under CCR Section 64652 through CCR

Section 64666 must be met if bacteriological treatment is being implemented to address a bacteriological contamination issue.

ORDER

In order to ensure that the water supplied by the SEHA water system is at all times safe, wholesome, healthful, and potable, and pursuant to Section 116655 of the H&S Code, the water system is ordered to take the following actions:

1. (a) Cease and Desist from failing to comply with H&S Code Section 116555(a)(1) and (3) by ensuring that the system is provided with a reliable and adequate source of pure, wholesome, healthful, and potable water that is in compliance with all primary drinking water standards.

(b) The SEHA must address the problems with the source wells to achieve compliance with State Law. Specifically, the SEHA must decide to either discontinue the use of the "Hot Well" (Well 1) or provide an approved method of treatment for the removal of excessive arsenic in the well. Also, a bacteriological study must be conducted on the "Cold Well" (Well 2) to determine if the well is under the direct influence of surface water. If the study shows that Well 2 is under the direct influence of surface water, then water from Well 2 must be treated using all required surface water treatment methods outlined in State law. Without an adequate bacteriological study on the well, and based on historical results and the proximity of the well to the Walker River, Well 2 will be considered to be under the direct influence of surface water, and therefore an unapproved source for the water system.

(c) The SEHA shall collect all required water quality samples from Well 1 and Well 2 and have samples tested by a California State certified lab. This water quality

monitoring shall include testing for all contaminants listed in the tables of this document.

(d) SEHA shall submit quarterly progress reports to the Department, beginning **March 27, 2012**. The progress reports shall describe the status of compliance and a proposed plan to address the water quality issues associated with the SEHA water system.

2. The SEHA shall distribute a Department-approved notice to all consumers. Notification to the public shall be **repeated on a quarterly basis as long as the violation exists**. Proof of public notification to all water system users shall continue to be provided to the Department following each quarterly notification by the 10th day of the month following notification.

3. Quarterly monitoring of the wells for arsenic must be conducted, preferably before each quarterly notice is released, so the notice can reflect the most recent sample results.

5. The Department reserves the right to make such modifications to this Order as it may deem necessary to protect public health and safety. Such modifications may be issued as amendments to this Order and shall be effective upon issuance.

All submittals required by this Order shall be addressed to:

Jon Drozd, REHS
Mono County Environmental Health
Small Water Systems Coordinator
Office: (760) 924-4605
Fax: (760) 924-1831
437 Old Mammoth Road, #Q
P.O. Box 3329
Mammoth Lakes, CA, 93546
www.jdrozd@mono.ca.gov

6. If SEHA is unable to perform the tasks specified in this Order for any reason, whether within or beyond its control, and if SEHA notifies the Department in writing no less than five days in advance of the due date, the Department may extend the time for performance if SEHA demonstrates that it has used its best efforts to comply with the schedule and other requirements of this Order.

7. If SEHA fails to perform any of the tasks specified in this Order by the time described herein or by the time subsequently extended pursuant to Item 6 above, SEHA shall be deemed to have not complied with the obligations of this Order and may be subject to additional judicial action, including civil penalties specified in H&S Code, Section 116725 and 116730.

8. The County of Mono shall not be liable for any injuries or damages to persons or property resulting from acts or omissions by the SEHA, its employees, agents, or contractors in carrying out activities pursuant to this Order, nor shall the County of Mono be held as a party to any contract entered into by SEHA or its agents in carrying out activities pursuant to this Order.

PARTIES BOUND

This Order shall apply to and be binding upon SEHA, its officers, directors, agents, employees, contractors, successors, and assignees.

SEVERABILITY

The requirements of this Order are severable, and SEHA shall comply with each and every provision thereof notwithstanding the effectiveness of any provisions.

2/3/12
Date

Jon Drozd, REHS
Small Water Systems Coordinator
Mono County Environmental Health

Attachment K
Scope of Project, Form 3P
Sierra East Homeowners Association
Mono County, CA
System Number 2600622

Description of Planning Tasks and Associated Budget

Sierra East Homeowners Association (SEHA) has water quality challenges associated with arsenic, temperature, and surface water influence. The planning tasks described below are based on alternatives developed to assist the SEHA attain adequate water quality without treatment, and determine what a treatment process would entail, if treatment is required. Monitoring is currently underway at the "cold" well to determine surface water influence. This monitoring is not included in the planning phase budget. Treatment of surface water at the "hot" well was not included as a feasible alternative. The alternatives to be examined are:

1. New potable water well to be drilled on or immediately adjacent to SEHA property, which is not under the influence of surface water based on site investigation and hydrogeological study. If the new well produces hot or contaminated water that could not be suitably treated, Alterative 2 could be implemented.

2. Use of a surface treatment system on water from Walker River (obtained from the existing "cold" well).

3. Interconnection with Coleville High School (Eastern Sierra Unified School District). Under this alternative SEHA would purchase treated water from Coleville High School to replace/supplement its own potable water production.

4. Installation of potable water storage tank sized per domestic and fire demand requirements, per Mono County Fire Marshall.

5. Distribution system repairs, including replacement of pipeline and valves.

6. Addition of a backup generator and transfer switch for SEHA facilities.

7. Installation of meters at connections (approximately 30).

The planning scope outlined below assumes that all the alternatives will be evaluated in the preliminary engineering report, and that Alternatives 2, 4, 5, and 6 will be designed. A test well is also included. If consolidation or a new permanent well is the preferred alternative, the planning scope budget may need to be adjusted.

APPENDIX 12
HYDROGEOLOGY REPORT & WELL SITING ANALYSIS

April 1, 2014

Kent Neddenriep
R.O. Anderson Engineering, Inc.
1603 Esmeralda Avenue
Minden, NV 89423

Subject: Recommended Well Locations, **SIERRA EAST HOA**

Dear Kent:

Andy Zdon & Associates, Inc. (AZI) is pleased to provide the following letter report summarizing recommended well locations for the Sierra East Home Owners' Association in Mono County, California. AZI has identified three potential well drilling sites and has ranked them in order of recommended location.

Background

The Sierra East Homeowner's Association Site (SEHOA) is a 36-unit mobile home park adjacent to the West Walker River in Antelope Valley, Mono County, California. The mobile home park currently maintains two water-supply wells and maintains a continuous demand of approximately 20 gallons per minute (gpm) during the summer. One well located near the Walker River that is cold water that has been determined to be under the influence of surface water (occasional past positive bacteriological tests although those could be caused by nearby septics and improper well sealing) and also has occasional arsenic levels above the maximum contaminant level (MCL) for arsenic of 10 micrograms per liter (µg/L). The second well which is further from the river has hot water (greater than 140 degrees Fahrenheit) and elevated arsenic concentrations. The purpose of this task was to identify potential well locations that could provide water of improved quality to the SEHOA site.

The SEHOA is located in northern Mono County along U.S. Highway 395 and north of the community of Walker. The West Walker River runs northward immediately to the east of the SEHOA, and the escarpment of the Sierra Nevada lies immediately to west across U.S. Highway 395. The principal land uses (not including open space or wild lands) in the area are agricultural and residential, with some scattered commercial uses. Water service (including wastewater) in the area is provided by individual wells and septic systems.

The SEHOA is within the Antelope Valley Groundwater Basin, and within the North Lahontan Hydrologic Study Area (California Department of Water Resources, 2003). Groundwater in the area is generally found within the unconsolidated alluvial and fluvial sediments comprising the basin fill. In the SEHOA area, Sierra Nevada range-front faults run generally north-northwest along the base of

the Sierra Nevada. Principal among these is the Antelope Valley fault system. The fault system forms the range-front scarp of the Sierra Nevada, and in places can place the igneous, metamorphic and volcanic rocks in the area against the valley fill. The ability for these faults to inhibit groundwater flow is unknown, however as can be seen in Figure 1, significant differences in groundwater quality can be present from one side of a fault to the other. As is typical with faults such as this, subordinate and somewhat parallel faults are likely to be present along their respective traces.

Groundwater Quality

The groundwater quality in the Antelope Valley is variable but generally of good quality. Glancy (1971) reported that groundwater present in the area typically had total dissolved solids (TDS) concentrations of approximately 175 to 350 milligrams per liter (mg/L). Boron, fluoride and arsenic have been noted in wells in the valley, and radionuclides were present above their MCL for two out five wells sampled (California Department of Water Resources, 2003).

In the SEHOA area, groundwater quality results are available for six wells including the two SEHOA wells. TDS concentrations in these wells range from 79 mg/L in the Codtz Well (south of SEHOA) to 250 mg/L in the Strong Well north of the SEHOA (Figure 1). Of note is an abrupt change in TDS concentration between the Strong and Vandendrake Wells, across a north-trending geologic structural lineament.

Arsenic concentrations (MCL of 10 µg/L) in the SEHOA area range from 1.2 µg/L at the Cortez Well on the south and 15 µg/L in the Kraft Well to the north, to a high concentration of 57 µg/L in the Strong Well. The two SEHOA wells have arsenic concentrations of 38 and 37 µg/L, respectively. Elevated uranium concentrations in the area generally trend with elevated arsenic concentrations. The California Public Health Goal (PHG) for uranium is 20 pCi/L (approximately 0.030 mg/L). All of the wells in the SEHOA area are well below the PHG for uranium.

Analysis of Potential Well Locations

In order to evaluate potential well locations, AZI conducted a fracture trace analysis of the area. While this method is typically used in fractured rock terrains and is well described in the literature (Fetter, 2001), in the SEHOA area, substantial differences in groundwater chemistry can be seen across fractures in the area. Additionally, given that both hot water (greater than 140 degrees F) and cold water wells are present in close proximity within the SEHOA, it is indicative of the influence of geologic structures on groundwater flow and quality in the area.

In a fracture or fault-trace analysis, those geologic structures are located by the study of existing geologic and/or fault maps, aerial photography, satellite imagery, and topographic map analysis. Fracture or fault traces may be identified as obvious features on the ground surface, or by lineaments only observable on topographic maps or various types of aerial imagery. For the purposes of this scope of work, field observations were not included as part of the analysis.

Maps and images used by AZI include:

- Google Earth imagery;
- Alquist-Priolo fault hazard maps and associated reporting; and,
- Topographic quadrangle maps.

A map showing some key fracture and fault traces is provided as Figure 1. As can be seen, most geologic structures/lineaments follow the trend of the base of the Sierra Nevada and are associated with the Antelope Valley fault system. As stated earlier, significant changes in groundwater chemistry can be seen across several of these features. Based on this analysis, three potential well sites were identified and ranked as the primary location, followed by the second and third site choices. It is likely that any of these three locations will provide sufficient quantity of water for the needs of SEHOA. Therefore, ranking is primarily based on expected quality of water to be anticipated.

The preferred location is south of the SEHOA in the vicinity of the Codtz well. Here TDS and arsenic are at their lowest concentrations (although arsenic is present, it remains below the MCL) and uranium was not detected in groundwater. The second alternative is to the north in the vicinity of the Kraft well where TDS and arsenic are slightly above that measured at the Codtz Well. The third location is immediately north of the SEHOA in the vicinity of the Vandenbrake Well.

In each of these locations, there is limited flexibility in well placement. For example, at the Codtz Well site, moving the location either somewhat north or south on the property would be acceptable so far as the location remained to the east of the easternmost lineament shown. For the second alternative site, so long as the well site were to remain within the wedge-shaped area between lineaments shown, the well could be moved onto an adjacent property. That is also true for the third alternative well site.

Given AZI's scope of work, we have presented well locations based on preferred areas of groundwater yield and quality based on hydrogeologic conditions. However, additional considerations should be recognized when marking the actual drilling location on-site. In all cases, the new wells should not be placed immediately next to existing wells so that well interference between the wells does not become a problem. When marking the well location in the field, other aspects will need to be taken

into consideration including the presence of overhead utilities or trees which could obstruct drilling equipment and/or present a safety hazard during drilling operations. Additionally, California Well

Standards recommend placing any well a minimum of 50 feet horizontally from any sewer line (sanitary, lateral, etc.); 100 feet from any watertight septic tank or sewage leach field. The well should also be placed upgradient, or off gradient from any of these features. Mono County may also have a setback requirement from any surface water body such as the West Walker River and the Mono County Health Department should be consulted for such a requirement.

Given the proximity of the West Walker River, it is important to note that additionally, the California Well Standards state that "*If possible, a well should be located outside areas of flooding. The top of the well casing shall terminate above grade and above known levels of flooding caused by drainage or runoff from the surrounding land. For community water supply wells, this level is defined as the: "…floodplain of a 100-year flood..." (Section 66417, Siting Requirements, Title 22 of the California Code of Regulations."*

References

- Bryant, William A., 1983. *Faults in Antelope Valley, Slinkard Valley, and along the West Walker River, Mono County.* California Division of Mines and Geology Fault Evaluation Report FER-154.

- California Department of Conservation, 1985. Special Studies Zone Map; SW ¼ Desert Creek Peak Quadrangle. January 1.

- California Department of Water Resources, 1991. *California Well Standards.* Bulletin 74-90 (Supplement to Bulletin 74-81).

- California Department of Water Resources, 2003. *California's Groundwater – Update.* Department of Water Resources Bulletin No. 118.

- Fetter, C.W., 2001. *Applied Hydrogeology.* 4th Ed, Prentice-Hall, Upper Saddle River. 598 p.

- Glancy, Patrick A., 1971. *Water Resources Appraisal of Antelope Valley and East Walker Area, Nevada and California.* Nevada Division of Water Resources Water-Resources-Reconnaissance Series Report 53. 69 p.

- Google Earth Imagery, 2014.

- R.O. Anderson Engineering, Inc., 2014. Water Quality Data, Well Location information.

- TEAM Engineering & Management, Inc., 2006. Surface Water and Groundwater Availability Assessment, Antelope Valley Area, Mono County, California. September 27.

Closing

It is important to recognize that in a structurally complex area as described herein, there is uncertainty associated with the work including spacial variability of geologic materials, field reconnaissance not being within the scope of work, and other variables. Therefore, although this report has been prepared according to generally accepted standards of hydrogeologic practice, no warranty regarding any particular yield or water quality resulting from placing a well at any specific location is implied or intended.

If you have any questions or need additional information, please feel free to contract me at 925-974-3680.

Sincerely,

Andy Zdon & Associates, Inc.

Andy Zdon
President – Principal Hydrogeologist
Andy Zdon & Associates, Inc.
2121 N. California Blvd., Suite 290
Walnut Creek, CA 94596
925-974-3680

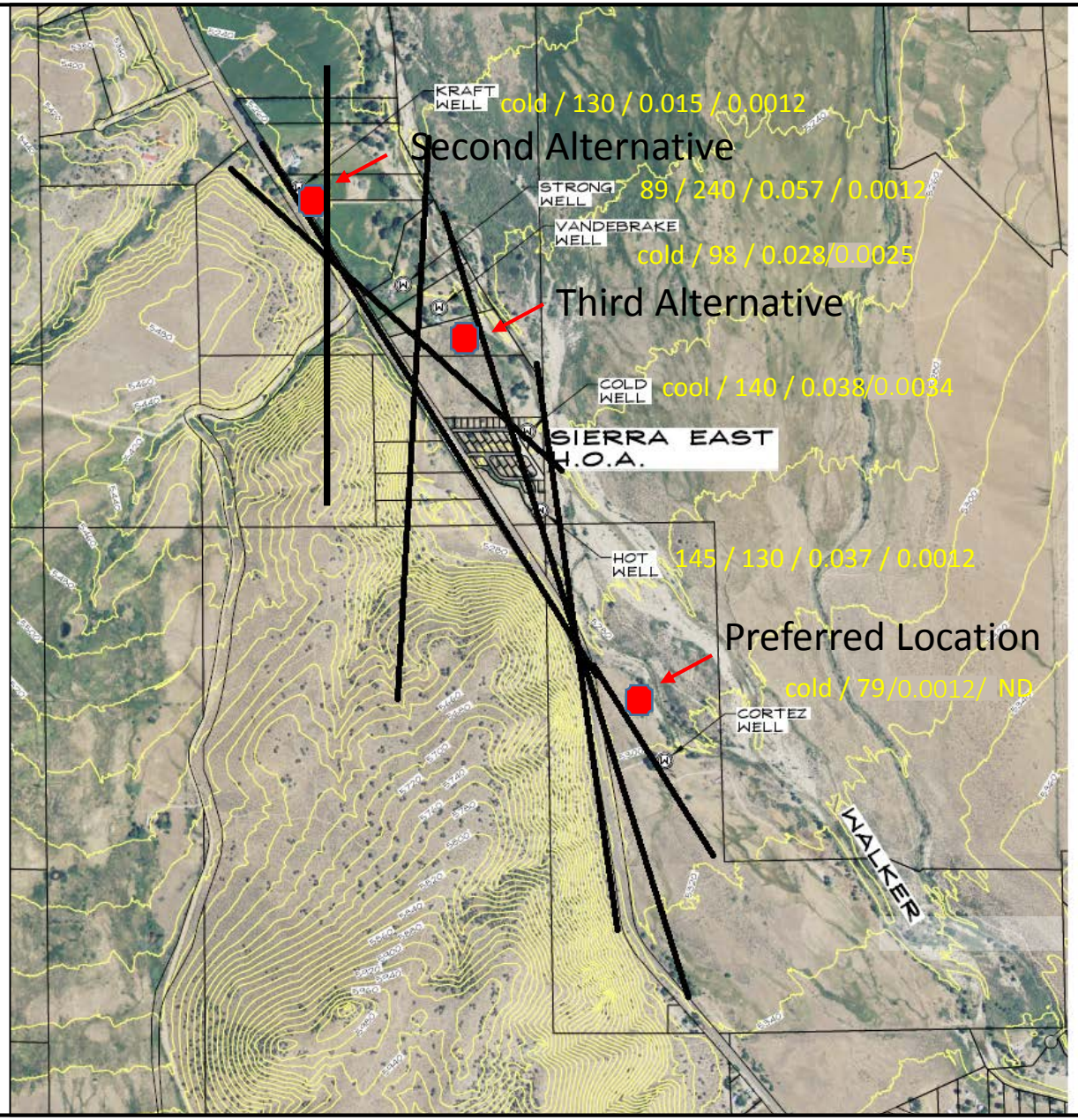


Figure 1
Sierra East HOA Well Locations and Area Features

Legend

Fault/Lineament

89 / 217 / 0.045 / 0.025

Temperature / TDS / As / U

(Concentrations in mg/L)

N

Scale: 1" = ~1600 ft

Date: March 28, 2014
Project: Sierra East HOA
Image Source: Google/R.O. Anderson

ANDY ZDON & ASSOCIATES, INC.

APPENDIX 13
COST SUMMARY BREAKDOWN

	Recommended Infrastructure Upgrades	Mechanical Building	New Water System	Loop Addition Modification	Ground Source Cooling Loop	Water Meters	Fire Hydrants	Emergency Generator	Redrilling the Cold Well	Rehabilitate the Hot Well	Backup Arsenic Treatment	Total
Alternative Description	Base Estimate of Cost	$171,000	$259,000	$78,000	$32,000	$150,800	$30,000	$115,000	$48,000	$10,000	$36,000	
1 - New Well	$389,000	Yes	Yes	No	No	Yes	Yes	Yes	Yes	No	Yes	$1,198,800
		Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Yes	$1,192,800
		Yes	Yes	No	No	Yes	No	Yes	Yes	No	Yes	$1,168,800
		Yes	Yes	No	Yes	Yes	No	Yes	No	Yes	Yes	$1,162,800
		Yes	Yes	No	No	No	Yes	Yes	Yes	No	Yes	$1,048,000
		Yes	Yes	No	No	Yes	Yes	No	Yes	No	Yes	$1,083,800
		Yes	Yes	No	Yes	No	Yes	Yes	No	Yes	Yes	$1,042,000
		Yes	Yes	No	Yes	Yes	Yes	No	No	Yes	Yes	$1,077,800
		Yes	Yes	No	No	No	No	Yes	Yes	No	Yes	$1,018,000
		Yes	Yes	No	No	Yes	No	No	Yes	No	Yes	$1,053,800
		Yes	Yes	No	Yes	No	No	Yes	No	Yes	Yes	$1,012,000
		Yes	Yes	No	Yes	Yes	No	No	No	Yes	Yes	$1,047,800
		Yes	Yes	No	No	No	Yes	No	Yes	No	Yes	$933,000
		Yes	Yes	No	Yes	No	Yes	No	No	Yes	Yes	$927,000
		Yes	Yes	No	No	No	No	No	Yes	No	Yes	$903,000
		Yes	Yes	No	Yes	No	No	No	No	Yes	Yes	$897,000
		Yes	No	Yes	No	Yes	Yes	Yes	Yes	No	Yes	$1,017,800
		Yes	No	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	$1,011,800
		Yes	No	Yes	No	Yes	No	Yes	Yes	No	Yes	$987,800
		Yes	No	Yes	Yes	Yes	No	Yes	No	Yes	Yes	$981,800
		Yes	No	Yes	No	No	Yes	Yes	Yes	No	Yes	$867,000
		Yes	No	Yes	No	Yes	Yes	No	Yes	No	Yes	$902,800
		Yes	No	Yes	Yes	No	Yes	Yes	No	Yes	Yes	$861,000
		Yes	No	Yes	Yes	Yes	Yes	No	No	Yes	Yes	$896,800
		Yes	No	Yes	No	No	No	Yes	Yes	No	Yes	$837,000
		Yes	No	Yes	No	Yes	No	No	Yes	No	Yes	$872,800
		Yes	No	Yes	Yes	No	No	Yes	No	Yes	Yes	$831,000
		Yes	No	Yes	Yes	Yes	No	No	No	Yes	Yes	$866,800
		Yes	No	Yes	No	No	Yes	No	Yes	No	Yes	$752,000
		Yes	No	Yes	Yes	No	Yes	No	No	Yes	Yes	$746,000
		Yes	No	Yes	No	No	No	No	Yes	No	Yes	$722,000
		Yes	No	Yes	Yes	No	No	No	No	Yes	Yes	$716,000
		Yes	No	No	No	Yes	Yes	Yes	Yes	No	Yes	$939,800
		Yes	No	No	Yes	Yes	Yes	Yes	No	Yes	Yes	$933,800
		Yes	No	No	No	Yes	No	Yes	Yes	No	Yes	$909,800
		Yes	No	No	Yes	Yes	No	Yes	No	Yes	Yes	$903,800
		Yes	No	No	No	No	Yes	Yes	Yes	No	Yes	$789,000
		Yes	No	No	No	Yes	Yes	No	Yes	No	Yes	$824,800
		Yes	No	No	Yes	No	Yes	Yes	No	Yes	Yes	$783,000
		Yes	No	No	Yes	Yes	Yes	No	No	Yes	Yes	$818,800
		Yes	No	No	No	No	No	Yes	Yes	No	Yes	$759,000
		Yes	No	No	No	Yes	No	No	Yes	No	Yes	$794,800
		Yes	No	No	Yes	No	No	Yes	No	Yes	Yes	$753,000
		Yes	No	No	Yes	Yes	No	No	No	Yes	Yes	$788,800
		Yes	No	No	No	No	Yes	No	Yes	No	Yes	$674,000
		Yes	No	No	Yes	No	Yes	No	No	Yes	Yes	$668,000
		Yes	No	No	No	No	No	No	Yes	No	Yes	$644,000
		Yes	No	No	Yes	No	No	No	No	Yes	Yes	$638,000

	Recommended Infrastructure Upgrades	Mechanical Building	New Water System	Loop Addition Modification	Ground Source Cooling Loop	Water Meters	Fire Hydrants	Emergency Generator	Redrilling the Cold Well	Rehabilitate the Hot Well	Backup Arsenic Treatment	Total
Alternative Description	Base Estimate of Cost	$171,000	$259,000	$78,000	$32,000	$150,800	$30,000	$115,000	$48,000	$10,000	$36,000	
2A -Treatment by Adsorption	$140,000	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	$955,800
		Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	No	$945,800
		Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes	No	$925,800
		Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	No	$915,800
		Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes	No	$805,000
		Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	$840,800
		Yes	Yes	No	Yes	No	Yes	Yes	Yes	No	No	$795,000
		Yes	Yes	No	Yes	Yes	Yes	No	Yes	No	No	$830,800
		Yes	Yes	No	Yes	No	No	Yes	Yes	Yes	No	$775,000
		Yes	Yes	No	Yes	Yes	No	No	Yes	Yes	No	$810,800
		Yes	Yes	No	Yes	No	No	Yes	Yes	No	No	$765,000
		Yes	Yes	No	Yes	Yes	No	No	Yes	No	No	$800,800
		Yes	Yes	No	Yes	No	Yes	No	Yes	Yes	No	$690,000
		Yes	Yes	No	Yes	No	Yes	No	Yes	No	No	$680,000
		Yes	Yes	No	Yes	No	No	No	Yes	Yes	No	$660,000
		Yes	Yes	No	Yes	No	No	No	Yes	No	No	$650,000
		Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	$774,800
		Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	$764,800
		Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	$744,800
		Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	No	$734,800
		Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	No	$624,000
		Yes	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No	$659,800
		Yes	No	Yes	Yes	No	Yes	Yes	Yes	No	No	$614,000
		Yes	No	Yes	Yes	Yes	Yes	No	Yes	No	No	$649,800
		Yes	No	Yes	Yes	No	No	Yes	Yes	Yes	No	$594,000
		Yes	No	Yes	Yes	Yes	No	No	Yes	Yes	No	$629,800
		Yes	No	Yes	Yes	No	No	Yes	Yes	No	No	$584,000
		Yes	No	Yes	Yes	Yes	No	No	Yes	No	No	$619,800
		Yes	No	Yes	Yes	No	Yes	No	Yes	Yes	No	$509,000
		Yes	No	Yes	Yes	No	Yes	No	Yes	No	No	$499,000
		Yes	No	Yes	Yes	No	No	No	Yes	Yes	No	$479,000
		Yes	No	Yes	Yes	No	No	No	Yes	No	No	$469,000
		Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	$696,800
		Yes	No	No	Yes	Yes	Yes	Yes	Yes	No	No	$686,800
		Yes	No	No	Yes	Yes	No	Yes	Yes	Yes	No	$666,800
		Yes	No	No	Yes	Yes	No	Yes	Yes	No	No	$656,800
		Yes	No	No	Yes	No	Yes	Yes	Yes	Yes	No	$546,000
		Yes	No	No	Yes	Yes	Yes	No	Yes	Yes	No	$581,800
		Yes	No	No	Yes	No	Yes	Yes	Yes	No	No	$536,000
		Yes	No	No	Yes	Yes	Yes	No	Yes	No	No	$571,800
		Yes	No	No	Yes	No	No	Yes	Yes	Yes	No	$516,000
		Yes	No	No	Yes	Yes	No	No	Yes	Yes	No	$551,800
		Yes	No	No	Yes	No	No	Yes	Yes	No	No	$506,000
		Yes	No	No	Yes	Yes	No	No	Yes	No	No	$541,800
		Yes	No	No	Yes	No	Yes	No	Yes	Yes	No	$431,000
		Yes	No	No	Yes	No	Yes	No	Yes	No	No	$421,000
		Yes	No	No	Yes	No	No	No	Yes	Yes	No	$401,000
		Yes	No	No	Yes	No	No	No	Yes	No	No	$391,000

	Recommended Infrastructure Upgrades	Mechanical Building	New Water System	Loop Addition Modification	Ground Source Cooling Loop	Water Meters	Fire Hydrants	Emergency Generator	Redrilling the Cold Well	Rehabilitate the Hot Well	Backup Arsenic Treatment	Total
Alternative Description	Base Estimate of Cost	$171,000	$259,000	$78,000	$32,000	$150,800	$30,000	$115,000	$48,000	$10,000	$36,000	
2B - Treatment by RO	$252,000	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	$1,067,800
		Yes	Yes	No	Yes	Yes	Yes	Yes	Yes	No	No	$1,057,800
		Yes	Yes	No	Yes	Yes	No	Yes	Yes	Yes	No	$1,037,800
		Yes	Yes	No	Yes	Yes	No	Yes	Yes	No	No	$1,027,800
		Yes	Yes	No	Yes	No	Yes	Yes	Yes	Yes	No	$917,000
		Yes	Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	$952,800
		Yes	Yes	No	Yes	No	Yes	Yes	Yes	No	No	$907,000
		Yes	Yes	No	Yes	Yes	Yes	No	Yes	No	No	$942,800
		Yes	Yes	No	Yes	No	No	Yes	Yes	Yes	No	$887,000
		Yes	Yes	No	Yes	Yes	No	No	Yes	Yes	No	$922,800
		Yes	Yes	No	Yes	No	No	Yes	Yes	No	No	$877,000
		Yes	Yes	No	Yes	Yes	No	No	Yes	No	No	$912,800
		Yes	Yes	No	Yes	No	Yes	No	Yes	Yes	No	$802,000
		Yes	Yes	No	Yes	No	Yes	No	Yes	No	No	$792,000
		Yes	Yes	No	Yes	No	No	No	Yes	Yes	No	$772,000
		Yes	Yes	No	Yes	No	No	No	Yes	No	No	$762,000
		Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	$886,800
		Yes	No	Yes	Yes	Yes	Yes	Yes	Yes	No	No	$876,800
		Yes	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	$856,800
		Yes	No	Yes	Yes	Yes	No	Yes	Yes	No	No	$846,800
		Yes	No	Yes	Yes	No	Yes	Yes	Yes	Yes	No	$736,000
		Yes	No	Yes	Yes	Yes	Yes	No	Yes	Yes	No	$771,800
		Yes	No	Yes	Yes	No	Yes	Yes	Yes	No	No	$726,000
		Yes	No	Yes	Yes	Yes	Yes	No	Yes	No	No	$761,800
		Yes	No	Yes	Yes	No	No	Yes	Yes	Yes	No	$706,000
		Yes	No	Yes	Yes	Yes	No	No	Yes	Yes	No	$741,800
		Yes	No	Yes	Yes	No	No	Yes	Yes	No	No	$696,000
		Yes	No	Yes	Yes	Yes	No	No	Yes	No	No	$731,800
		Yes	No	Yes	Yes	No	Yes	No	Yes	Yes	No	$621,000
		Yes	No	Yes	Yes	No	Yes	No	Yes	No	No	$611,000
		Yes	No	Yes	Yes	No	No	No	Yes	Yes	No	$591,000
		Yes	No	Yes	Yes	No	No	No	Yes	No	No	$581,000
		Yes	No	No	Yes	Yes	Yes	Yes	Yes	Yes	No	$808,800
		Yes	No	No	Yes	Yes	Yes	Yes	Yes	No	No	$798,800
		Yes	No	No	Yes	Yes	No	Yes	Yes	Yes	No	$778,800
		Yes	No	No	Yes	Yes	No	Yes	Yes	No	No	$768,800
		Yes	No	No	Yes	No	Yes	Yes	Yes	Yes	No	$658,000
		Yes	No	No	Yes	Yes	Yes	No	Yes	Yes	No	$693,800
		Yes	No	No	Yes	No	Yes	Yes	Yes	No	No	$648,000
		Yes	No	No	Yes	Yes	Yes	No	Yes	No	No	$683,800
		Yes	No	No	Yes	No	No	Yes	Yes	Yes	No	$628,000
		Yes	No	No	Yes	Yes	No	No	Yes	Yes	No	$663,800
		Yes	No	No	Yes	No	No	Yes	Yes	No	No	$618,000
		Yes	No	No	Yes	Yes	No	No	Yes	No	No	$653,800
		Yes	No	No	Yes	No	Yes	No	Yes	Yes	No	$543,000
		Yes	No	No	Yes	No	Yes	No	Yes	No	No	$533,000
		Yes	No	No	Yes	No	No	No	Yes	Yes	No	$513,000
		Yes	No	No	Yes	No	No	No	Yes	No	No	$503,000

	Recommended Infrastructure Upgrades	Mechanical Building	New Water System	Loop Addition Modification	Ground Source Cooling Loop	Water Meters	Fire Hydrants	Emergency Generator	Redrilling the Cold Well	Rehabilitate the Hot Well	Backup Arsenic Treatment	Total
Alternative Description	Base Estimate of Cost	$171,000	$259,000	$78,000	$32,000	$150,800	$30,000	$115,000	$48,000	$10,000	$36,000	
3 - Connection to Coleville School	$970,000	Yes	Yes	No	No	Yes	Yes	Yes	No	No	No	$1,695,800
		Yes	Yes	No	No	Yes	Yes	No	No	No	No	$1,580,800
		Yes	Yes	No	No	Yes	No	No	No	No	No	$1,550,800
		Yes	Yes	No	No	No	No	No	No	No	No	$1,400,000
		Yes	Yes	No	No	No	No	Yes	No	No	No	$1,515,000
		Yes	Yes	No	No	No	Yes	Yes	No	No	No	$1,545,000
		Yes	Yes	No	No	Yes	No	Yes	No	No	No	$1,665,800
		Yes	Yes	No	No	No	Yes	No	No	No	No	$1,430,000
		Yes	No	Yes	No	Yes	Yes	Yes	No	No	No	$1,514,800
		Yes	No	Yes	No	Yes	Yes	No	No	No	No	$1,399,800
		Yes	No	Yes	No	Yes	No	No	No	No	No	$1,369,800
		Yes	No	Yes	No	No	No	No	No	No	No	$1,219,000
		Yes	No	Yes	No	No	No	Yes	No	No	No	$1,334,000
		Yes	No	Yes	No	No	Yes	Yes	No	No	No	$1,364,000
		Yes	No	Yes	No	Yes	No	Yes	No	No	No	$1,484,800
		Yes	No	Yes	No	No	Yes	No	No	No	No	$1,249,000
		Yes	No	No	No	Yes	Yes	Yes	No	No	No	$1,436,800
		Yes	No	No	No	Yes	Yes	No	No	No	No	$1,321,800
		Yes	No	No	No	Yes	No	No	No	No	No	$1,291,800
		Yes	No	No	No	No	No	No	No	No	No	$1,141,000
		Yes	No	No	No	No	No	Yes	No	No	No	$1,256,000
		Yes	No	No	No	No	Yes	Yes	No	No	No	$1,286,000
		Yes	No	No	No	Yes	No	Yes	No	No	No	$1,406,800
		Yes	No	No	No	No	Yes	No	No	No	No	$1,171,000

Appendix B

SEHOA Improvement Plans

(RO Anderson Engineering, March 24, 2015)

WATER SYSTEM IMPROVEMENTS

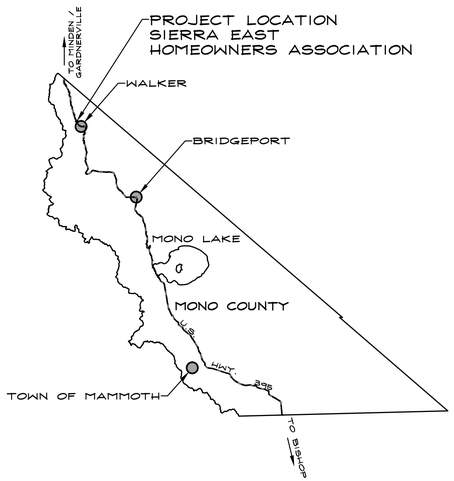
IMPROVEMENT PLANS

FOR

SIERRA EAST HOMEOWNERS ASSOCIATION

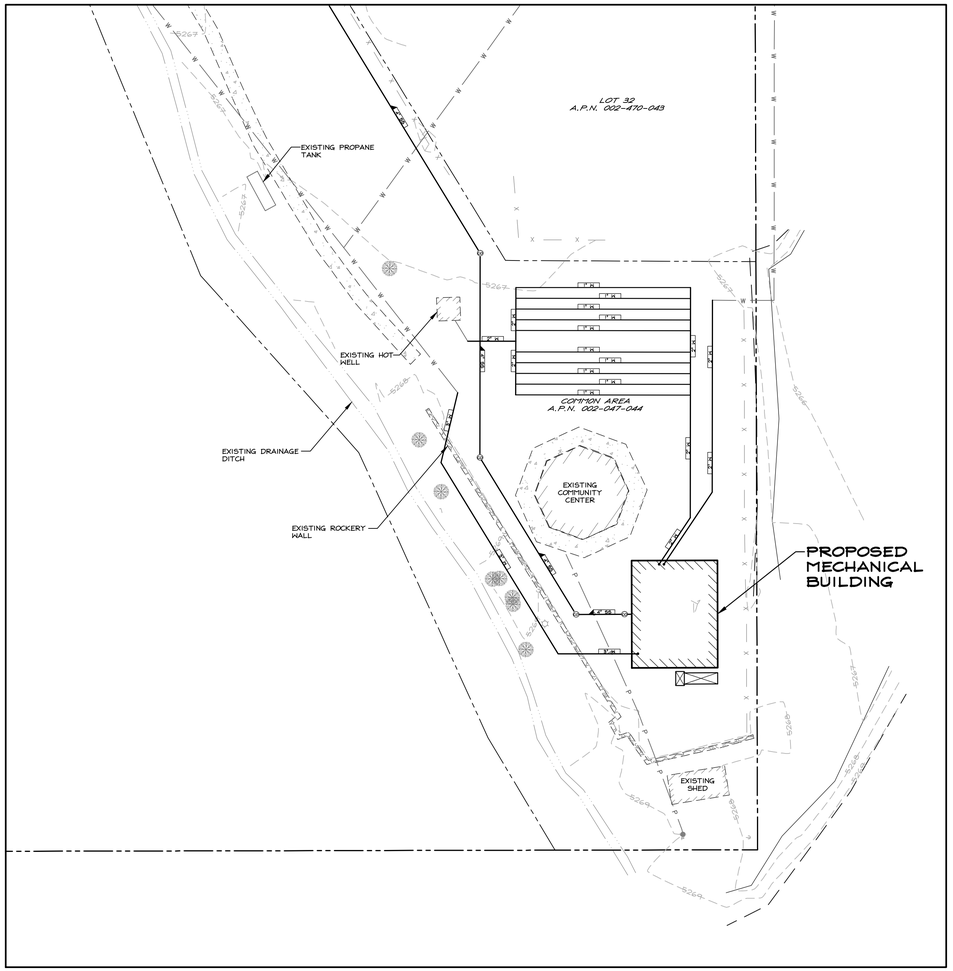
AREA MAP

SCALE: NTS



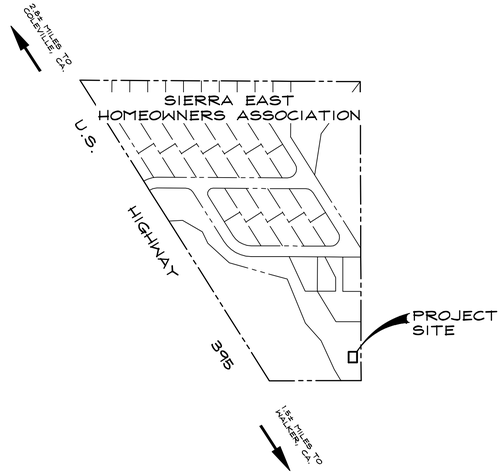
VICINITY MAP

SCALE: NTS



PROJECT LOCATION

SCALE: 1"=20'



LOCATION MAP

SCALE: 1"=200'

PROJECT SUMMARY

TITLE:	WATER SYSTEM IMPROVEMENTS
OWNER/APPLICANT:	SIERRA EAST HOMEOWNERS ASSOCIATION 108952 HIGHWAY 395, UNIT 19 COLEVILLE, CA 96107 PH: (775) 230-0688

SHEET INDEX

NO.	DATE	REVISION BLOCK	BY

R|O|Anderson

1603 ESMERALDA AVENUE / POST OFFICE BOX 2229
MINDEN, NEVADA 89423
PHONE: (775) 782-2322 / FAX: (775) 782-7084
WEB SITE: WWW.ROANDERSON.COM

WATER SYSTEM IMPROVEMENTS

SIERRA EAST HOMEOWNERS ASSOCIATION

COVER SHEET

REGISTERED PROFESSIONAL ENGINEER
KENT R. NEDDENRIEP
C48475
EXP. 06-30-16
CIVIL
STATE OF CALIFORNIA

DRAWN: MAB	JOB: 2088-001
ENGINEER: KRN	DRAWING: SEE PLOT STAMP
SCALE: AS NOTED	SHEET: C01
DATE: 02/10/15	OF: 12 SHEETS

Y:\Clients Files\2088\2088-001\CAD\Engineering\Improvements Plans\2088-001_C01.dwg, 8/4/2015 8:11:02 PM, Mark Bray

SYMBOLS

EXISTING	NEW	
		AIR RELEASE VALVE
		CONIFEROUS TREE
		DIRECTION OF NORTH
		DECIDUOUS TREE
		FIRE DEPARTMENT CONNECTION
		FIRE HYDRANT
		GAS MANHOLE
		GAS RISER
		GAS VALVE
		GAS METER
		HANDICAPPED SIGN
		IDENTIFICATION OF SECTION POINTING IN THE DIRECTION IN WHICH THE SECTION IS VIEWED
		SHEET NUMBER THAT THE SECTION APPEARS ON
		IDENTIFICATION OF DETAIL
		SHEET NUMBER THAT THE DETAIL APPEARS ON
INTX	INTX	INTERSECTION SIGN
MERGE	MERGE	MERGING TRAFFIC SIGN
		PARKING LIGHT
PEDX	PEDX	PEDESTRIAN CROSSING SIGN
		PERCOLATION TEST PIT LOCATION
		POST INDICATOR VALVE
		POWER GUY ANCHOR
		POWER GUY POLE
		POWER HAND HOLE
		POWER MANHOLE
		POWER METER
		POWER POLE
		POWER RISER
		REVISION NUMBER
		SANITARY SEWER CLEAN OUT
		SANITARY SEWER MANHOLE (48")
		SANITARY SEWER LATERAL
SCHOOL	SCHOOL	SCHOOL ZONE SIGN
5 MPH	5 MPH	SPEED LIMIT SIGN
STOP	STOP	STOP SIGN
		STORM DRAIN CATCH BASIN (24")
		STORM DRAIN CURB INLET (24")
		STORM DRAIN CULVERT INVERT
		STORM DRAIN DROP INLET (24")
		STORM DRAIN DROP INLET (24")
		STORM DRAIN MANHOLE (48")
ST	ST	STREET SIGN
		STREET LIGHT
		SURVEY CONTROL POINT
		TELEPHONE GUY ANCHOR
		TELEPHONE GUY POLE
		TELEPHONE HAND HOLE
		TELEPHONE MANHOLE
		TELEPHONE POLE
		TELEPHONE RISER
		TELEVISION GUY ANCHOR
		TELEVISION HAND HOLE
		TELEVISION MANHOLE
		TELEVISION RISER
		TRAFFIC HAND HOLE
		TRAFFIC LIGHT
		TRAFFIC MANHOLE
		UTILITY GUY ANCHOR
		UTILITY GUY POLE
		UTILITY POLE
		WATER GATE VALVE
		WATER METER PIT
		WATER RISER
		WELL
YIELD	YIELD	YIELD SIGN
		GRADE ELEVATION
		GRADE DESCRIPTION
		CENTERLINE MONUMENT

ABBREVIATIONS

AASHTO..... AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTATION OFFICIALS
AB..... AGGREGATE BASE
AC..... ASPHALT CONCRETE
ADA..... AMERICANS WITH DISABILITIES ACT OF 1990
ADT..... AVERAGE DAILY TRAFFIC
ALT..... ALTITUDE
ANSI..... AMERICAN NATIONAL STANDARDS INSTITUTE
APN..... ASSESSOR'S PARCEL NUMBER
APPROX..... APPROXIMATELY
APWA..... AMERICAN PUBLIC WORKS ASSOCIATION
ARV..... AIR RELEASE VALVE
ASCE..... AMERICAN SOCIETY OF CIVIL ENGINEERS
ASTM..... AMERICAN SOCIETY OF TESTING AND MATERIALS
@..... AT
AWS..... AMERICAN WELDING SOCIETY
AWWA..... AMERICAN WATER WORKS ASSOCIATION

BC..... BEGIN CURVE
BFE..... BASE FLOOD ELEVATION
BLD..... BUILDING
BW..... BACK OF WALK
BW..... BARBED WIRE

CAP..... CORRUGATED ALUMINUM PIPE
CAPA..... ARCH
C&G..... CURB AND GUTTER
CB..... CATCH BASIN
CC..... CARSON CITY
CF..... CUBIC FOOT
CHL..... CHAIN LINK
CI..... CURB INLET(THROUGH)
CL..... CENTER LINE
CMP..... CORRUGATED METAL PIPE
CO..... CLEAN OUT
COMP..... COMPACTION
CON..... CONIFEROUS
CRN..... CROWN OF ROAD
CSP..... CORRUGATED STEEL PIPE
CSPA..... CORRUGATED STEEL PIPE ARCH
CUL..... CULVERT INVERT
CY..... CUBIC YARD

°..... DEGREES
D..... DIRT
DCCD..... DOUGLAS COUNTY COMMUNITY DEVELOPMENT
DEC..... DECIDUOUS
DG..... DECOMPOSED GRANITE
DI..... DROP INLET
DIA(Ø)..... DIAMETER

E..... EAST
EA..... EACH
EC..... END CURVE
ED..... EDGE
EGL..... ENERGY GRADE LINE
ELEC..... ELECTRICAL
ELEV..... ELEVATION
EP..... EDGE OF PAVEMENT
EPA..... ENVIRONMENTAL PROTECTION AGENCY
EVC..... END VERTICAL CURVE
EX..... EDGE OF WATER EXISTING

F..... FAHRENHEIT
FC..... FACE OF CURB
FC..... FIRE CONNECTION
FEMA..... FEDERAL EMERGENCY MANAGEMENT AGENCY
FF..... FINISHED FLOOR
FG..... FINISHED GRADE
FH..... FIRE HYDRANT
FL..... FLOWLINE
FNC..... FENCE
FND..... FOUND MONUMENT, CORNER OR CONTROL POINT
FS..... FIRE STUB
FT(')..... FOOT(FEET)

G..... GAS
G..... GATE
GA..... GUY ANCHOR
GB..... GRADE BREAK
GID..... GENERAL IMPROVEMENT DISTRICT
GP..... GUY POLE
GPM..... GALLONS PER MINUTE
GR..... GRAVEL
GS..... GROUND SHOT

HDPE..... HIGH DENSITY POLYETHYLENE
HDS..... HYDRAULIC DESIGN SERIES
HEC..... HYDRAULIC ENGINEERING
HERCP..... CIRCULAR
HORIZONTAL ELLIPTICAL
HGL..... REINFORCED CONCRETE PIPE
HH..... HYDRAULIC GRADE LINE
HORIZ..... HAND HOLE
HW..... HORIZONTAL HOG WIRE

ID..... INNER DIAMETER
IE..... INVERT ELEVATION
IN(")..... INCH
INC..... INCORPORATED
INTX..... INTERSECTION
IRRIG..... IRRIGATION
ITE..... INSTITUTE OF TRANSPORTATION ENGINEERS

LAT..... LATERAL
LOS..... LEVEL OF SERVICE
LS..... LUMP SUM
LT..... LIGHT

M..... METER
MAX..... MAXIMUM
MGD..... MILLION GALLONS PER DAY
MGSD..... MINDEN GARDNERVILLE SANITATION DISTRICT
MH..... MANHOLE
MI..... MILE
MIN..... MINIMUM
MISC..... MISCELLANEOUS
MIX..... MIXED
MPH..... MILES PER HOUR
MUTCD..... MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES

N..... NORTH
NAC..... NEVADA ADMINISTRATIVE CODE
NDEP..... NEVADA DIVISION OF ENVIRONMENTAL PROTECTION
NDOT..... NEVADA DEPARTMENT OF TRANSPORTATION
NE..... NORTHEAST
NEC..... NATIONAL ELECTRIC CODE
NFIP..... NATIONAL FLOOD INSURANCE
NSF..... NATIONAL SANITATION FOUND.
NO..... NUMBER
NOAA..... NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
NRCS..... NATIONAL RESOURCE CONSERVATION SERVICE
NRS..... NEVADA REVISED STATUTES
NTS..... NOT TO SCALE
NW..... NORTHWEST
NWS..... NATIONAL WEATHER SERVICE

OC..... ON CENTER
OD..... OUTER DIAMETER
OSHA..... OCCUPATIONAL SAFETY AND HEALTH ACT OF 1970
O/H..... OVERHEAD

±..... PLUS OR MINUS
P..... POWER
PC..... POINT OF CURVATURE
PDL..... PADDLE
PE..... PROFESSIONAL ENGINEER
PED..... PEDESTAL
PEDX..... PEDESTRIAN CROSSING
PK..... PARKING
%..... PERCENT
P/L..... PROPERTY LINE
PMF..... PROBABLE MAXIMUM FLOOD
PNT..... POINT
PNT..... PAINT MARK
PO..... PUSH ON
PSI..... POUNDS PER SQUARE INCH
PT..... POINT OF TANGENCY
PUE..... PUBLIC UTILITY EASEMENT
PVC..... POLYVINYL CHLORIDE

R..... RADIUS
R..... ROCK
R..... RISER
RB..... RIVER BED
RCBC..... REINFORCED CONC. BOXED CULV.
RCP..... REINFORCED CONCRETE PIPE
ROW..... RIGHT OF WAY
RTC..... REGIONAL TRANSPORTATION COMMISSION OF DOUGLAS COUNTY

S..... SIGN
S..... SLOPE
S..... SOUTH
SD..... STORM DRAIN
SDMH..... STORM DRAIN MANHOLE
SDR..... STANDARD DIMENSION RATIO
SE..... SOUTHEAST
SET..... SET MONUMENT, CORNER OR CONTROL POINT
SF..... SQUARE FOOT(FEET)
SPP..... STRUCTURAL PLATE PIPE
SPPA..... STRUCTURAL PLATE PIPE ARCH
SRV..... SERVICE
SS..... SANITARY SEWER
SSMH..... SANITARY SEWER MANHOLE
ST..... STREET
STA..... STATION
STB..... STUB
STD..... STANDARD
SW..... SOUTHWEST
S/W..... SIDEWALK

T..... TELEPHONE
TBC..... TOP BACK OF CURB
TC..... TOP OF CURB
TRB..... TRANSPORTATION RESEARCH BOARD
TOE..... TOE OF SLOPE
TOP..... TOP OF SLOPE
TR..... TREE
TRF..... TRAFFIC CONTROL
TV..... TELEVISION
TYP..... TYPICAL

U..... UTILITY
UBC..... UNIFORM BUILDING CODE
UG..... UNDERGROUND
UMC..... UNIFORM MECHANICAL CODE
UPC..... UNIFORM PLUMBING CODE
USACE..... UNITED STATES ARMY CORPS OF ENGINEERS
USBR..... UNITED STATES BUREAU OF RECLAMATION
USGS..... UNITED STATES GEOLOGICAL SURVEY

V..... VALVE
VA..... VAULT
VC..... VERTICAL CURVE
VG..... VALLEY GUTTER
VERT..... VERTICAL
VPC..... VERTICAL POINT OF CURVATURE
VPT..... VERTICAL POINT OF TANGENCY

W..... WEST
W..... WITH
WEF..... WATER ENVIRONMENT
WL..... FEDERATION
WK..... WALL
WW..... WALKWAY
WATER GATE VALVE

YR..... YEAR

SURVEY CONTROL

ASSUMED DATUM

PROJECT BENCHMARK
FOUND 1/2" IP OPEN
ELEV.=5214.13

ASSUMED BASIS OF BEARING

FROM BENCHMARK #1
TO BENCHMARK #2 S16°09'54"E 887.69'

GENERAL NOTES

- CONTRACTOR SHALL COMPLY WITH ALL FEDERAL, STATE AND LOCAL LAWS DURING THE COURSE OF CONSTRUCTION.
- ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE CONDITIONS OF FEDERAL, STATE, AND LOCAL LAWS, REGULATIONS, PERMITS, AND OTHER APPLICABLE REQUIREMENTS.
- SITE IMPROVEMENT SHALL BE IN ACCORDANCE WITH THE CALIFORNIA BUILDING CODE. WORK ITEMS NOT ADDRESSED IN THE CONTRACT DOCUMENTS SHALL CONFORM TO THE MOST RECENT EDITION OF THE STANDARD SPECIFICATIONS AND STANDARD PLANS OF THE CALIFORNIA DEPARTMENT OF TRANSPORTATION AND ACCEPTED ENGINEERING PRACTICE.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE LOCATION AND/OR PROTECTION OF ALL EXISTING AND PROPOSED PIPING, UTILITIES, STRUCTURES, ADJACENT STREETS, AND IMPROVEMENTS DURING THE PERIOD OF CONSTRUCTION.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL EXCAVATION AND SHORING PROCEDURES
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING THE ENGINEER OF ANY DISCREPANCIES IN THE IMPROVEMENT PLANS.
- THE PAVEMENT SURFACE WHEN COMPLETED, SHALL BE SMOOTH, DENSE, WELL BONDED AND OF UNIFORM TEXTURE AND APPEARANCE. ALL AREAS SHALL DRAIN AND BE FREE OF STANDING WATER.

GRADING

- ALL WORK SHALL BE DONE IN ACCORDANCE WITH THE CALIFORNIA BUILDING CODE, OSHA REQUIREMENTS FOR EXCAVATION, AND SPECIAL REQUIREMENTS OF THE CONTRACT DOCUMENTS. VIOLATIONS WILL RESULT IN THE STOPPAGE OF ALL WORK UNTIL THE VIOLATION IS CORRECTED.
- NO WORK SHALL BE STARTED WITHOUT FIRST NOTIFYING THE ENGINEER AT (775) 782-2322 AT LEAST 2 WORKING DAYS BEFORE WORK IS COMMENCED.
- PROTECTIVE MEASURES AND TEMPORARY DRAINAGE PROVISIONS SHALL BE USED TO PROTECT ADJOINING PROPERTIES DURING CONSTRUCTION OF IMPROVEMENTS.
- DUST SHALL BE CONTROLLED BY THE CONTRACTOR TO THE SATISFACTION OF THE OWNER.
- ALL STREETS & DRIVEWAYS SHALL BE MAINTAINED FREE OF DUST, MUD AND OTHER DEBRIS CAUSED BY GRADING AND OTHER SITE IMPROVEMENT ACTIVITIES.
- THE CONTRACTOR'S SURVEYOR SHALL SET GRADE STAKES FOR ALL DRAINAGE DEVICES AND THE CONTRACTOR SHALL OBTAIN INSPECTION BEFORE PLACING CONCRETE OR STRUCTURES.
- FINISHED GRADING FOR SITE IMPROVEMENTS AND INSTALLATION OF EROSION CONTROL AND REVEGETATION MEASURES WILL BE COMPLETED, INSPECTED AND APPROVED PRIOR TO ISSUANCE BY THE COUNTY OF A NOTICE OF COMPLETION.
- IN THE EVENT OF CHANGES ARISING DURING CONSTRUCTION, THE CONTRACTOR SHALL PROPOSE ONE OR MORE ALTERNATE SOLUTIONS TO THE ENGINEER FOR HIS REVIEW. NO CHANGES IN THE DESIGN WILL BE PERMITTED UNLESS WRITTEN APPROVAL IS GIVEN BY THE ENGINEER.
- IMPROVEMENTS SHALL BE CONSTRUCTED IN CONFORMANCE WITH THE RECOMMENDATIONS OF THE GEOTECHNICAL REPORT FOR THE PROJECT. IN THE EVENT OF A DISCREPANCY BETWEEN THE GEOTECHNICAL REPORT AND NOTES HEREIN, THE GEOTECHNICAL REPORT SHALL PREVAIL.
- MAINTAIN EROSION CONTROL PROTECTION UNTIL PERMANENT STABILIZATION IS INSTALLED. MODIFICATIONS TO MEASURES INSTALLED MAY BE REQUIRED BY THE ENGINEER IF MEASURES INSTALLED PROVE TO BE INEFFECTIVE FOR EROSION CONTROL.
- EROSION CONTROL:
  - ~ A STANDBY CREW FOR EMERGENCY WORK SHALL BE AVAILABLE AT ALL TIMES. NECESSARY MATERIALS SHALL BE AVAILABLE ON-SITE AND STOCKPILED AT APPROVED LOCATIONS TO FACILITATE RAPID CONSTRUCTION OF TEMPORARY DEVICES OR TO REPAIR DAMAGED EROSION CONTROL MEASURES.
  - ~ AFTER A RAINSTORM, ALL SILT AND DEBRIS SHALL BE REMOVED FROM CHECK BERMS AND DESILTING FACILITIES SO AS NOT TO AFFECT THEIR ABILITY TO PERFORM THE INTENDED FUNCTION. GRADED SLOPE SURFACE PROTECTION MEASURES DAMAGED DURING THE RAINSTORM SHALL ALSO BE REPAIRED.
  - ~ FILL SLOPES AT THE PROJECT PERIMETER MUST DRAIN AWAY FROM THE TOP OF THE SLOPE AT THE CONCLUSION OF EACH WORKING DAY.
- DISPOSAL OF STUMPS AND BRUSH SHALL EITHER BE CHIPPED ON-SITE, OR TAKEN TO A FACILITY FOR GRINDING AND REUSE, OR LANDFILLED. DOCUMENTATION OF ACCEPTABLE DISPOSITION OF GRUBBED MATERIALS SHALL BE PROVIDED TO THE ENGINEER PRIOR TO DISPOSAL.
- ORGANIC LADEN SOILS SHALL BE STRIPPED AND STORED FOR USE AS TOPSOIL DURING FINAL GRADING.
- ALL DISTURBED AREAS, EXCEPT AREAS OF RIP-RAP, CONCRETE & ROADWAYS SHALL BE STABILIZED BY SEEDING WITH 16#/ACRE CRESTED WHEAT AND 1 TON PER ACRE STRAW MULCH.

UTILITIES

- ALL WORK SHALL CONFORM TO THE IMPROVEMENT STANDARDS OF THE RESPONSIBLE UTILITY.
- ALL TRAFFIC CONTROL AND BARRICADING WITHIN THE PUBLIC RIGHT-OF-WAYS SHALL CONFORM TO PART VI OF THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES, LATEST EDITION. NO STREET CLOSURES WILL BE ALLOWED WITHOUT PRIOR WRITTEN APPROVAL OF A TRAFFIC CONTROL PLAN BY THE MONO COUNTY ENGINEERING DIVISION & CALTRANS.
- THE CONTRACTOR SHALL CALL MONO COUNTY FORTY-EIGHT (48) HOURS PRIOR TO START OF CONSTRUCTION. THE CONTRACTOR SHALL CALL TWENTY-FOUR (24) HOURS PRIOR TO REQUIRED INSPECTIONS AND TESTING, INCLUDING COMPACTION AND PAVING.
- THE APPROVED PLAN MUST BE ON THE JOB SITE AT ALL TIMES.
- ALL NEW WATER MAINS ARE TO BE PRESSURE TESTED IN ACCORDANCE WITH THE CONTRACT DOCUMENTS.
- WATERLINE 4" AND LARGER SHALL BE PVC AWWA C900, CLASS 150 UNLESS NOTED OTHERWISE.
- WATER LINE DISINFECTION SHALL BE IN CONFORMANCE WITH AWWA C651.
- THESE PLANS MAKE NO REPRESENTATION REGARDING THE LOCATION OF ALL CROSSINGS REQUIRING ADDITIONAL PROTECTION. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO IDENTIFY CROSSINGS REQUIRING PROTECTION PRIOR TO, OR DURING CONSTRUCTION AND PROVIDE ADEQUATE PROTECTION.
- ALL UNSPECIFIED CONCRETE SHALL BE 4000 PSI WITH 6% AIR ENTRAINMENT ±1.5%.
- EXISTING UTILITY LOCATIONS SHOWN ON THE PLANS ARE APPROXIMATE ONLY. CONTRACTOR SHALL DETERMINE THE EXACT HORIZONTAL AND VERTICAL LOCATION OF ALL UNDERGROUND UTILITIES PRIOR TO COMMENCING CONSTRUCTION AND SHALL NOTIFY THE ENGINEER OF ANY CONFLICTS.
- NO REPRESENTATION IS MADE THAT ALL EXISTING UTILITIES ARE SHOWN AND THE ENGINEER ASSUMES NO RESPONSIBILITY FOR UTILITY LOCATIONS. CALL USA DIG AT 1-800-227-2600 BEFORE COMMENCING EXCAVATION.
- WHERE WATERLINE PIPE DEFLECTION IS NECESSARY, DEFLECT PIPE PER MANUFACTURER'S RECOMMENDATIONS.
- MAINTAIN 3.5' COVER OVER WATERLINE EXCEPT WHERE REDUCTION TO 36" MINIMUM IS NECESSARY TO AVOID CONFLICTS, AS DIRECTED BY THE ENGINEER.
- COORDINATE WITH AND/OR INSTALL GAS, ELECTRICAL, & TV PER PLANS FROM THOSE UTILITY COMPANIES.

FIRE PROTECTION

- ANY GATES OR BARRIERS ACROSS REQUIRED FIRE DEPARTMENT ACCESS WILL REQUIRE A SEPARATE SUBMITTAL AND APPROVAL PRIOR TO CONSTRUCTION.
- DURING CONSTRUCTION OF THE MAINTENANCE BUILDING THE CONTRACTOR SHALL PROVIDE ACCESS ACCEPTABLE TO THE FIRE DEPARTMENTS.

SCHEDULE OF WORK

THE WATER SYSTEM AT THE SIERRA EAST HOMEOWNERS ASSOCIATION IS CONTINUALLY IN USE SERVING DOMESTIC AND IRRIGATION WATER.

THE CONTRACTOR SHALL STAGE AND SEQUENCE HIS CONSTRUCTION TO MINIMIZE THE NUMBER OF WATER SYSTEM SHUTDOWNS AND THE LENGTH OF TIME THE WATER IS SHUT DOWN. FURTHERMORE, ALL WATER SYSTEM SHUTDOWNS SHALL FOLLOW THE FOLLOWING PROCEDURE.

DOMESTIC SYSTEM

- ALL SHUTDOWNS OF THE DOMESTIC SYSTEM SHALL BE LESS THAN 16 HOURS IN DURATION.
- ALL WORK ON THE EXISTING WATER SYSTEM SHALL FOLLOW THE PROCEDURES SET FORTH IN AWWA STANDARDS C650, FACILITIES DISINFECTION, SECTION 10, DISINFECTION PROCEDURES WHEN CUTTING INTO OR REPAIRING EXISTING MAINS.
- THE OWNER SHALL BE GIVEN WRITTEN NOTICE OF THE SCHEDULED SHUTDOWN TWO BUSINESS DAYS IN ADVANCE OF THE SHUTDOWN AND ADDITIONALLY 30 MINUTES PRIOR TO THE SHUTDOWN AND RE-PRESSURIZATION THE OWNER'S ON SITE REPRESENTATIVE SHALL BE NOTIFIED IN PERSON.

IRRIGATION SYSTEM

- ALL SHUTDOWNS OF THE IRRIGATION SYSTEM THAT OCCUR DURING THE IRRIGATION SEASON SHALL BE LESS THAN 62 HOURS IN DURATION.
- CONSECUTIVE SHUTDOWNS DURING THE IRRIGATION SEASON MUST BE SEPARATED BY A PERIOD WHERE THE IRRIGATION SYSTEM IS OPERATIONAL OF AT LEAST TWICE THE LENGTH OF THE SHUT DOWN.
- THE OWNER SHALL BE GIVEN WRITTEN NOTICE OF THE SCHEDULED SHUTDOWN TWO BUSINESS DAYS PRIOR TO THE SHUTDOWN. ADDITIONALLY, 30 MINUTES PRIOR TO THE SHUTDOWN AND RE-PRESSURIZATION THE OWNERS ON SITE REPRESENTATIVE SHALL BE NOTIFIED IN PERSON.
- FLUSHING IS REQUIRED PRIOR TO PLACING THE IRRIGATION SYSTEM BACK INTO SERVICE.

ALL IMPROVEMENTS SHALL BE CONSTRUCTED, STARTUP ACCEPTED & TESTING ACCEPTED BY THE OWNER AS SUBSTANTIALLY COMPLETE PRIOR TO SWITCHING TO THE NEW WATER SYSTEM.

DISINFECTION

ALL PIPING, TANKS AND PLUMBING APPURTENANCES THAT CONTACT DOMESTIC WATER MUST BE DISINFECTED. DISINFECTION OF THE TANKS SHALL BE IN ACCORDANCE WITH AWWA STANDARDS C652-92 OR THE MOST RECENT VERSION. DISINFECTION OF WATER LINES AND PUMPS AND SHALL BE IN ACCORDANCE WITH AWWA STANDARD C651. DISINFECTION OF THE ARSENIC REMOVAL SYSTEM AND ASSOCIATED PIPING SHALL NOT BE MADE WITH CHLORINE OR SODIUM HYPOCHLORITE.

PRESSURE TESTING & LEAK TESTING

- PRIOR TO SUBSTANTIAL COMPLETION ALL PIPING AND APPURTENANCES SHALL BE TESTED FOR LEAKS IN ACCORDANCE WITH THE SPECIFICATIONS.

LINE TYPES

EXISTING	NEW	
		BUILDING ENVELOPE
		CENTERLINE OF RIGHT-OF-WAY
100	100	CONTOUR - FIVE FOOT INTERVAL
99	99	CONTOUR - ONE FOOT INTERVAL
		EASEMENT
		EDGE OF PAVEMENT AND/OR CURB
		FLOW LINE
GAS	GAS	GAS LINE
DOM	DOM	WATER LINE
E	E	ELECTRICAL LINE
SS	SS	SANITARY SEWER MAIN
		COMMON UTILITY TRENCH
SD	SD	STORM DRAIN LINE
X X X	X X X	FENCE

NOTE: NOT ALL SYMBOLS, ABBREVIATIONS, LINE TYPES AND GENERAL NOTES LISTED MAY BE APPLICABLE TO THIS PROJECT.

NO.	DATE	REVISION BLOCK	BY

R|O|Anderson
1603 ESMERALDA AVENUE / POST OFFICE BOX 2229
MINDEN, NEVADA 89423
PHONE: (775) 782-2322 / FAX: (775) 782-7084
WEB SITE: WWW.ROANDERSON.COM

WATER SYSTEM IMPROVEMENTS

SIERRA EAST HOMEOWNERS ASSOCIATION

LEGEND, NOTES and ABBREVIATIONS

REGISTERED PROFESSIONAL ENGINEER
KENT R. NEUDEMAR PE
C48475
EXP. 06-30-16
CIVIL
STATE OF CALIFORNIA

DRAWN: MAB	JOB: 2088-001
ENGINEER: KRN	DRAWING: SEE PLOT STAMP
SCALE: AS NOTED	SHEET: C02
DATE: 02/10/15	OF: 12 SHEETS

Y:\Clients Files\2088\2088-001\CAD\Engineering\Improvement Plans\2088-001-C02.dwg 3/9/2015 8:11:39 PM Mark Brow

SEE THIS SHEET - RIGHT
MATCH LINE STATION

S 89°43'16" E - 70.00'

SSCO #3
RIM:66.8
IE:64.3

COOLING LOOP

CUT AND CAP EXIST. WATER

EXISTING HOT WELL

2" WATER FROM COLD WELL

TIE IN NEW 2" W TO EXISTING 2" W AT POINT OF DEMOLITION

BEGIN NEW 2" W, CONNECT TO EXISTING 2" W AT POINT OF DEMOLITION

N 41°47'55" W - 66.34'

CUT AND CAP EXIST. WATER

CONST 57 LF OF 4" SS @ S=0.1% MIN.

3.0'-TYP.

10.0' MIN.

48.84'

EXISTING YARD HYDRANT

SSCO #3
RIM:67.5
IE:64.9

CONST 80 LF OF NEW 2" W

CONST 78 LF OF NEW 2" W

EXISTING DRAINAGE DITCH

BEGIN NEW 3" W, CONNECT TO EXISTING 3" W AT POINT OF DEMOLITION

EXISTING COMMUNITY CENTER

S 00°09'30" E - 164.38'

11.0'

EXISTING YARD HYDRANT

S 24°21'37" E - 87.51'

4" SS

CONST 51 LF OF 4" SS @ S=0.1% MIN.

SSCO #2
RIM:68.0
IE:65.4

SSCO #1
RIM:68.5
IE:65.5

PROPOSED MECHANICAL BUILDING
F.F.=5269.0'

30'

CONST 80 LF OF NEW 3" W

EXISTING YARD HYDRANT

CONST 14 LF OF 4" SS @ S=0.1% MIN.

24'

11.0'

NEW EMERGENCY GENERATOR

50.9'

EXISTING ROCKERY WALL, TO REMAIN

EXISTING SHED

N 30°51'20" W - 36.63'

TOP OF SLOPE

S 89°53'00" W - 56.58'

TOP OF SLOPE

SCALE: 1"=10'

CONST 13 LF OF 4" SS AT 0.01% MIN.

EX. FG=
65.3

EX. IE=63.3
(ASSUMED ELEVATION, FIELD VERIFY PRIOR TO CONSTRUCTION)

SSCO #4
RIM:66.0
IE:63.4

CONST 91 LF OF 4" SS @ S=0.1% MIN.

4" SS

5.0'-TYP.

MATCH LINE STATION
SEE THIS SHEET - LEFT

NO.	DATE	REVISION BLOCK	BY

SCALE: 1"=10'

R|O|Anderson
WWW.ROANDERSON.COM

NEVADA
1603 Esmeralda Ave
P.O. Box 2229
Minden, NV 89423
p 775.782.2322
f 775.782.7084

CALIFORNIA
595 Tahoe Keys Blvd
Suite A-2
South Lake Tahoe, CA 96150
p 530.600.1660
f 775.782.7084

WATER SYSTEM IMPROVEMENTS

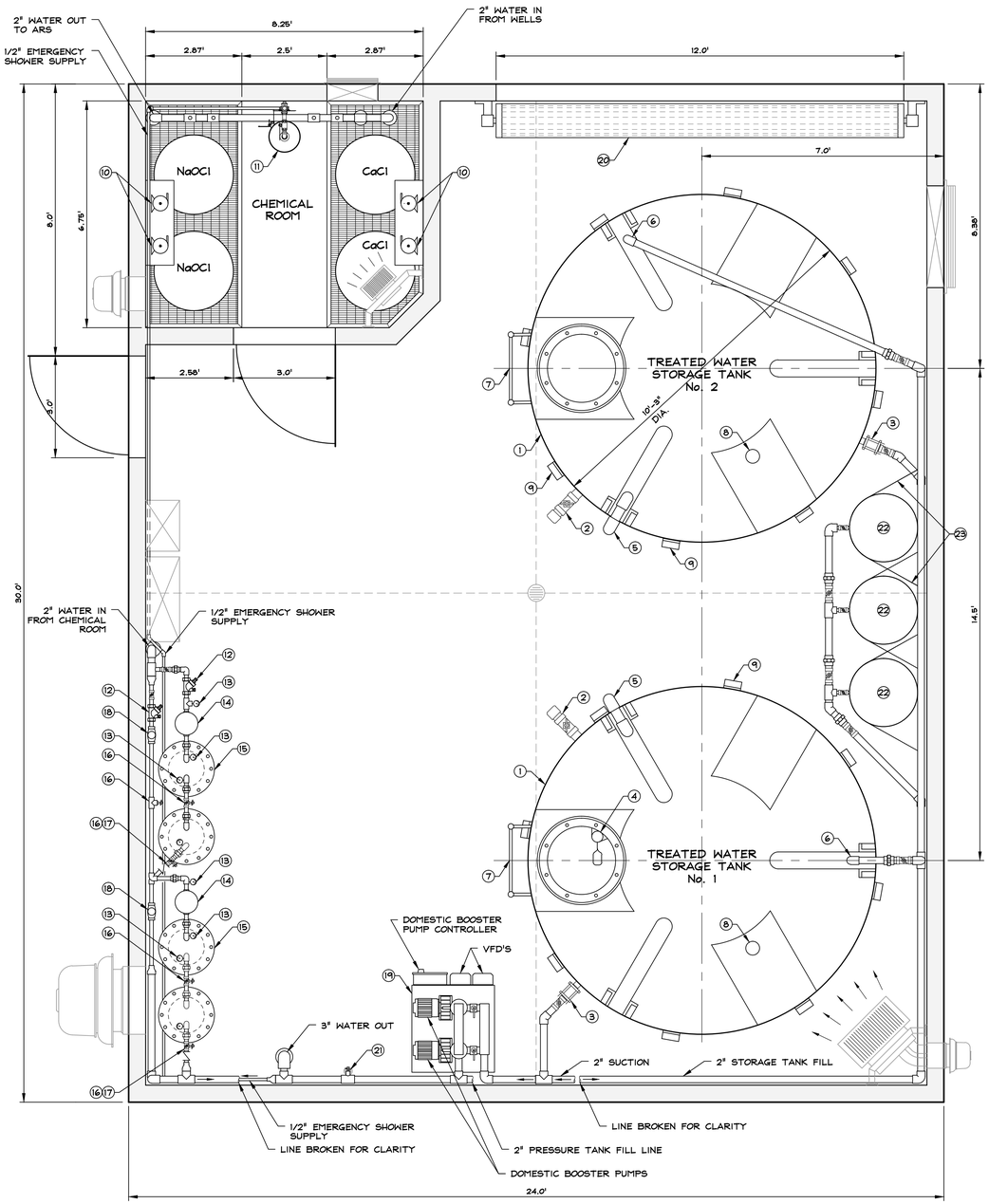
SIERRA EAST HOMEOWNERS ASSOCIATION

SITE and UTILITY PLAN

REGISTERED PROFESSIONAL ENGINEER
KENT R. NEDDENRIEP
EXP. 06-30-16
CIVIL
STATE OF CALIFORNIA
C48475

DRAWN: MCR	JOB: 2088-001
ENGINEER: KRN	DRAWING: SEE PLOT STAMP
SCALE: AS NOTED	SHEET: C03
DATE: 01/20/15	OF: 12 SHEETS

SCALE: 1/2"=1'-0"



WATER TREATMENT PLAN

SCALE: 1/2"=1'-0"

TANK No. 1 SCHEDULE:

0" – MANWAY AND LADDER
35" – SEISMIC ANCHOR
45" – 2" FLEX. CONN. TANK OUTLET W/ PVC BALL VALVE
80" – SEISMIC ANCHOR
120" – TANK VENT WITH SCREEN
125" – SEISMIC ANCHOR
170" – SEISMIC ANCHOR
180" – 2" PVC TANK FILL LINE W/ PVC BALL VALVE
215"– SEISMIC ANCHOR
260" – SEISMIC ANCHOR
300" – REVERSE LEVEL SIGHT GAUGE
305" – SEISMIC ANCHOR
315" – 2" DRAIN WITH PVC BALL VALVE
350" – SEISMIC ANCHOR

TANK No. 2 SCHEDULE:

0" – MANWAY AND LADDER
35" – SEISMIC ANCHOR
45" – 2" DRAIN WITH PVC BALL VALVE
60" – REVERSE LEVEL SIGHT GAUGE
80" – SEISMIC ANCHOR
120" – TANK VENT WITH SCREEN
125" – SEISMIC ANCHOR
157.5"– 2" FLEX. CONN. TANK OUTLET W/ PVC BALL VALVE
170" – SEISMIC ANCHOR
215"– SEISMIC ANCHOR
260" – SEISMIC ANCHOR
300" – 2" PVC TANK FILL LINE W/ PVC BALL VALVE
305" – SEISMIC ANCHOR
350" – SEISMIC ANCHOR

TANK FLOAT TREE

EQUIPMENT SCHEDULE:

1. 5,000 GALLON CROSS LINKED POLYETHYLENE POTABLE WATER STORAGE TANK.
2. 2" DRAIN WITH PVC BALL VALVE
3. 2" FLEXIBLE CONNECTION TANK OUTLET WITH PVC BALL VALVE
4. PVC FLOAT TREE
5. REVERSE LEVEL SIGHT GAUGE
6. 2" PVC TANK FILL LINE WITH PVC BALL VALVE
7. FRP LADDER AND MANWAY WITH EMERGENCY VENT
8. TANK VENT WITH SCREEN
9. SEISMIC ANCHORS FOR TANKS

   (ITEMS 1 – 9 PROVIDED BY TANK MANUFACTURER)
10. LMI CHEMICAL METERING PUMP, MODEL A151-928HI WITH 0.006-0.065 GPH @ 110 PSI, 120 VAC SERVICE
11. EMERGENCY SHOWER AND EYE WASH STATION AND STAINLESS STEEL BRADLEY WALL MOUNT EYE WASH/SHOWER STATION S19-3105B, OR APPROVED EQUAL
12. GRISWOLD CONTROLS FLOW CONTROL VALVE, MODEL "K VALVE", 1"LB812-20, LEAD FREE BRASS VALVE, 20 GPM, 7.4 FOOT HEAD LOSS, OR APPROVED EQUAL.
13. PRESSURE GAUGE WITH BALL VALVE
14. PRE-FILTER
15. MEL CHEMICAL ISOLUX ARSENIC ADSORPTION SYSTEM WITH DUAL ADSORPTION CANNISTERS IN LEAD-LAG CONFIGURATION, 20 GPM CAPACITY, OR APPROVED EQUAL.
16. SAMPLE TAP, 1/2" WITH SMOOTH NOSE BIBB
17. 1" PVC BALL CHECK VALVE
18. FLOW METER WITH TOTALIZER AND RATE OF FLOW
19. SKID MOUNTED GOULDS AQUABOOST DUPLEX PACKAGED SYSTEM VARIABLE SPEED MODEL 2A308FVS WITH PUMP CONTROLLER AND VFD's, OR APPROVED EQUAL.
20. 12'x10' ROLL UP METAL DOOR
21. 2" PRESSURE RELIEF VALVE SET TO RELIEF AT 75 PSI, DIRECT VALVE DISCHARGE TOWARDS FLOOR DRAIN
22. 120 GALLON PRESSURE TANK, FLEXCON MODEL 1120-PC 366, OR APPROVED EQUAL
23. SEISMIC CABLE RESTRAINTS

GENERAL WATER TREATMENT NOTES:

- ALL PIPE PENETRATIONS THROUGH FLOOR SLAB TO BE IN PVC SCHEDULE 40 SLEEVE. SEE STRUCTURAL PLANS FOR PIPES UNDER FOOTINGS.
- ALL ABOVE GROUND JOINTS IN COPPER PIPE TO BE MADE WITH PROPER FITTINGS SOLDERED OR BRAZED. ALL BELOW GROUND JOINTS TO BE MADE WITH WROUGHT COPPER BRAZED FITTINGS AND THE NUMBER OF JOINTS SHALL BE LIMITED TO THE MINIMUM NUMBER POSSIBLE.
- UNLESS OTHERWISE SPECIFIED ALL PIPE SHALL BE SCHEDULE 80, PVC.
- ALL PIPE SUPPORTS TO BE ATTACHED TO WALL UNLESS OTHERWISE SPECIFIED AND TO HAVE 2 SUPPORTS MINIMUM FOR EACH STRAIGHT RUN OF PIPE PLUS ADDITIONAL SUPPORTS SO THAT NO TWO SUPPORTS ARE MORE THAN 10' APART.
- ALL WATER VALVES SHALL BE 1/4 TURN PVC BALL VALVES UNLESS OTHERWISE SPECIFIED.
- IDENTIFICATION LABELS IN ACCORDANCE WITH THE CALIFORNIA PLUMBING CODE ARE REQUIRED ON ALL PIPING WITHIN THE BUILDING.
- ALL VALVES ON CHEMICAL PROCESS LINES SHALL BE VENTED PVC BALL VALVES, UNLESS OTHERWISE NOTED.

EQUIPMENT ANCHORAGE NOTES:

ALL MECHANICAL AND ELECTRICAL EQUIPMENT SHALL BE ANCHORED OR BRACED TO MEET THE HORIZONTAL AND VERTICAL FORCES PRESCRIBED IN THE 2007 CBC, SECTION 1614A.1.13 AND ASCE 7-05 SECTIONS 13.3, 13.4, 13.6, AND CHAPTER 6.

THE ATTACHMENT OF THE FOLLOWING ITEMS SHALL BE DESIGNED TO RESIST THE FORCES PRESCRIBED ABOVE, BUT NEED NOT BE DETAILED ON THE PLANS, AND THE PROJECT INSPECTOR WILL VERIFY THAT THESE ITEMS (EQUIPMENT) HAVE BEEN ANCHORED:

A. EQUIPMENT WEIGHING LESS THAN 400 POUNDS SUPPORTED DIRECTLY ON THE FLOOR OR ROOF.
B. FURNITURE REQUIRED TO BE ATTACHED IN ACCORDANCE WITH ASCE 7-05, SECTION 13.5.
C. TEMPORARY OR MOVABLE EQUIPMENT WITH FLEXIBLE CONNECTION TO POWER OR UTILITIES.
D. EQUIPMENT WEIGHING LESS THAN 20 POUNDS SUPPORTED BY VIBRATION ISOLATORS.
E. EQUIPMENT WEIGHING LESS THAN 20 POUNDS SUSPENDED FROM A ROOF OR FLOOR OR HUNG FROM A WALL.

FOR THOSE ELEMENTS THAT DO NOT REQUIRE DETAILS ON THE APPROVED DRAWINGS, THE INSTALLATION SHALL BE SUBJECT TO THE APPROVAL OF THE MECHANICAL/ELECTRICAL ENGINEER.

PIPING, DUCTWORK, AND ELECTRICAL DISTRIBUTION SYSTEM BRACING NOTE

PIPING, DUCTWORK, AND ELECTRICAL DISTRIBUTION SYSTEMS SHALL BE BRACED TO RESIST THE FORCES PRESCRIBED IN ASCE 7-05 SECTION 13.3 AS DEFINED IN ASCE 7-05 SECTION 13.6.8, 13.6.7, AND 13.6.5.5, ITEM 6, RESPECTIVELY.

THE BRACING AND ATTACHMENTS TO THE STRUCTURE SHALL COMPLY WITH ONE OF THE OSHPD PRE-APPROVALS WITH AN OPA #, SUCH AS MASON INDUSTRIES (OPA 349), OR ISAT (OPA 485) AS MODIFIED TO SATISFY ANCHORAGE REQUIREMENTS OF ACI 318, APPENDIX D.

COPIES OF THE MANUAL SHALL BE AVAILABLE ON THE JOBSITE PRIOR TO THE START OF HANGING AND BRACING OF THE PIPE, DUCTWORK, AND ELECTRICAL DISTRIBUTION SYSTEMS.

THE STRUCTURAL ENGINEER OF RECORD SHALL VERIFY THE ADEQUACY OF THE STRUCTURE TO SUPPORT THE HANGER AND BRACE LOADS.

NO.	DATE	REVISION BLOCK	BY

SCALE: 1/2" = 1'-0"

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WATER SYSTEM IMPROVEMENTS

SIERRA EAST HOMEOWNERS ASSOCIATION

FLOOR PLAN
WATER TREATMENT

REGISTERED PROFESSIONAL ENGINEER
KENT R. NEDDENRIEP
C48475
EXP. 06-30-16
CIVIL
STATE OF CALIFORNIA

DRAWN: MAB	JOB: 2088-001
ENGINEER: JEL	DRAWING: SEE PLOT STAMP
SCALE: 1/2"=1'-0"	SHEET: C04
DATE: 01/20/15	OF: 12 SHEETS

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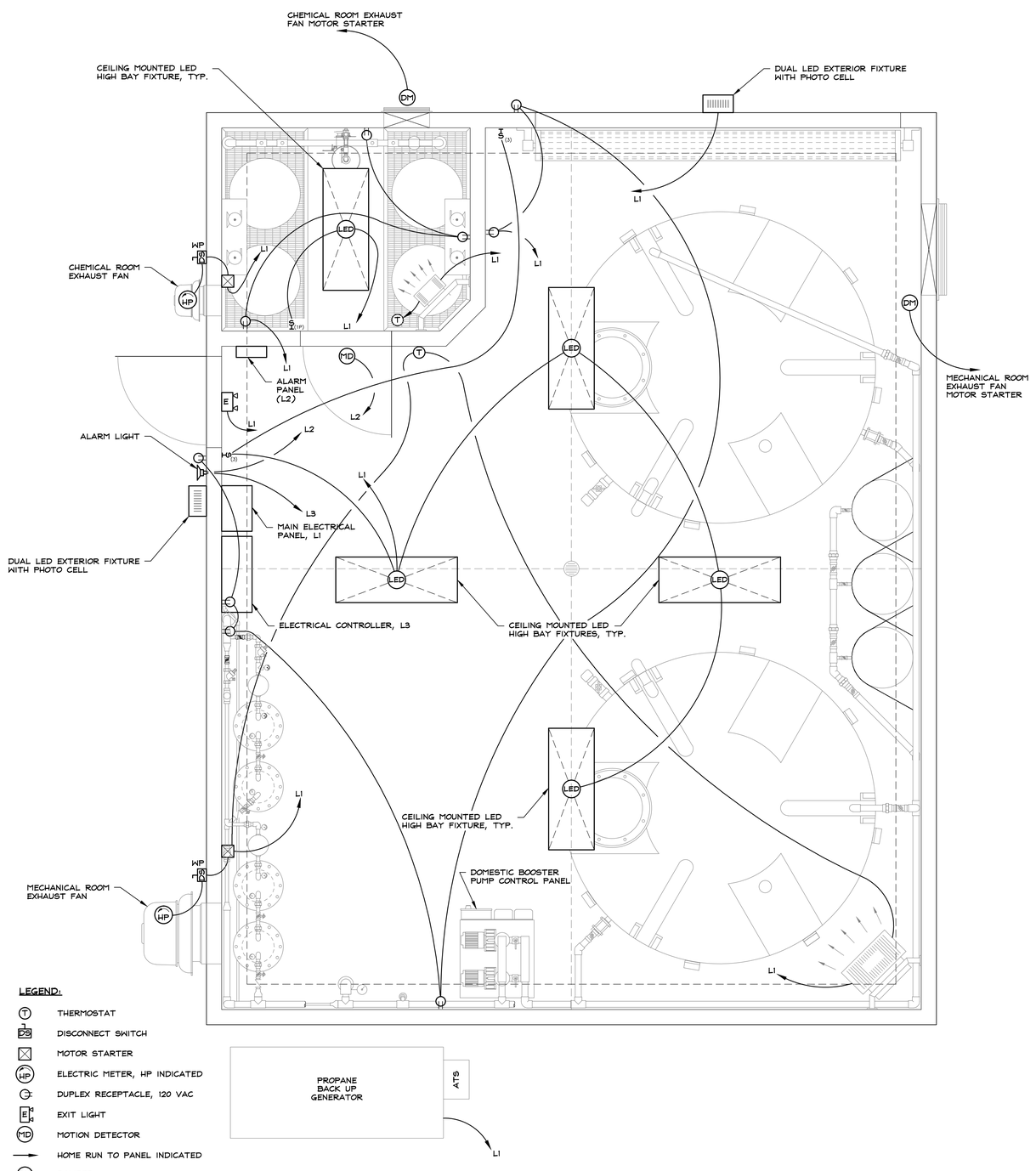


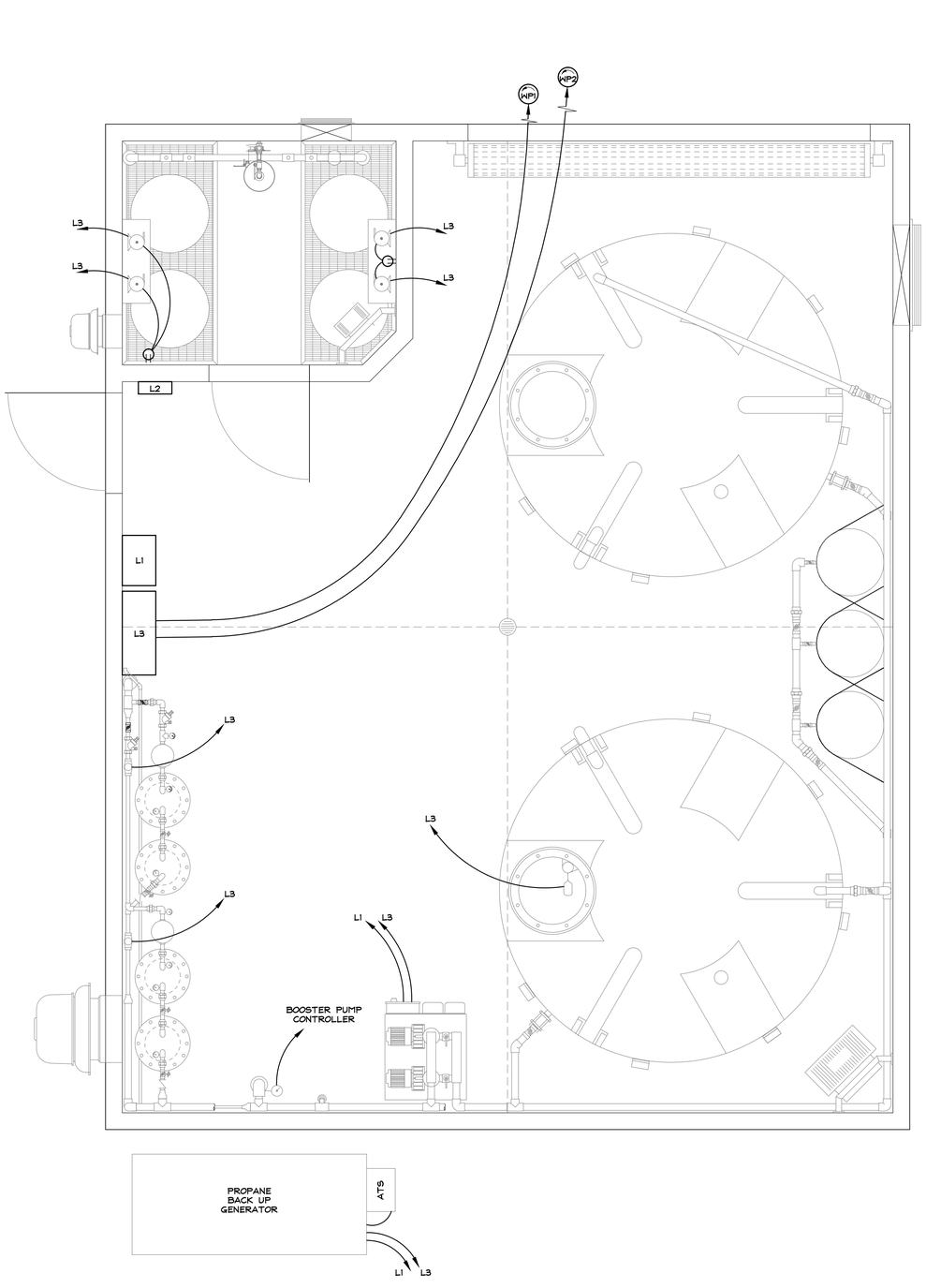
LEGEND:

- (T) THERMOSTAT
- DS DISCONNECT SWITCH
- MOTOR STARTER
- (HP) ELECTRIC METER, HP INDICATED
- DUPLEX RECEPTACLE, 120 VAC
- E EXIT LIGHT
- (MD) MOTION DETECTOR
- HOME RUN TO PANEL INDICATED
- (DM) DAMPER
- S(1P) (3) LIGHT SWITCH (SINGLE POLE or THREE WAY)
- WP WEATHER PROOF
- EUH ELECTRIC UNIT HEATER

ELECTRICAL LIGHTING AND RECEPTACLE PLAN

SCALE: 1/2"=1'-0"

SCALE: 1/2"=1'-0"



ELECTRICAL PROCESS PLAN

SCALE: 1/2"=1'-0"

NO.	DATE	REVISION BLOCK	BY

SCALE: 1/2" = 1'-0"

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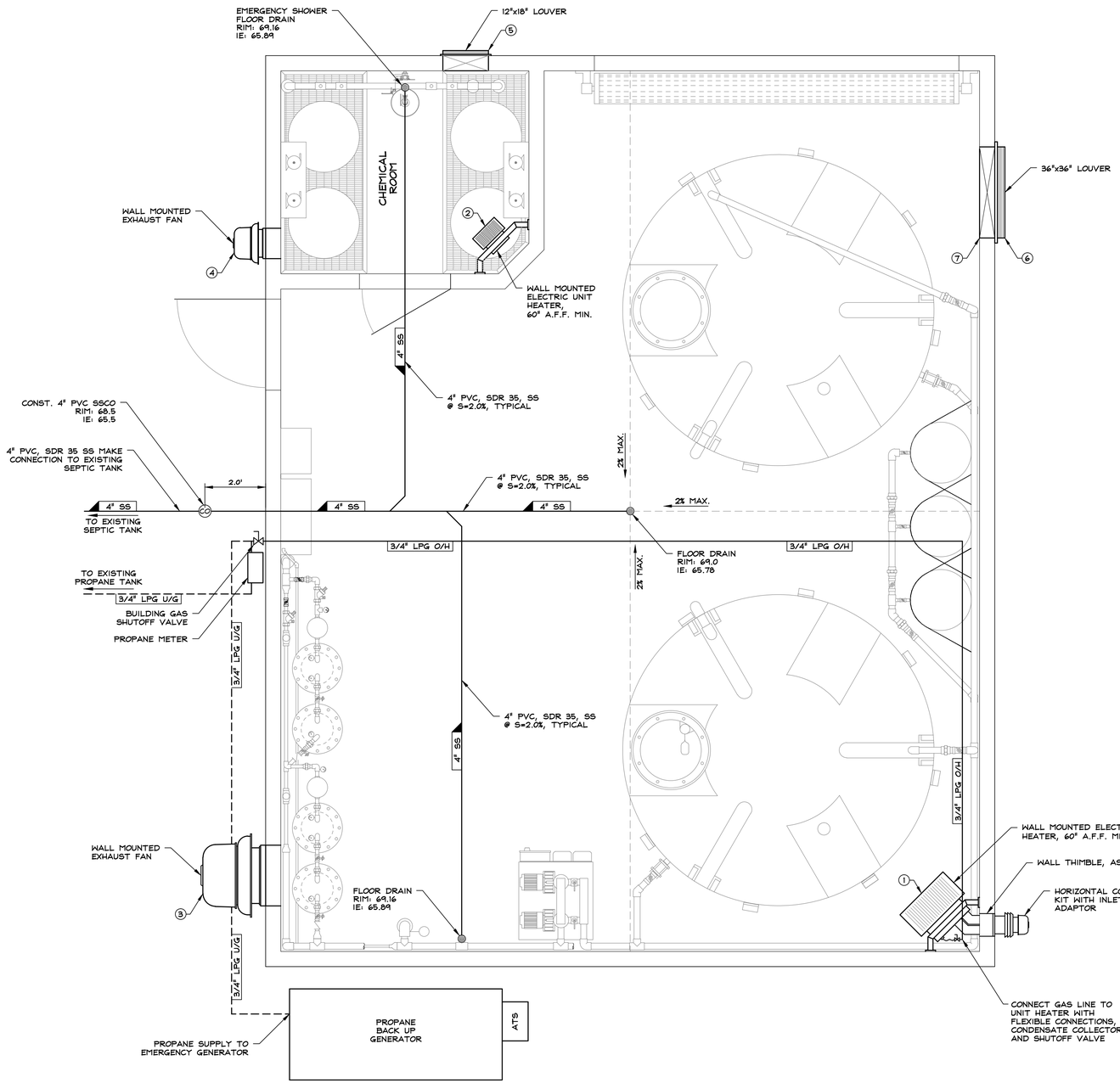
WATER SYSTEM IMPROVEMENTS

SIERRA EAST HOMEOWNERS ASSOCIATION

FLOOR PLAN
ELECTRICAL

DRAWN: MAB	JOB: 2088-001
ENGINEER: JEL	DRAWING: SEE PLOT STAMP
SCALE: 1/2"=1'-0"	SHEET: C05
DATE: 01/20/15	OF: 12 SHEETS

SCALE: 1/2"=1'-0"



MECHANICAL PLAN

SCALE: 1/2"=1'-0"

EQUIPMENT SCHEDULE:

1. MODINE MODEL HDS-45-S-S-01-21, PROPANE GAS FIRED UNIT HEATER AT 120V/10 45,000 BTUH INPUT/ 36,000 BTUH OUTPUT, 46° TEMPERATURE RISE, OR APPROVED EQUAL.
2. TRANE MODEL UHEC-031A0C0 ELECTRIC UNIT HEATER AT 208 VOLT/10 11,200 BTUH OUTPUT, 26° TEMPERATURE RISE, OR APPROVED EQUAL.
3. GREENHECK MODEL CW-121-VG/5/AX SIDEWALL EXHAUST FAN, 1200 CFM AT 3/8" W.C. WITH GREENHECK VARI-GREEN CONTROL INDOOR AIR QUALITY - TEMPERATURE/AUMIDITY CONTROL PACKAGE. CONTROL SHALL INCLUDE PROPORTIONAL INTEGRAL DERIVATIVE (PID) FEEDBACK LOOP TO REGULATE FAN SPEED BASED ON ADJUSTABLE SETPOINTS FOR TEMPERATURE AND/OR RELATIVE HUMIDITY, OR APPROVED EQUAL.
4. GREENHECK MODEL CW-065-VG/6/AX SIDEWALL EXHAUST FAN, 172 CFM AT 1/4" W.C. WITH VARI-GREEN CONTROL - REMOTE DIAL, OR APPROVED EQUAL.
5. GREENHECK ESD-403 12"x18" WEATHER LOUVER WITH 4" FRAME AND INSECT SCREEN. SCREEN, LOUVER AND FRAME SHALL BE STAINLESS STEEL TO PREVENT CORROSSION, OR APPROVED EQUAL.
6. GREENHECK ESD-403 36"x36" WEATHER LOUVER WITH 4" FRAME AND INSECT SCREEN, OR APPROVED EQUAL.
7. GREENHECK MODEL VCD-23 LOW LEAKAGE CONTROL DAMPER WITH DRIVE ARRANGEMENT CC-11-1FEL-0 AND TBF120 ACTUATOR FOR 120 VAC OPERATION. DAMPER SHALL OPEN AND REMAIN OPEN WHENEVER THE MECHANICAL ROOM EXHAUST FAN IS ENERGIZED, OR APPROVED EQUAL.

NOTES:

VERIFY EXISTING GAS PRESSURE REGULATOR (GPR) AT EXISTING TANK IS CAPABLE OF PROVIDING 35,000 BTU OF PROPANE AT EXISTING WATER COLUMN AND INLET PRESSURE. SUPPLY AND INSTALL NEW GPR AS NECESSARY.

NO.	DATE	REVISION BLOCK	BY

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SCALE: 1/2" = 1'-0"

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WATER SYSTEM IMPROVEMENTS

SIERRA EAST HOMEOWNERS ASSOCIATION

FLOOR PLAN
MECHANICAL

REGISTERED PROFESSIONAL ENGINEER
KENT R. NEUDENFELD
C48475
EXP. 06-30-16
CIVIL
STATE OF CALIFORNIA

DRAWN: MAB	JOB: 2088-001
ENGINEER: JEL	DRAWING: SEE PLOT STAMP
SCALE: 1/2"=1'-0"	SHEET: C06
DATE: 01/20/15	OF: 12 SHEETS

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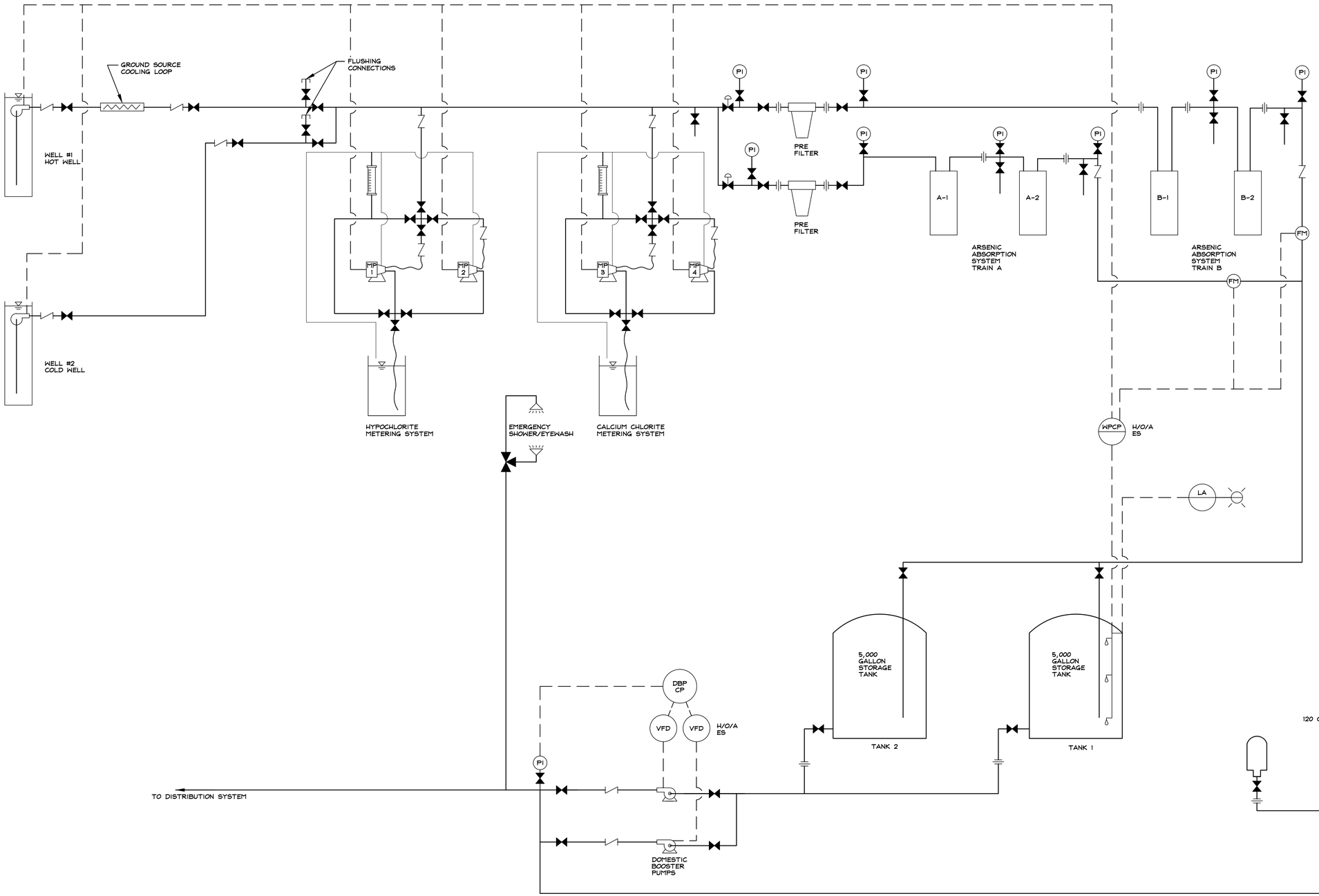

ABBREVIATIONS:

FIRST LETTER		SUCCEEDING
A		ALARM
F	FLOW	
I		INDICATE
L	LEVEL	
P	PRESSURE	
T	TEMPERATURE	TRANSMIT
M	MANUAL	METER

LEGEND:

- MOUNTED ON MAIN PANEL
- LOCALLY MOUNTED
- BALL VALVE
- CHECK VALVE/BACKFLOW PREVENTOR
- FLOW CONTROL VALVE
- UNION
- CALIBRATION COLUMN
- CENTRIFUGAL PUMP
- LIGHT

WPCP	WELL PUMP CONTROL PANEL
DBPCP	DOMESTIC BOOSTER PUMP CONTROL PANEL
VFD	VARIABLE FREQUENCY DRIVE
MP	METERING PUMP
A-1, A-2, B-1, B-2	ARSENIC ABSORPTION FILTERS INDICATING TRAIN AND LEAD/LAG POSITION
H/O/A	HAND/OFF/AUTOMATIC
ES	EMERGENCY SWITCH

- FLEXIBLE TUBE
- MAIN PROCESS LINE
- ELECTRICAL SIGNAL
- MINOR/SECONDARY PROCESS LINE (VENT, SAMPLING)

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WATER SYSTEM IMPROVEMENTS

SIERRA EAST HOMEOWNERS ASSOCIATION

PIPING and INSTRUMENTATION SCHEMATIC

REGISTERED PROFESSIONAL ENGINEER
KENT R. NEDDENRIEP
C48475
EXP. 06-30-16
CIVIL
STATE OF CALIFORNIA

DRAWN: MCR	JOB: 2088-001
ENGINEER: JEL	DRAWING: SEE PLOT STAMP
SCALE: NO SCALE	SHEET: C07
DATE: 01/20/15	OF: 12 SHEETS

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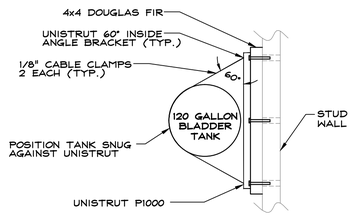
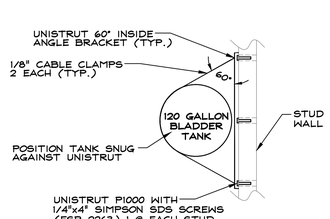
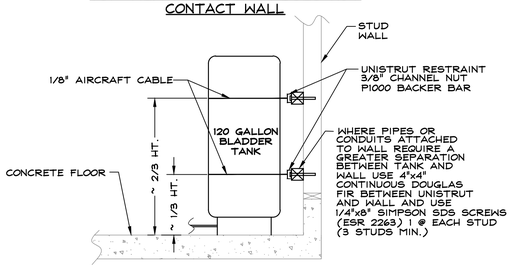


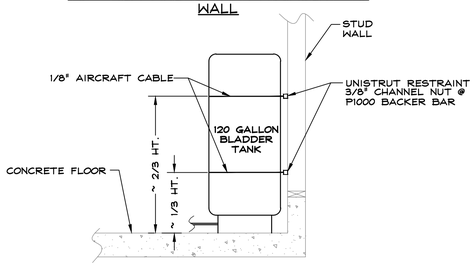
TOP VIEW WHERE TANK DOES NOT CONTACT WALL



TOP VIEW WHERE TANK ADJACENT TO WALL



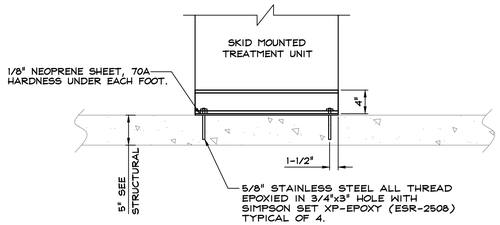
SIDEVIEW WHERE TANK DOES NOT CONTACT WALL

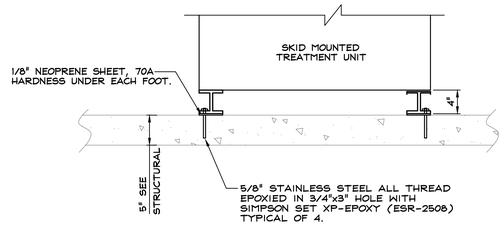


SIDEVIEW WHERE TANK ADJACENT TO WALL

BLADDER TANK SEISMIC RESTRAINTS

N.T.S.





SKID MOUNTED TREATMENT UNIT FLOOR SUPPORT

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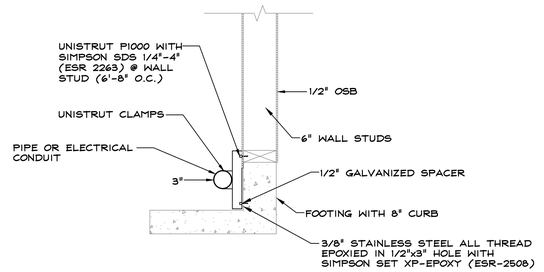

PIPE & CONDUIT WALL SUPPORT (AT CURB)

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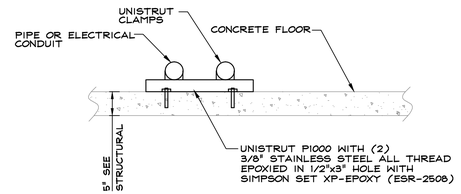

PIPE & CONDUIT FLOOR SUPPORTS

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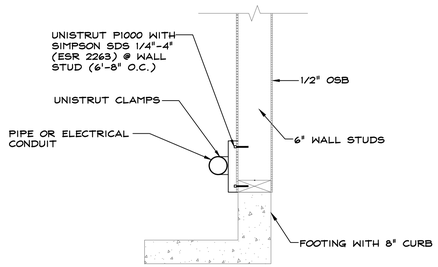

PIPE & CONDUIT WALL SUPPORT (ABOVE CURB)

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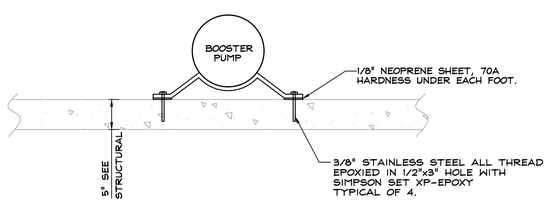

BOOSTER PUMP FLOOR SUPPORT

N.T.S.

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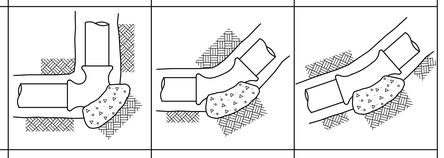
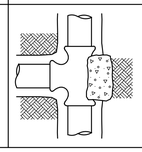
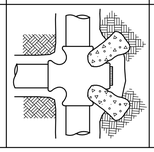
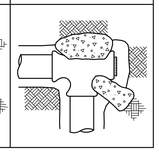
WATER SYSTEM IMPROVEMENTS

SIERRA EAST HOMEOWNERS ASSOCIATION

DETAILS

REGISTERED PROFESSIONAL ENGINEER KENT R. NEUDENFELDT C48475 EXP. 06-30-16 CIVIL STATE OF CALIFORNIA

DRAWN: MCR	JOB: 2088-001
ENGINEER: JEL	DRAWING: SEE PLOT STAMP
SCALE: N.T.S.	SHEET: C08
DATE: 01/20/15	OF: 12 SHEETS

Type of Fitting	90° Bend	45° Bend	11.25° or 22.5° Bend
Typical Installation			
Type of Fitting	Tee or Dead End	Cross w/Plug	Tee w/Plug
Typical Installation			

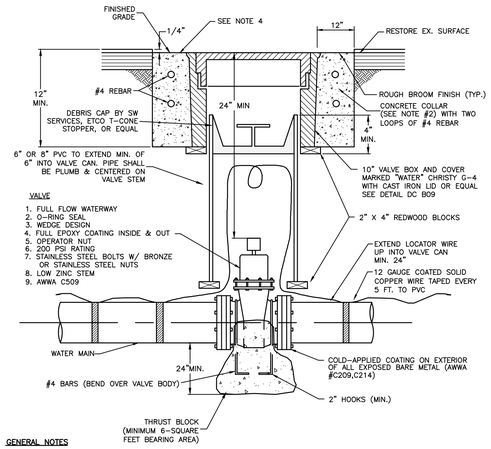
Thrust Block Bearing Area – Square Feet

Size of Pipe	Type of Fitting	90° Bend	45° Bend	11.25° or 22.5° Bend	Tee or Dead End	Cross w/Plug	Tee w/Plug
	4"	2	1	1	2	2	2
	6"	5	3	2	4	5	5
	8"	8	5	3	6	8	8
	10"	13	7	4	9	13	13
	12"	18	10	5	13	18	18
	14"	25	13	7	17	25	25
	16"	32	17	9	23	32	32

NOTE:
1. CONCRETE FOR THRUST BLOCKS SHALL CONFORM TO SPEC. SECTION FOR PUBLIC WORKS CONSTRUCTION.
2. THRUST BLOCKS SHALL BE PLACED AGAINST UNDISTURBED SOIL.
3. JOINTS AND FACE OF PLUGS SHALL BE KEPT CLEAR OF CONCRETE.
4. THRUST BLOCK BEARING AREAS ARE FOR A 150 PSI TEST PRESSURE WITH 2000 PSF BEARING CAPACITY, NOMINAL PIPE DIAMETER, AND A FACTOR OF SAFETY OF 1.5 INSTALLATIONS USING DIFFERENT TEST PRESSURES, AND/OR SOIL TYPES SHALL BE ADJUSTED BY THE DESIGN ENGINEER.

THRUST BLOCKS

N.T.S.

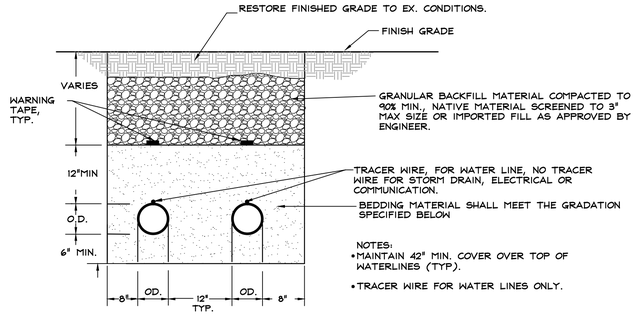


GENERAL NOTES

1. MATERIAL USED FOR THRUST BLOCKING SHALL NOT PREVENT ACCESS TO THE BOLT ASSEMBLY.
2. CONCRETE SHALL MEET THE REQUIREMENTS OF SPEC. SECTION
3. IN ALL AREAS, LIDS SHALL BE SET FLUSH WITH FINISHED GRADE UNLESS OTHERWISE NOTED.
4. THE CONCRETE COLLAR SHALL BE 3/8" BELOW SURROUNDING GRADE
5. SPLICES IN WIRE SHALL BE CONNECTED BY SOLDER OR WIRE NUTS AND WRAPPED WITH UL LISTED ELECTRICAL TAPE.
6. PROVIDE AND INSTALL EXTENSION STEMS SO THAT VALVE OPERATING NUT IS NOT GREATER THAN FIVE (5) FEET BELOW FINISHED GRADE.
7. THRUST BLOCK MAY BE ELIMINATED FOR FLANGED VALVES WITH MUELLER AQUAGRIP OR APPROVED EQUAL FLANGED RESTRAINT ADAPTOR.
8. PROVIDE PIPE POLYETHYLENE PROTECTIVE WRAP ON ALL VALVES, 8-MILS MINIMUM, SECURED WITH 2-INCH WIDE PRESSURE SENSITIVE PLASTIC TAPE, 10-MILS MINIMUM.

GATE VALVE

N.T.S.



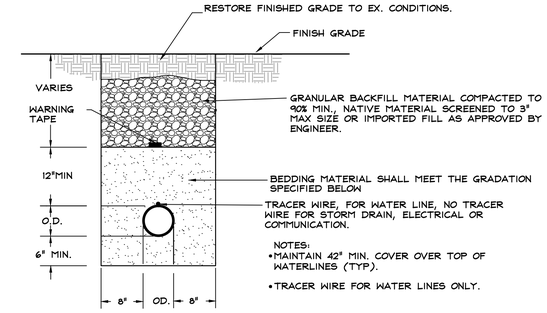
NOTES:
- MAINTAIN 42" MIN. COVER OVER TOP OF WATERLINES (TYP).
- TRACER WIRE FOR WATER LINES ONLY.

THE FOLLOWING GRADED BEDDING MATERIAL SHALL BE USED IN DRY TRENCHES ONLY:

U.S STANDARD SIEVE SIZE:	PERCENT BY WEIGHT PASSING
3/8"	100%
NO. 4	90-100%
NO. 50	10-40%
NO. 100	3-20%
NO. 200	0-15%

COMMON UTILITY TRENCH

N.T.S.



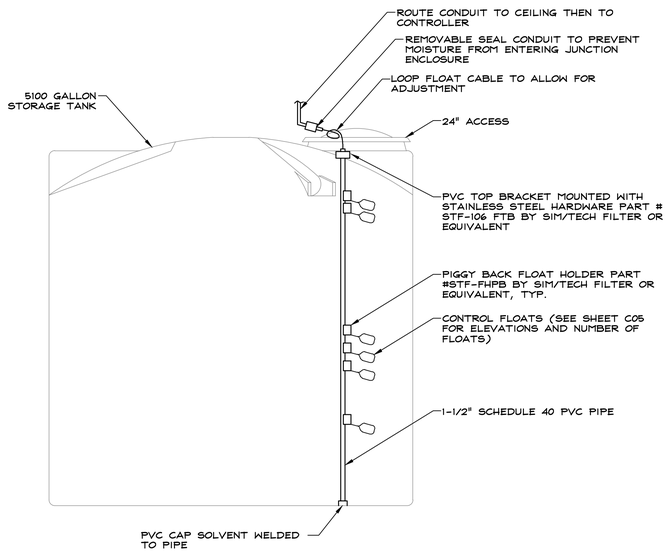
NOTES:
- MAINTAIN 42" MIN. COVER OVER TOP OF WATERLINES (TYP).
- TRACER WIRE FOR WATER LINES ONLY.

THE FOLLOWING GRADED BEDDING MATERIAL SHALL BE USED IN DRY TRENCHES ONLY:

U.S STANDARD SIEVE SIZE:	PERCENT BY WEIGHT PASSING
3/8"	100%
NO. 4	90-100%
NO. 50	10-40%
NO. 100	3-20%
NO. 200	0-15%

TYPICAL TRENCH SECTION

N.T.S.



FLOAT TREE DETAIL

N.T.S.

NO.	DATE	REVISION BLOCK	BY

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WATER SYSTEM IMPROVEMENTS

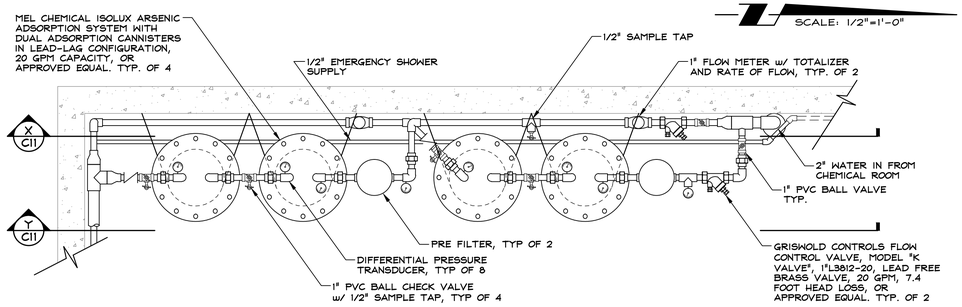
SIERRA EAST HOMEOWNERS ASSOCIATION

DETAILS

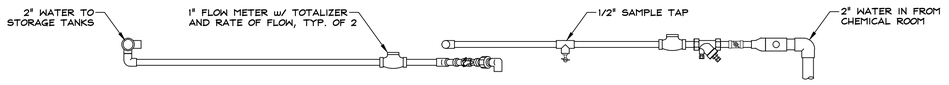
REGISTERED PROFESSIONAL ENGINEER
KENT R. NEDDENRIEP
C48475
EXP. 06-30-16
CIVIL
STATE OF CALIFORNIA

DRAWN: MCR	JOB: 2088-001
ENGINEER: JEL	DRAWING: SEE PLOT STAMP
SCALE: N.T.S.	SHEET: C09
DATE: 01/20/15	OF: 12 SHEETS

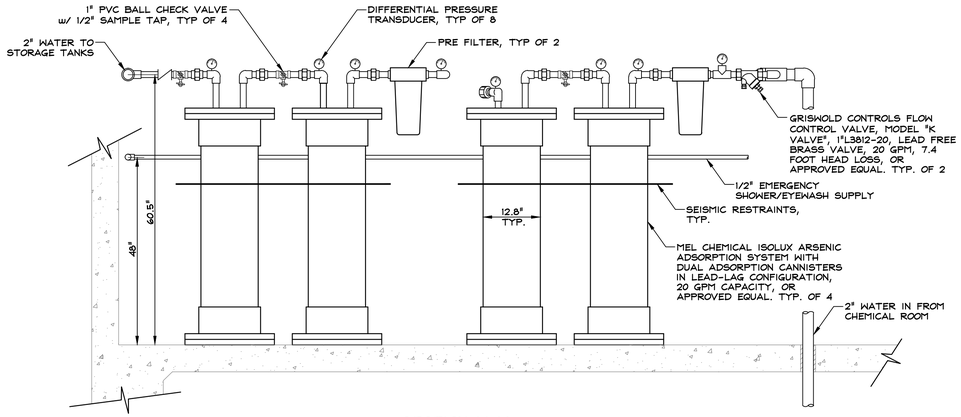
SCALE: 1/2"=1'-0"



PLAN



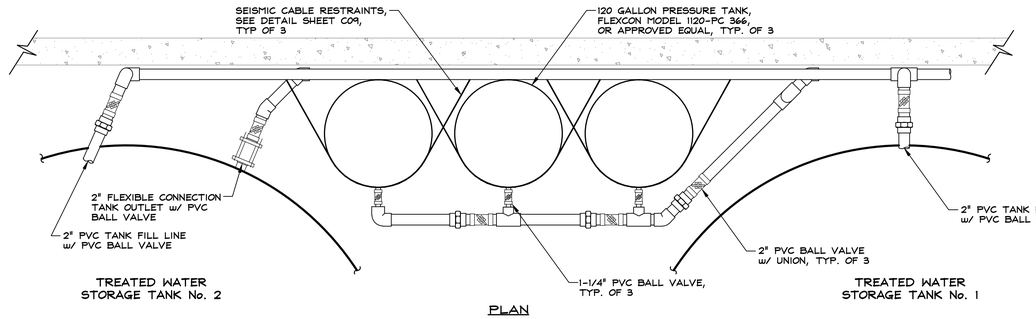
SECTION X-X



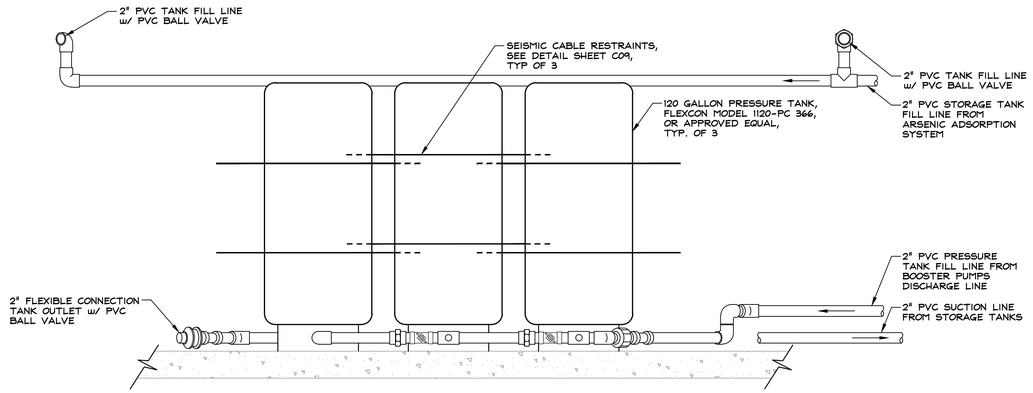
SECTION Y-Y

SECTION A-A PRE-FILTERS and PIPING

SCALE: 1/2" = 1'-0"



PLAN



SECTION B-B PRESSURE TANKS and PIPING

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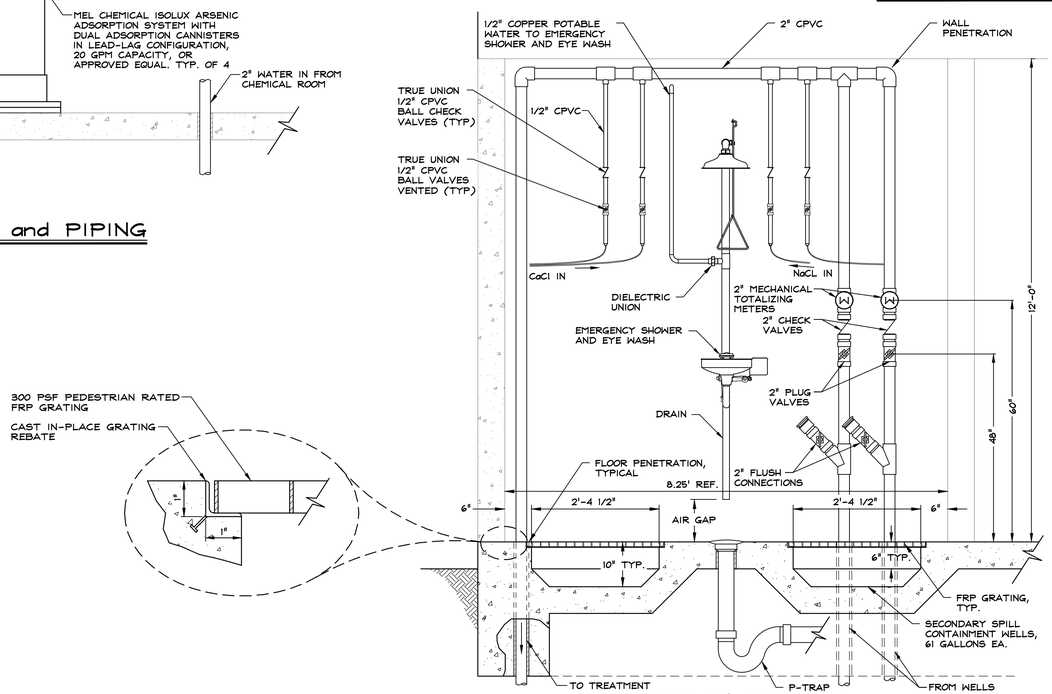
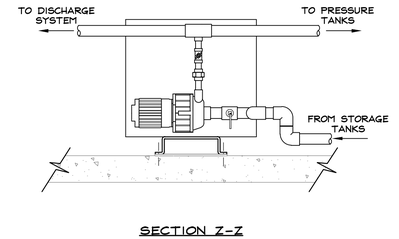
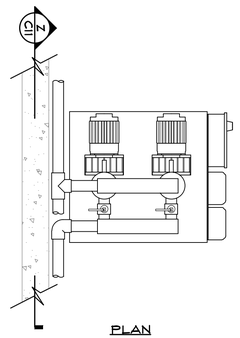


SECTION C-C CHEMICAL INJECTION and EMERGENCY SHOWER/EYE WASH

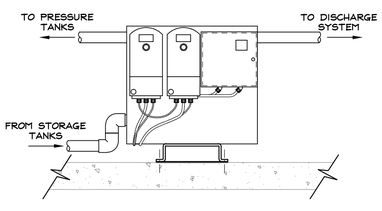
SCALE: 1/2" = 1'-0"



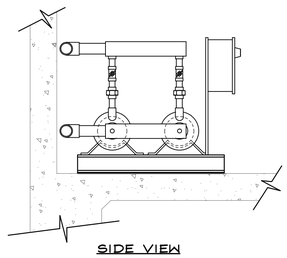
SECTION Z-Z



PLAN



FRONT VIEW



SIDE VIEW

DUPLEX BOOSTER PUMP DETAIL

SCALE: 1/2" = 1'-0"

NO.	DATE	REVISION BLOCK	BY

SCALE: 1/2" = 1'-0"

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WATER SYSTEM IMPROVEMENTS

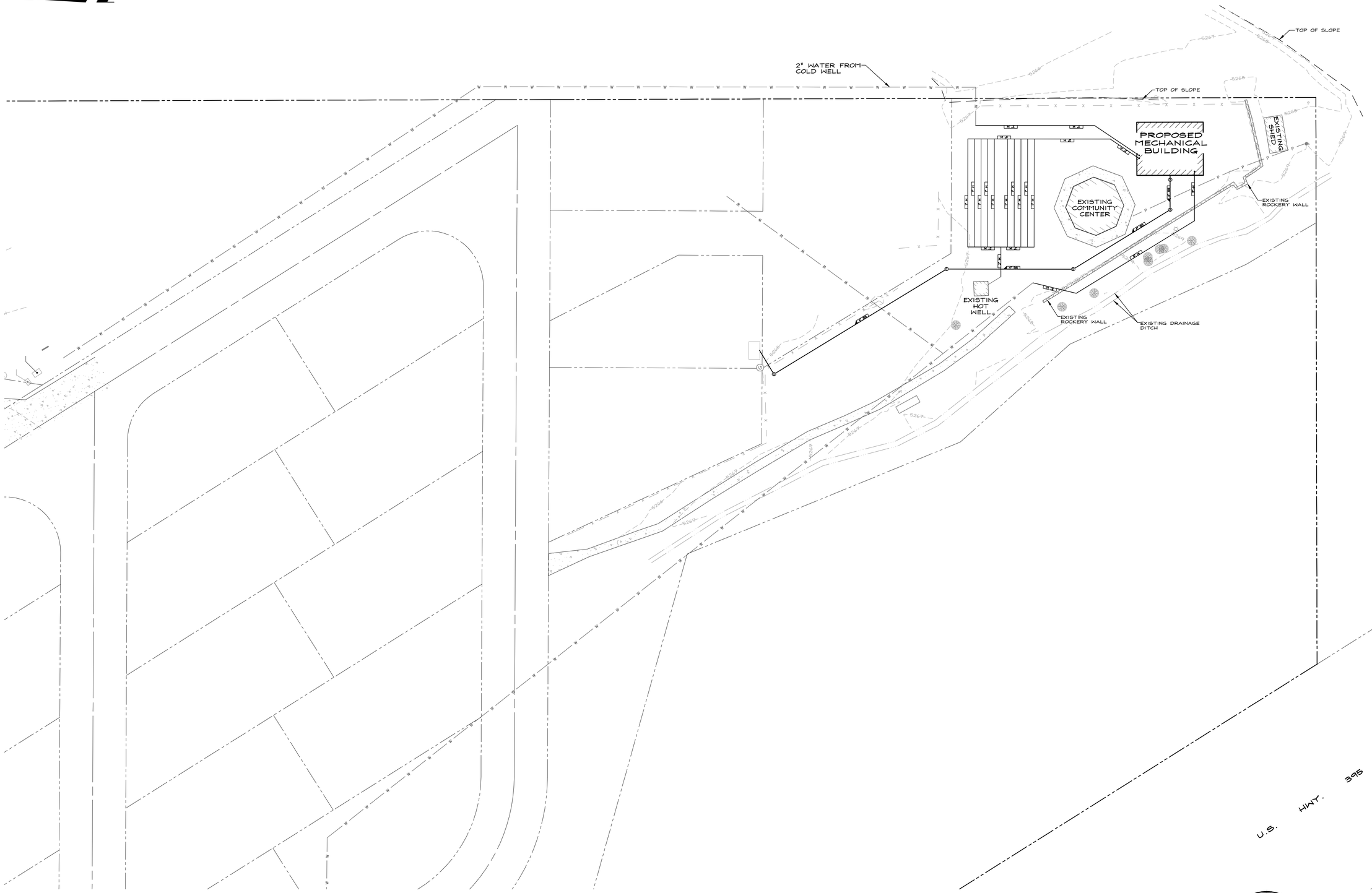
SIERRA EAST HOMEOWNERS ASSOCIATION

SECTIONS

REGISTERED PROFESSIONAL ENGINEER
KENT R. NEDDENRIEP
C48475
EXP. 06-30-16
CIVIL
STATE OF CALIFORNIA

DRAWN: MAB	JOB: 2088-001
ENGINEER: JEL	DRAWING: SEE PLOT STAMP
SCALE: AS SHOWN	SHEET: C10
DATE: 01/20/15	OF: 12 SHEETS

SCALE: 1"=20'



NO.	DATE	REVISION BLOCK	BY

SCALE: 1"=20'

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WATER SYSTEM IMPROVEMENTS

SIERRA EAST HOMEOWNERS ASSOCIATION

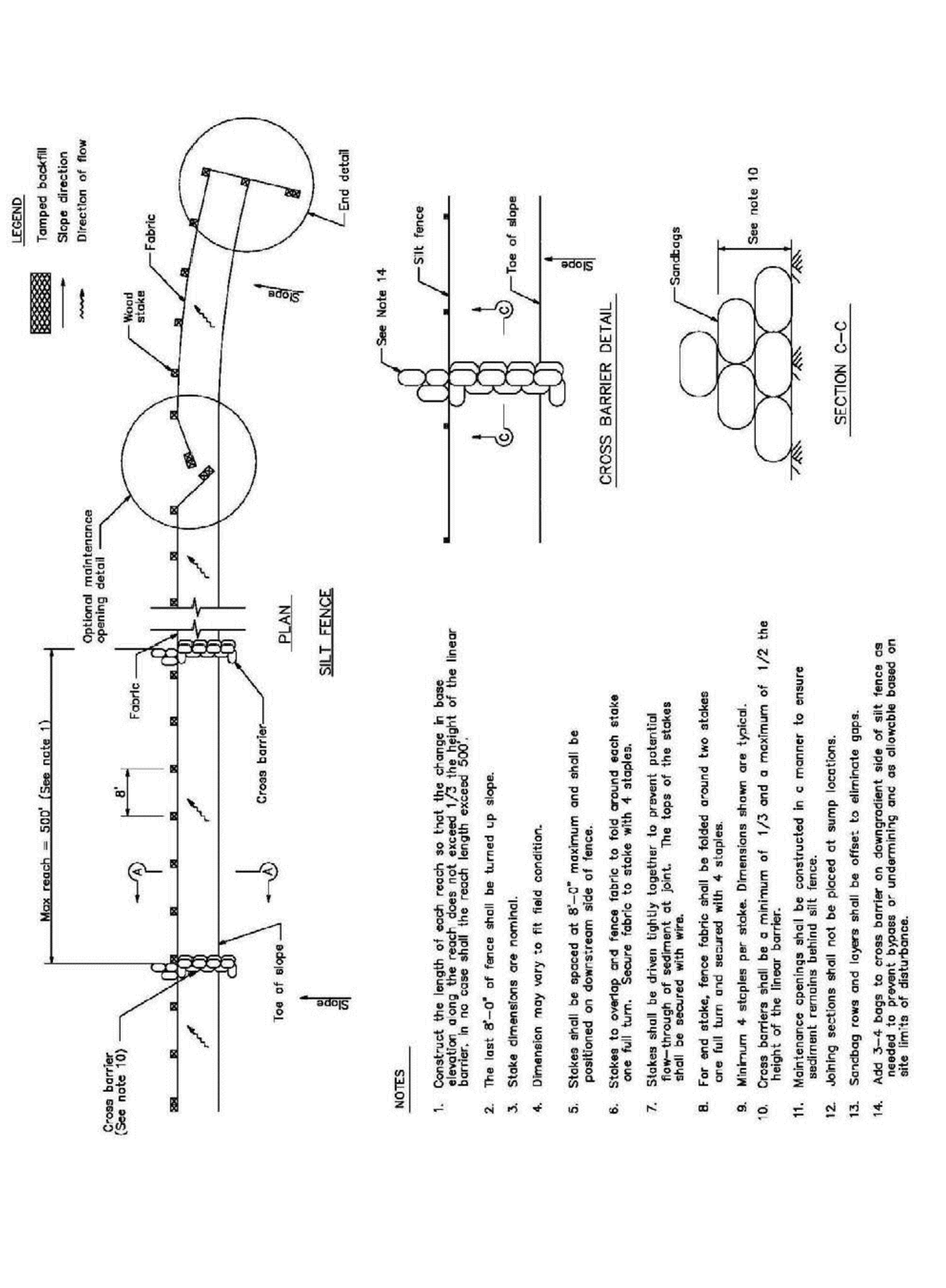
BMP PLAN

REGISTERED PROFESSIONAL ENGINEER
KENT R. NEDDENRIEP
C48475
EXP. 06-30-16
CIVIL
STATE OF CALIFORNIA

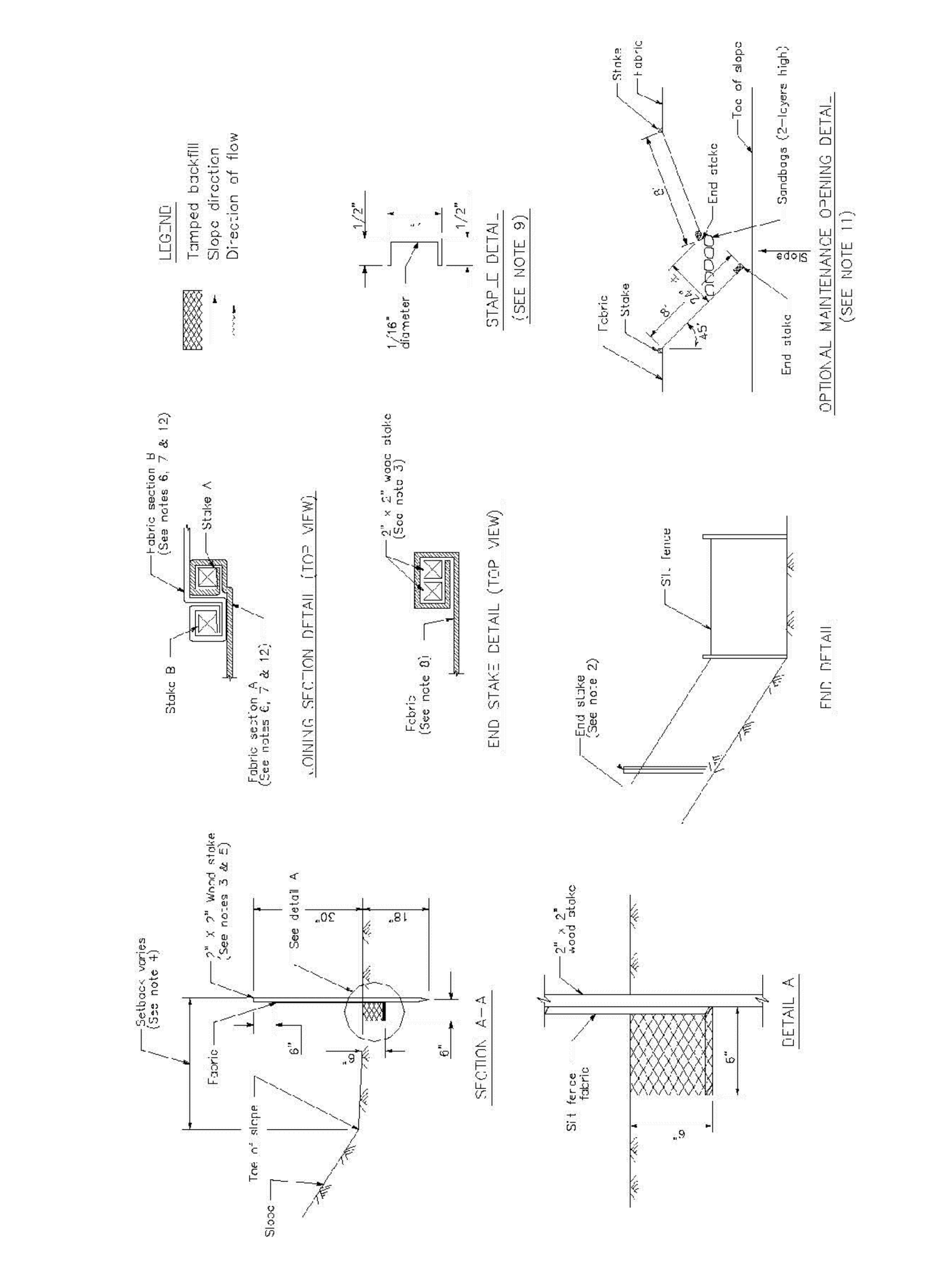
DRAWN: MCR	JOB: 2088-001
ENGINEER: KRN	DRAWING: SEE PLOT STAMP
SCALE: AS NOTED	SHEET: C11
DATE: 01/20/15	OF: 12 SHEETS

Y:\Client Files\2088\2088-001\CAD\Engineering\Improvement Plans\2088-001_C11.dwg 3/11/2015 1:56:58 PM Mark Brav

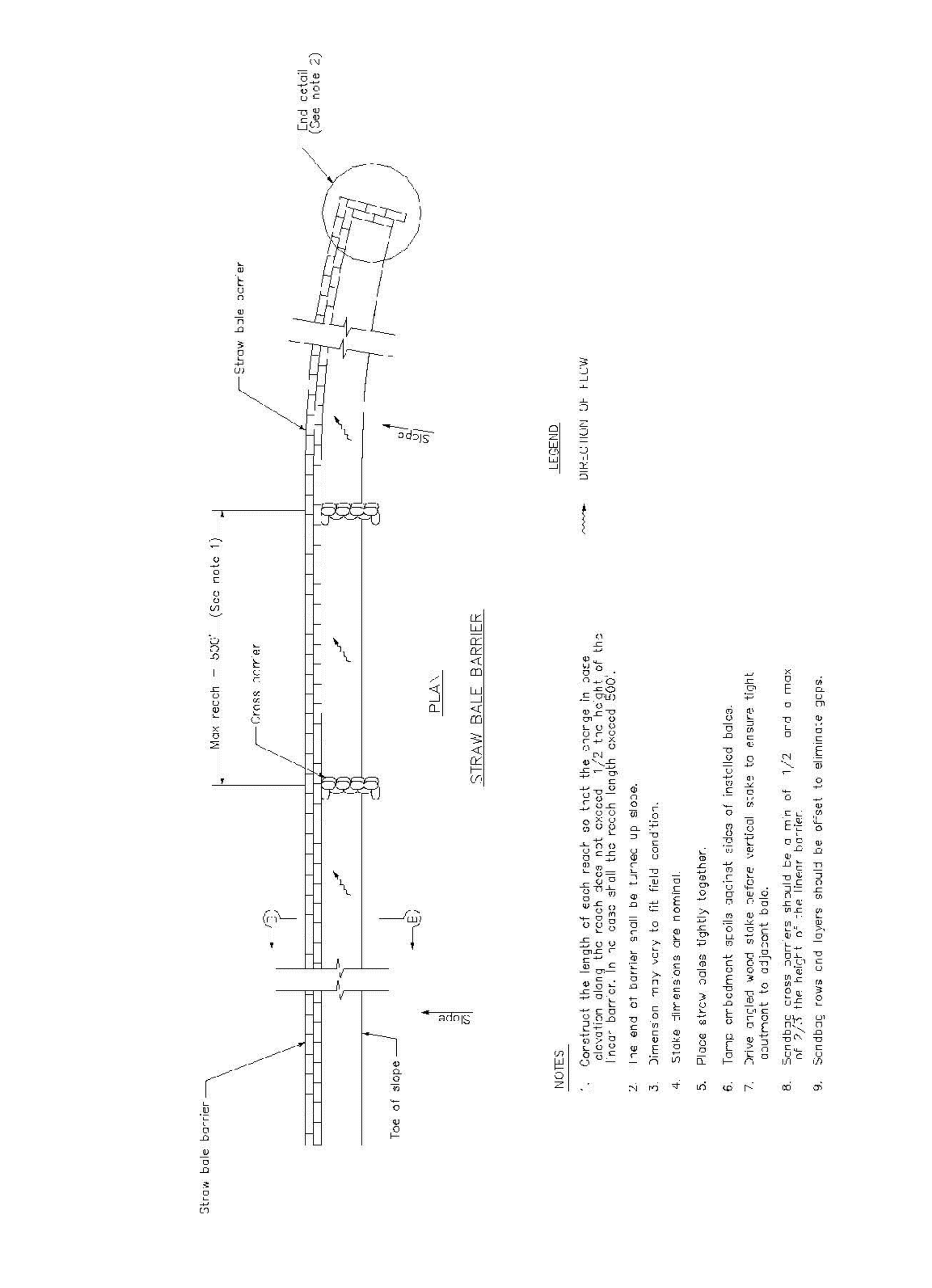
Silt Fence SE-1



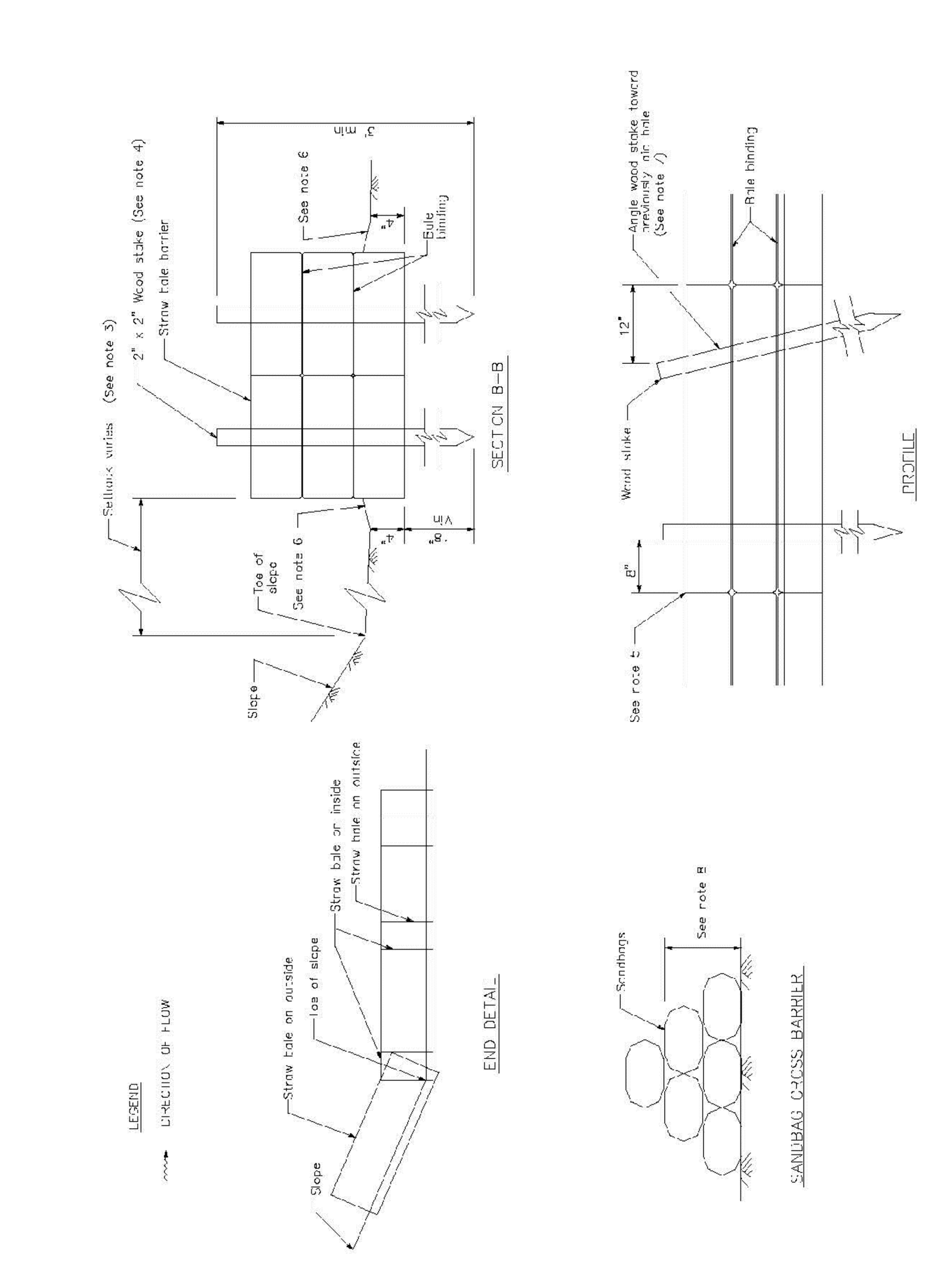
Silt Fence SE-1



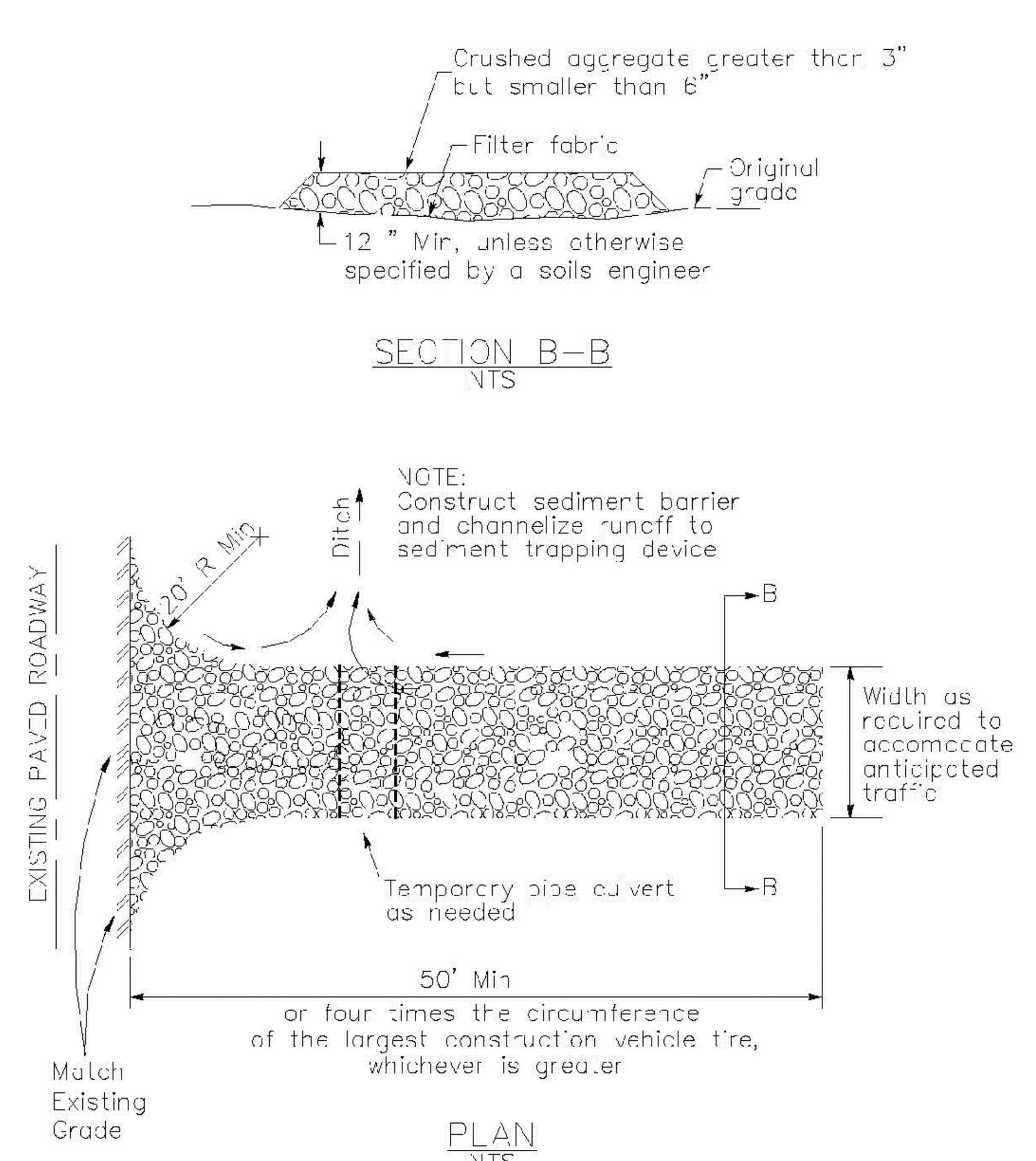
Straw Bale Barrier SE-9



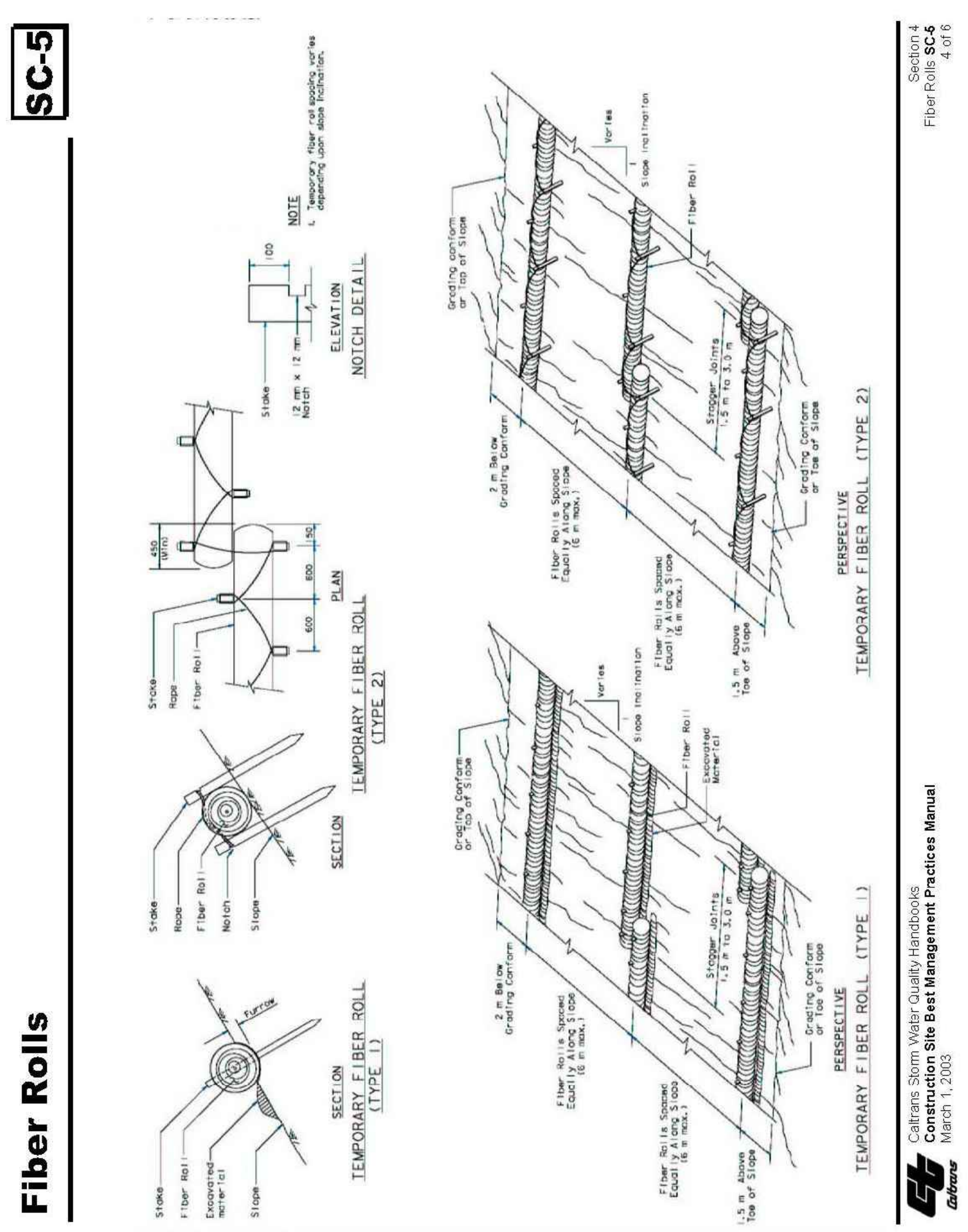
Straw Bale Barrier SE-9



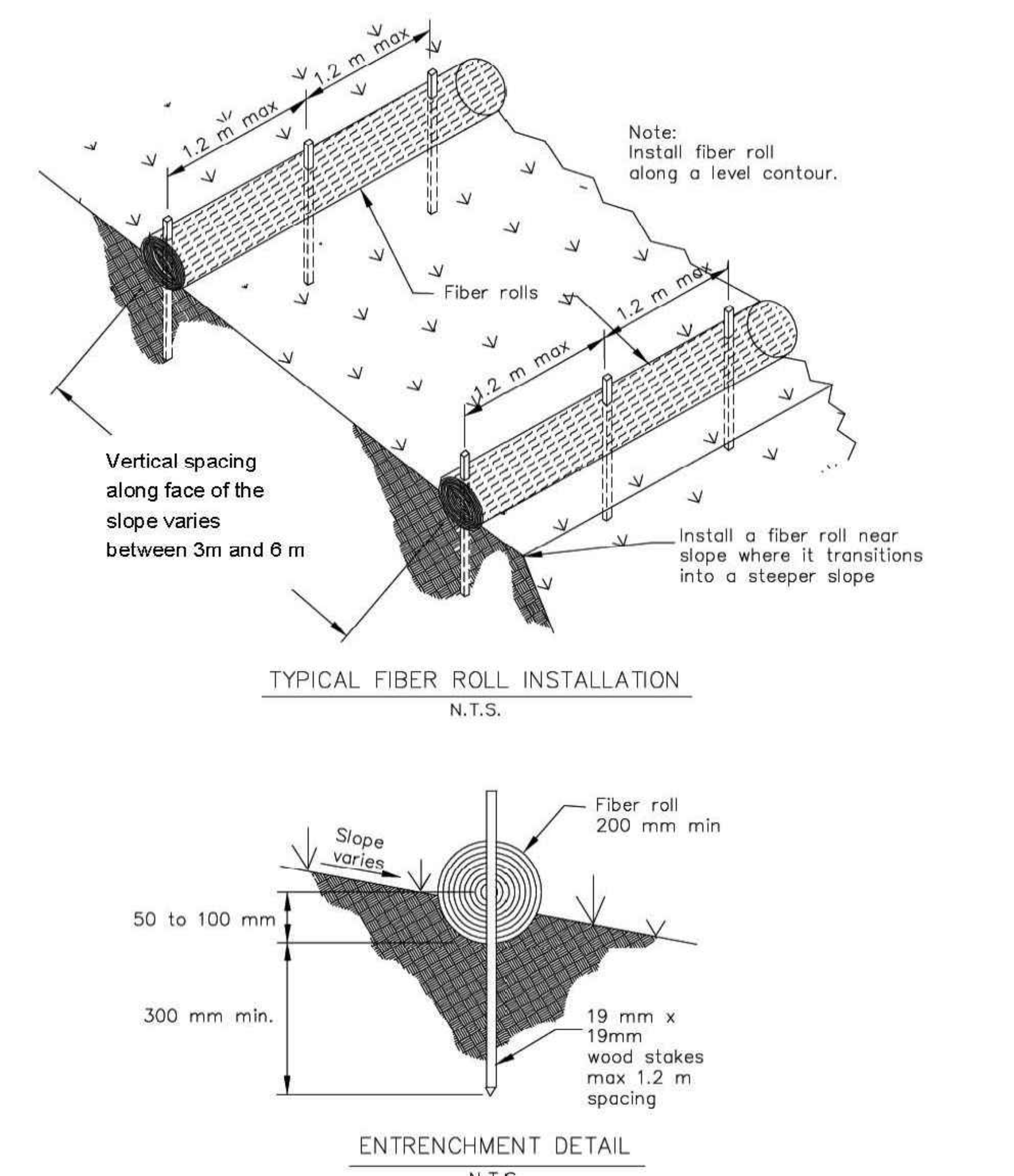
Stabilized Construction Entrance/Exit TC-1



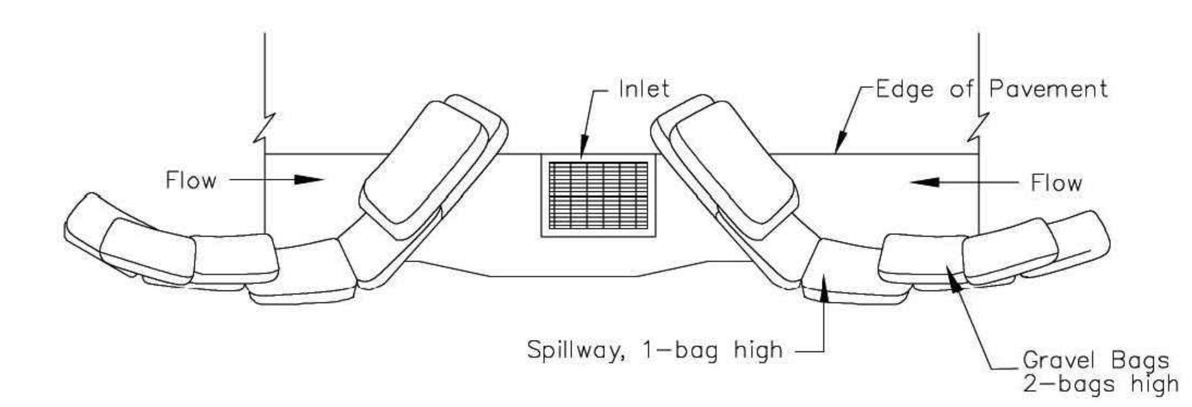
SC-5 Fiber Rolls



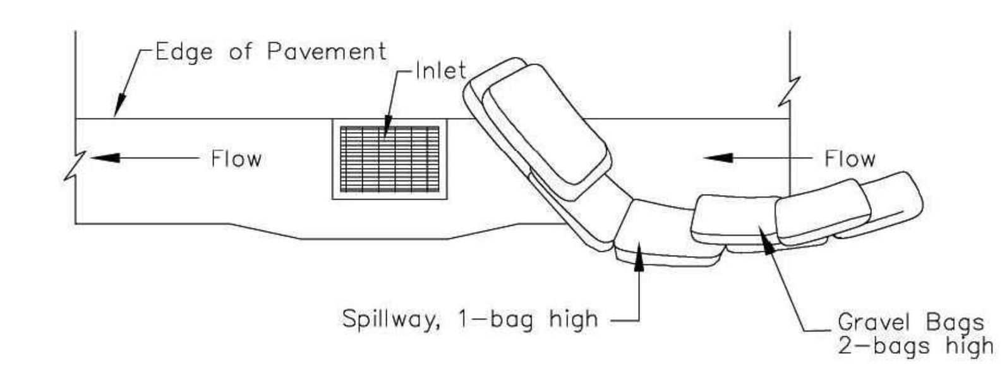
Fiber Rolls SC-5



Storm Drain Inlet Protection SC-10



TYPICAL PROTECTION FOR INLET WITH OPPOSING FLOW DIRECTIONS



TYPICAL PROTECTION FOR INLET WITH SINGLE FLOW DIRECTION

NOTES:
1. Intended for short-term use.
2. Use to inhibit non-storm water flow.
3. Allow for proper maintenance and cleanup.
4. Bags must be removed after adjacent operation is completed
5. Not applicable in areas with high silts and clays without filter fabric.

NO.	DATE	REVISION BLOCK	BY

SCALE: 1/2" = 1'-0"

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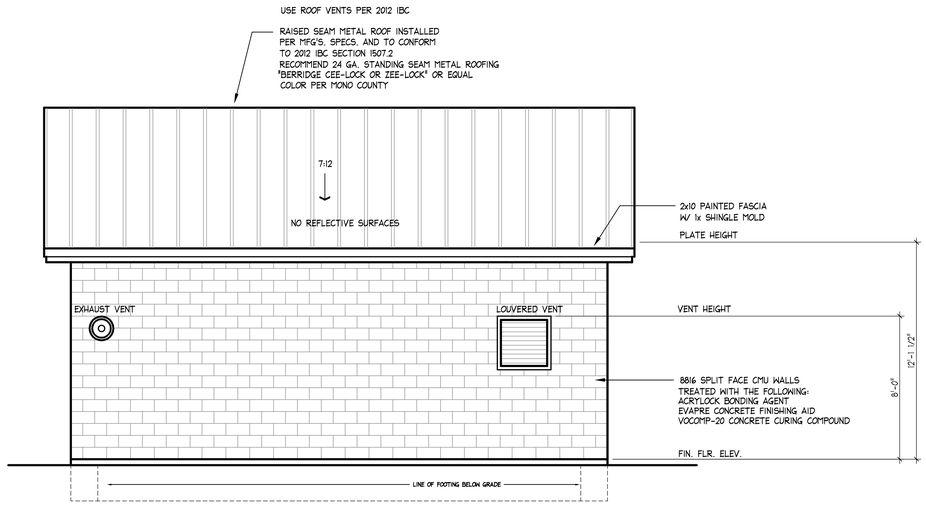
WATER SYSTEM IMPROVEMENTS

SIERRA EAST HOMEOWNERS ASSOCIATION

BMP DETAILS

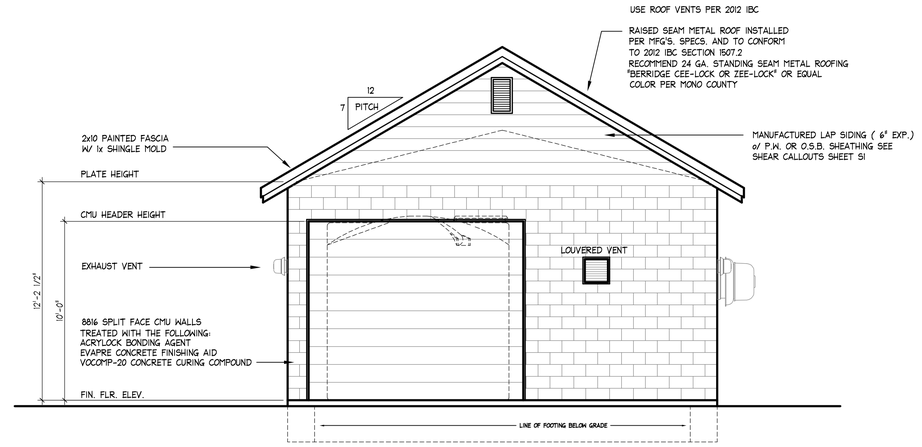
REGISTERED PROFESSIONAL ENGINEER KENT R. NEDDENRIEP C48475 EXP. 06-30-16 CIVIL STATE OF CALIFORNIA

DRAWN: MAB	JOB: 2088-001
ENGINEER: JEL	DRAWING: SEE PLOT STAMP
SCALE: AS SHOWN	SHEET: C12
DATE: 01/20/15	OF: 12 SHEETS



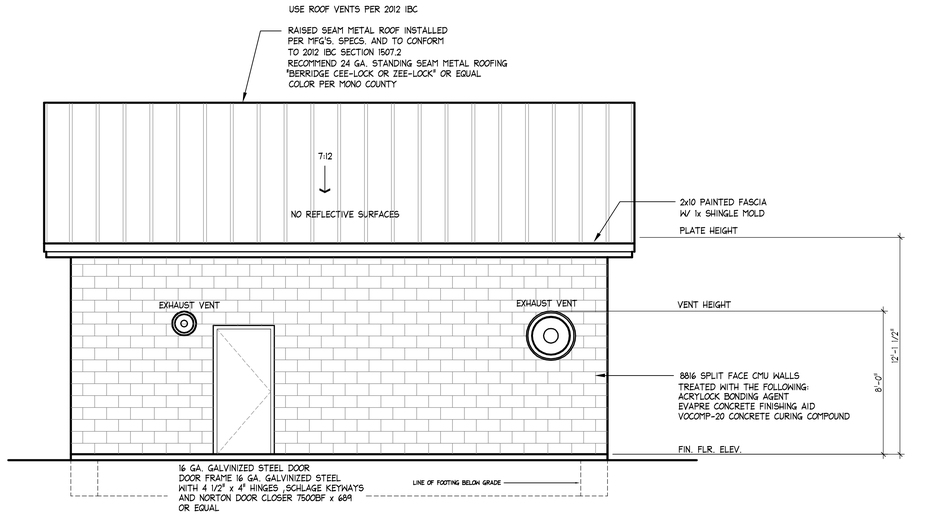
REAR ELEVATION

SCALE: 1/4" = 1'-0"



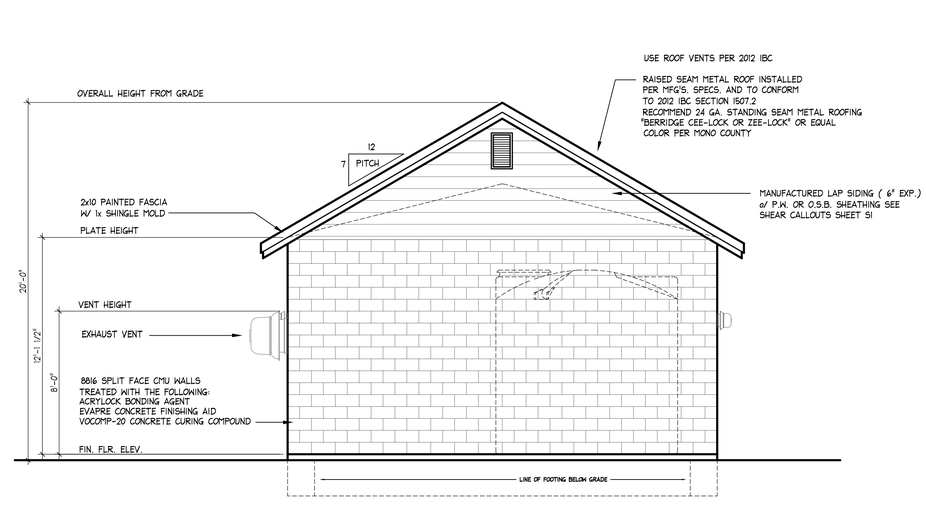
LEFT SIDE ELEVATION

SCALE: 1/4" = 1'-0"



FRONT ELEVATION

SCALE: 1/4" = 1'-0"



RIGHT SIDE ELEVATION

SCALE: 1/4" = 1'-0"

NO.	DATE	REVISION BLOCK	BY

1 0 1 2
4 0 4 8
SCALE: 1/4" = 1'-0"

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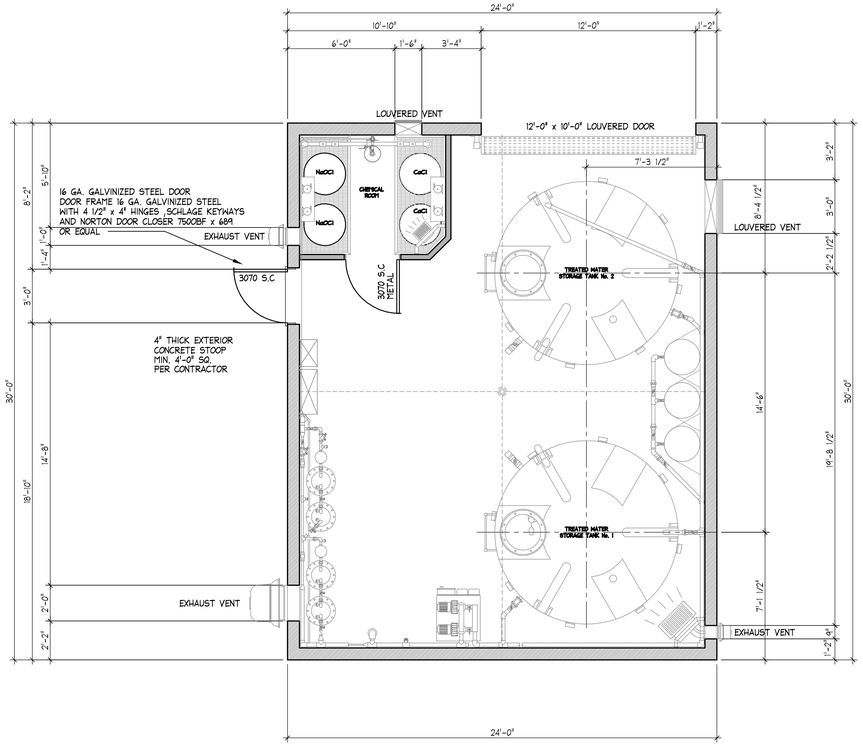
WATER SYSTEM IMPROVEMENTS

SIERRA EAST HOMEOWNERS ASSOCIATION

ARCHITECTURAL ELEVATIONS
WATER TREATMENT

DRAWN: W.A.N.	JOB: 2088-001
ENGINEER: R.V.	DRAWING: 2088-001EL1
SCALE: 1/4" = 1'-0"	SHEET: A1
DATE: 3/19/15	OF: 6 SHEETS



FLOOR PLAN

720 SQ. FT. SCALE: 1/4" = 1'-0"

FLOOR TO BE TREATED WITH THE FOLLOWING:

TIAH-ACRYLIC SEALER- CONC. FLOOR SEALER

CMU TO BE TREATED WITH THE FOLLOWING:

ACRYLOCK BONDING AGENT
EVAPRE CONCRETE FINISHING AID
VOCOMP-20 CONCRETE CURING COMPOUND

GENERAL NOTES:

GENERAL NOTES:

WORK PERFORMED SHALL COMPLY TO THE FOLLOWING:
ALL APPLICABLE LOCAL, STATE AND FEDERAL CODES, ORDINANCES, LAWS, REGULATIONS AND PROTECTIVE COVENANTS GOVERNING THE SITE OF WORK IN CASE OF CONFLICT, THE MORE STRINGENT REQUIREMENTS SHALL GOVERN.

THE CONTRACTOR/OWNER SHALL BE RESPONSIBLE FOR THE GENERAL SAFETY DURING CONSTRUCTION, AND ALL WORK SHALL CONFORM TO PERTINENT SAFETY REGULATIONS.

INSTALLATION OF ALL MATERIALS AND FINISHES MUST BE DONE IN STRICT ACCORDANCE WITH THE RELATED MANUFACTURES SPECIFICATIONS AND DETAILS.

THE CONTRACTOR/OWNER SHALL SECURE AND PAY FOR THE BUILDING PERMIT AND FOR ALL OTHER PERMITS AND GOVERNMENTAL FEE, LICENSES AND INSPECTIONS NECESSARY FOR THE PROPER EXECUTION AND COMPLETION OF THE WORK.

ROOFING:

STANDING SEAM METAL ROOFING INSTALL PER MANUFACTURER'S SPECIFICATIONS AND 2012 IBC SECTION 1507.2, OVER 15# FELT OR BUILDING PAPER VAPOR BARRIER

FLASHING:

ALL JOINTS AND PENETRATIONS AT EXTERIOR WALLS, CEILINGS AND FLOORS SHALL BE FULLY CAULKED AND SEALED.

ROOF FLASHING AT VERTICAL WALL JUNCTIONS BASE AND COUNTER FLASHINGS ARE REQUIRED WHERE ROOFING MATERIAL MEETS WALLS. FORM FLASHING WITH A 4" MIN. TURN-UP AGAINST THE WALL AND FORM HORIZONTAL LEG 6" MIN. AWAY FROM THE WALL BASE FLASHINGS SHOULD BE FASTENED TO THE SHEATHING TO PREVENT SLIPPAGE "RAKE" COUNTER FLASHING ALONG WALL AS REQUIRED PER SIDING CONDITION. FLASHING SHALL BE MINIMUM 26 GAGE GALVANIZED SHEET METAL.

EXTERIOR FLATWORK:

PROVIDE 4" CONCRETE SLAB ON GRADE . PREPARE GRADE WITH 4" OF SAND # GRAVEL AGGREGATE BASE COMPACTED TO 95% OF RELATIVE COMPACTION.

PLUMBING:

ALL PLUMBING INSTALLATIONS SHALL CONFORM WITH THE 2012 UNIFORM PLUMBING CODE.

FAUCET AERATORS SHALL HAVE A MAXIMUM FLOW RATE OF NO MORE THAN 2.75 GALLONS PER MINUTE.

ALL WATER PIPES TO BE COPPER TYPE "L" UNDER FLOOR TYPE "M" ABOVE SLAB AND PVC SCHED. 40 FROM METER TO STRUCTURE.

ALL WASTE AND VENT PIPE TO BE PLASTIC A.B.S.

NO.	DATE	REVISION BLOCK	BY

1 0 1 2
4 0 4 8
SCALE: 1/4" = 1'-0"

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WATER SYSTEM IMPROVEMENTS

SIERRA EAST HOMEOWNERS ASSOCIATION

ARCHITECTURAL FLOOR PLAN
WATER TREATMENT

DRAWN: W.A.N.	JOB: 2088-001
ENGINEER: R.V.	DRAWING: 2088-001FP
SCALE: 1/4" = 1'-0"	SHEET: A2
DATE: 3/17/15	OF: 6 SHEETS

GENERAL CONSTRUCTION NOTES:

1. GENERAL

a) All work shall conform to the 2012 IBC and applicable local codes.

b) Where applicable, allowable stresses have been increased 15% (except Alpine and Placer counties) for snow, 33% seismic, and 33% for wind and seismic connections (timber).

c) All codes and standards shall be the most current edition as of the date of the calculations.

d) The Engineer is responsible for the structural items in the plans only. Should any changes be made from the design as detailed in these calculations without written approval from the Engineer then the Engineer assumes no responsibility for the entire structure or any portion thereof. Should the results of the calculations not be fully or properly transferred to the plans, the Engineer assumes no responsibility for the structure.

e) These calculations are based upon a completed structure. Should an unfinished structure be subjected to loads, the Engineer should be consulted for an interim design or if not, will assume no responsibility.

f) The details shown on the drawings are typical. Similar details apply to similar conditions.

2. SITE WORK

a) Assumed soil bearing pressure shall be determined in accordance with IBC Table 1804.2.

b) Building sites are assumed to be drained and free of clay or expansive soil. These calculations assume stable, undisturbed soils and level or stepped footings. Any other conditions should be reported to this Engineer.

c) Foundations shall bear on non-expansive native soil or compacted structural fill. Any loose soil in the bottom of the footing excavations shall be compacted to at least 90% relative compaction or removed to expose firm, unyielding material.

d) All footings shall bear on undisturbed soil with a footing depth below frostline, (18" or 24" as per local requirements).

e) All finished grade shall slope a minimum of 2% away from foundation for a minimum of 10 ft.

f) This Engineer has not made a geotechnical review of the building site and is not responsible for general site stability or soil suitability for the proposed project.

g) Foundation design is based on minimum footing dimensions and bearing capacities set forth in Table 1804.2 of Chapter 18 in the IBC. Assume Class 4 soil with allowable soil bearing pressure of 2000 psf, uno, with a constant expansion index less than 20. Footings shall extend 18" or 24" (minimum) below finish grade at exterior walls for frost protection. Footings shall bottom 12" (minimum) below natural undisturbed grade.

3. FILL & BACKFILL

a) Fill material shall be free from debris, vegetation, and other foreign substances.

b) Backfill trenches shall be compacted to 90% density per ASTM D1557 to within 12" of finished grade. The top 12" shall be landscape fill.

c) Backfill at pipe trenches shall be compacted on both sides of pipe in 6" lifts.

d) Waterproof exterior faces of all foundation walls adjacent to usable spaces.

e) Backfill at foundation walls shall be compacted to 90% relative density, uno.

f) Use 4" diameter PVC, uno, perforated pipe sub-drain behind all retaining walls. Slope pipe to drain to daylight and drywell.

4. CONCRETE / MASONRY

a) Concrete shall have a minimum 28 day compressive strength of 2500 psi, uno. Alpine County shall have a minimum of 3000 psi for all concrete and 3500 psi for all slabs on grade, uno.

b) Concrete shall be air entrained to not less than 5% and not more than 7%.

c) All slabs on grade shall have a minimum thickness of 4" and be reinforced with 6x6x10WW mesh at centerline as per ASTM A185, or with fibermesh as per manufacturers specifications, uno.

d) All slabs on grade shall be placed over 4" minimum of free draining aggregate base compacted to a minimum of 95% relative compaction. Provide 2" sand above and below a 6 mil. (min.) vapor barrier at all living areas and areas requiring moisture protection.

e) All slab on grade subgrade (upper six inches) shall be scarified, moisture conditioned to within 2% of optimum, and uniformly compacted to at least 90% of maximum dry density as determined by ASTM D1557. This will not be required if slabs are to be placed directly on undisturbed compacted structural fill.

f) Waterproofing of foundations and retaining walls is the responsibility of the owner.

g) Reinforcement shall be grade 40 as per ASTM A615 uno. Lap reinforcing bar splices 40 bar diameters, uno.

h) Concrete stem walls and footings are to be a monolithic pour. Provide vertical & horizontal #4's @ 18" oc. developed into footing for stemwalls over 28" in height, uno. Stemwalls 36" or greater in height shall be designed as retaining walls.

i) All masonry units shall conform to ASTM C90 grade N.

j) All masonry cells are to be solid grouted with mortar conforming to ASTM C279 Type S, with a 28 day compressive strength of 2000 psi min.

k) Reinforcement cover in cast-in-place concrete shall be as follows:

- 3" - Concrete cast against and permanently exposed to earth.
- 1 ½" - Concrete exposed to earth or weather with #5 bars or smaller.
- 1 ½" - Concrete not exposed to weather or in contact with ground, #11 bars and smaller.
- 1 ½" - Beams, columns, and pilaster, cover over ties.
- 1 ½" - Clear to top for reinforcement in slabs on grade.

l) Provide slab control joints (saw cut or plastic inserts) at 20'-0" maximum spacing each way for 4" slab. Joint depth to be ¼ of slab depth.

m) Vertical steel placement in masonry stem walls to be #4 bars at 32" o.c. maximum spacing, uno.

n) Horizontal steel placement in masonry stem walls to be #4 bars at 24" o.c. maximum spacing, uno.

o) Reinforced concrete shall conform to applicable requirements of IBC and ACI Standards.

p) Aggregate shall conform to ASTM C33 for stone aggregate.

q) Use normal weight concrete (145 pcf) for all concrete, uno. Use Type II cement , uno. Use Type V cement if soil contains sulfate concentrations of Ø.2% or more.

r) Weather protection:

1) In hot weather, follow "Recommended Practice for Hot Weather Concreting", ACI 305.

2) In cold weather, follow "Recommended Practice for Cold Weather Concreting", ACI 306.

s) All reinforcing steel and anchor bolts shall be accurately located and adequately secured in position before and during placement of concrete.

t) All details of fabrication and installation of reinforcing steel shall be in accordance with the ACI Manual of Standard Practice.

5. FRAMING / LUMBER

a) Roof plywood thickness is per APA load tables based upon roof live load and framing spacing. Apply face grain perpendicular to framing, stagger panels and nail with 8d Per IBC Table 2306.3.1, uno.

b) Floor plywood shall be APA rated plywood and glued and nailed with 8d or 10d @ 6" o.c. edge, 10" o.c. field, uno.

c) Plywood shall conform to APA, PS 1. Shear plywood shall be 'Exposure 1' C-D or C-C. Alternate sheathing may be substituted for floors, roofs, and shear walls provided they are structurally equivalent to plywood. Plywood permanently exposed to weather and/or moisture shall be rated 'Exterior'.

d) Wood structural panel diaphragms and shear walls shall be constructed with wood structural panel sheets not less than 4 feet by 8 feet, except at boundaries and changes in framing where minimum sheet dimensions shall be 2 feet by 4 feet. Framing members or blocking shall be provided at the edges of all sheets in shear walls.

e) Headers that are not specifically addressed in the calculations shall be typical header specified on the plans. (OK by observation). Use (2) trimmers on all openings 5'-0" and larger, uno.

f) Floor joists shall be Douglas Fir #2 min. Size and space in accordance with IBC Table 2308.8. Engineer recommends using E less than 12. Manufactured "I" joists (such as Truss Joists) may be substituted for sawn lumber, size and spacing as per manufacturer's recommendations. Use manufactured rim joist (such as Timber Strand) with all "I" joists.

g) All foundation sill plates, nailers, and ledgers in direct contact with concrete and within 8" of ground shall be pressure treated Douglas Fir or Hem Fir.

h) Studs shall be stud grade or better. In no instance shall a stud wall be used to retain soil or resist lateral pressure due to snow loading. In the case of snow build up against a stud wall the owner shall be responsible to eliminate snow to stud wall contact.

GENERAL CONSTRUCTION NOTES (CONT.):

i) All framing lumber shall be Douglas Fir Larch with moisture content less than 19%, uno.

j) Glu-lams shall be 24F-V4 uno. Glu-lams exposed to weather must be rated for exterior use by the manufacturer or approved protection from exposure to be provided.

k) Micro-lams (laminated veneer lumber) and parallams (parallel strand lumber) specified shall have the following minimum design strengths: 1¾" wide : Fb=2600 psi, Fv=220 psi, E=1,800,000 psi and 2-11/16" wide & up: Fb=2300 psi, Fv=230 psi, E=2,000,000 psi.

l) Splice all beams over supports or saucul top 1/3 at support (not @ cantilevers), uno.

m) Where multiple trimmers or studs are specified, those trimmers are to be stacked in all wall framing and solid vertical grain blocking shall be provided @ all floor levels down to the foundation, uno.

n) Where posts with column caps, straps, or bearing plates are called out for, the load is to be transferred to the foundation with posts as specified and solid vertical grain blocking shall be provided @ all floor levels down to the foundation, uno.

o) All built up, laminated double or multiple 2X joists and beams shall be nailed together with (3) rows of 16d nails at 12" oc. staggered, uno. Three piece members shall be nailed from each side.

p) All 4x and 6x posts, columns, and headers shall be D.F. #1 or better, uno. All other 4x and 6x framing members shall be D.F. #2 or better, uno.

q) All framing members specified in these calculations are minimums, and larger members may be substituted.

r) All floor openings shall be between joists, uno.

s) DO NOT drill holes, notch, or cut into beams, studs, and joists, unless detailed on the plans.

t) Provide double joists below all parallel partition walls.

u) When using 'green' lumber, care shall be taken to allow for the effects of shrinkage. If necessary to avoid sagging, joists, rafters, and beams shall be braced at midspan until lumber has dried out and reached a stable moisture content.

6. HARDWARE / STRUCTURAL STEEL

a) All hardware specified shall be Simpson Strong-Tie Co. (or equal) installed per manufacturer's specifications, uno.

b) Structural steel shall conform to ASTM A36, uno. Pipe columns shall conform to ASTM A53, Type E or S, uno. Tube sections shall conform to ASTM 500, Grade B, uno.

c) All welding shall conform to the American Welding Society specifications. All welding shall be done by welders certified by the local building authority. All shop welding shall be in an approved fabricators shop authorized by the local building authority or special inspection per the IBC shall be provided. All field welding shall require special inspection per IBC Section 1701.

d) All welding electrodes shall be E70XX or shielded wires with Fy greater than 70ksi.

e) All nails specified are common nails. No substitutions unless specified on plans or in these calculations or approved in writing by Engineer. For all hardware specified, use nails or bolts per manufacturer's recommendations.

f) The minimum nailing for all framing shall conform to UBC Table 23-II-B-1.

g) All bolts specified must meet ASTM A307. Bolt holes shall be 1/32" to 1/16" larger than the specified bolt. Washers shall be used at each bolt head and nut next to wood. All washers to be not less than standard cut washers.

h) Provide 3" x 3" x 1/4" plate washers on all foundation anchor bolts in Seismic Design Categories D, E, & F.

7. TRUSSES

a) All prefabricated trusses shall be fabricated by a code approved manufacturer. The manufacturer shall be responsible for the design and certification of the trusses.

b) It is the responsibility of the manufacturer to conform the truss design according to the loading conditions as called for in these calculations, such as (1) live and dead loads: (2) truss spacing: (3) spans and eave overhangs: (4) roof pitch: (5) bearing points: and (6) drag loads.

c) Truss manufacturer shall supply to the Engineer calculations and shop drawings for approval prior to fabrication.

d) All calculations and shop drawings shall be signed by a registered engineer in the state in which the structure is being built.

e) Trusses shall be designed in accordance with the latest local approved codes and ordinances for all loads imposed, including lateral loads and mechanical equipment loads. Truss fabricator shall review all architectural drawings and meet architectural profiles as indicated.

f) Shop drawings shall also include the following information:

1) Project name and location.

2) All design loads as set forth in these calculations.

3) Member stresses, deflections, type of joint plates, and allowable design values. Truss joints shall be designed per requirements of Truss Plate Institute (TPI).

4) Type, size, and location of hangers to be used for the project. Hangers shall be designed to support the full vertical load and a lateral load equal to 20% of the vertical reaction. All connectors shall be code approved and of adequate strength to resist stresses due to the loading involved.

g) The truss manufacturer shall be responsible for all truss to truss connections, all truss to girder connections, and if the girder truss is made up of more than one truss, all connections between these trusses.

h) The truss manufacturer shall insure that the truss package meets the profile as required by the contract documents.

i) Total load deflection shall be limited to the lesser of L/240 or 1" max. Live load deflection shall be limited to L/360.

j) Trusses are to be handled, installed, and braced in accordance with HIB-91 of the TPI. Cross bridging and/or bracing shall be provided for and detailed by truss manufacturer as required to adequately brace all trusses.

k) Where truss blocking is called out, the blocking piece shall be the same depth as the adjoining members and capable of resisting a lateral load equal to 500 pounds in its plane, or be sheathed with ½" CDX plywood and nailed with 10d common nails at 6" o.c. edge nailing.

l) The truss manufacturer shall be responsible for the design of all trusses used as drag or chord members and shall insure that such trusses are placed as required on the framing plans. The amount of load to be laterally transmitted by the member shall be a minimum of 2000 pounds unless otherwise shown on the framing plans.

m) The truss manufacturer shall provide a means of attic access when spacing is 16" oc or less.

n) Gable end trusses shall be structural, designed to support overhang and to allow a top chord notch of 1 1/2".

o) Girder trusses are to be supported by multiple trimmers.

p) All non-bearing walls are to have a 1/2" gap to the bottom chord of trusses.

q) When snow loads exceed 50 psf the trusses shall be stacked over wall studs at bearing points.

SHEAR WALL SCHEDULE

SYMBOL	SHEAR PLY	EDGE NAIL SPACING**	16d NAIL SPACING	3x P.T. MUDSILL AND FRAMING MEMBERS @ ALL" ABUTTING PANEL EDGES
A	⅜"	8d @ 6"	6" o.c.	NO
A	⅜"	8d @ 4"	4" o.c.	NO
3	⅜"	8d @ 3"	3" o.c. STAGG	YES
2	⅜"	8d @ 2"	2" o.c. STAGG	YES
4Ø*	(2) ⅜"	8d @ 4" B/S	PER PLANS	NO
3Ø*	(2) ⅜"	8d @ 3" B/S	PER PLANS	YES
2Ø*	(2) ⅜"	8d @ 2" B/S	PER PLANS	YES
1	½"	8d @ 2"	PER PLANS	YES
B	½"	10d @ 2"	PER PLANS	YES
C	⅝"	10d @ 2"	PER PLANS	YES
S	⅝" GYP. BD.	6d @ 4"	8" o.c.	NO
LOUISIANA PACIFIC SMART PANEL SIDING				
1A	19/32" Smart panel siding	8d @ 6"	6" o.c.	NO
1A	19/32" Smart panel siding	8d @ 4"	4" o.c.	NO
1S	19/32" Smart panel siding	8d @ 3"	3" o.c. STAGG	YES
1S	19/32" Smart panel siding	8d @ 2"	2" o.c. STAGG	YES

- Use Minimum 3/8" APA Rated Shear Ply / OSB or Rated Equivalent U.N.O.
- Use Common Nails And Field Nail @ 12" o.c., U.N.O.
- Nail All Shear Plywood With Edge Nail Spacing @ Top & Mud Sill, All Posts, All King Studs, Sole Plates, & All Studs W/ Holdowns.

* - Double Shear Walls To Have Shear Ply With Specified Nailing Both Sides. Offset Plywood Edges Or Provide 3x Studs At Location Where Edge Nailing Is Located On Both Sides Of Wall Stud.

** - Provide 3x Minimum Foundation Sills Unless Otherwise Specified On Plans And 3x Minimum Framing Members (Top & Sole , Studs, Posts, Blocking, Etc.) Receiving Edge Nailing From Two Abutting Shear Plywood Panels. All Edge Nailing At These Members Shall Be Staggered.

- Use SIMPSON MSTC28 To Strap Top 2's Across All Beams And Breaks In Top Plates, U.N.O.
- Provide Blocking @ All Horizontal Edges Of Shear Plywood Or Gyp. Bd.
- Nailing Of Gyp. Bd. w/ 6d @ 4" o.c. Applies To Edge & Field Nailing.

PIER SCHEDULE

SYMBOL	WIDTH (each side)	DEPTH	STEEL (each way)
12	12"	18"	(2) #4's
14 or 16 @	14"	18"	(2) #4's
16 or 18 @	16"	18"	(2) #4's
18 or 21 @	18"	18"	(2) #4's
21 or 24 @	21"	18"	(2) #4's
24	24"	18"	(3) #4's
28	28"	12"	(3) #4's
32	32"	12"	(4) #4's
36	36"	12"	(5) #4's
42	42"	12"	(6) #4's
48	48"	14"	(7) #4's
54	54"	14"	(8) #4's
60	60"	14"	(9) #4's

PERIMETER FOOTING SCHEDULE

SYMBOL	WIDTH	DEPTH (BELOW NATURAL GRADE)	STEEL (CONTINUOUS)
12	12"	18"	(2) #4's
16	16"	8"	(2) #4's
18	18"	8"	(2) #4's

	WIDTH	DEPTH	FOOTING STEEL	STEMWALL STEEL (LOCK + FOOTING ALTERNATE HOOKS)
16a	16"	18"	(2) #4's CONTINUOUS T & B & #5 SHEAR TIES @ 18" o.c.	N/A
16b	16"	24"	(2) #4's CONTINUOUS T & B & #5 SHEAR TIES @ 18" o.c.	N/A

STEMWALL

- 8" Wide w/ (1) #4 Cont. @ Top, U.N.O. Provide #4 Verticals @ 48" o.c., Hook @ Footing (Alternate Hooks.) Provide #4 Vert. @ 32" o.c. & #4 Horiz. @ 24" o.c. at CMU Stemwalls.
- If Stemwall Exceeds 28" Above Top Of Footing, Use #4's @ 18" o.c. Horizontal Cont. and #4's @ 18" o.c. Vert., U.N.O. Stemwalls 36" and Greater Shall be Designed as Retaining Walls.
- All Footings Shall Bear On Undisturbed Soil, Assumed Soil Bearing Pressure is Determined & Increased in Accordance w/ IBC Table 1804.2.
- Exterior Footings To Be Placed 18" Or 24" Below Grade Per Applicable Local Codes
- Footings Supporting Three Stories Or More Shall have a Minimum Depth of 18".
- Stemwalls Supporting Three Stories Or More Shall have a Minimum Thickness of 10".

FOOTINGS

ABBREVIATIONS

Additional	ADD'L	Footing	FTG	Pressure Treated or Preservative Treated	PT
Anchor Bolt	A.B.	Foundation	FDN	Redwood	RWD
At	@	Glued Laminated Beam	GLB	Required	REQ'D
Beam	BM	Gypsum Board	GYP BD	Schedule	SCHED
Bearing	BRG	Hanger	HGR	Shear Wall	SW
Blocking	BLKG	Header	HDR	Similar	SIM
Both Sides	B/S	Hem-Fir	HF	Specification	SPEC
Boundary Nailing	B.N.	Holdown	HD	Square	SQ
Cantilever	CANT	Horizontal	HORIZ	Square Footage	#
Centerline	,	Interior	INT	Staggered	STAGG
Column	COL	Joist	JST	Standard	STD
Concrete	CONC	Laminated Veneer Lumber	LVL	Steel	STL
Concrete Masonry Unit	CMU	Live Load	LL	Structural	STRUC
Continuous	CONT	Machine Bolt	MB	Threaded	THRD
Dead Load	D.L.	Manufacturer	MFR	Toe Nail	T.N.
Detail	DET/DTL	Maximum	MAX	Tongue & Groove	T&G
Diameter	ø	Micro-Lam (Truss Joist)	ML	Top Of	T.O.
Double	DBL	Minimum	MIN	Tube Steel	T.S.
Douglas Fir, North	DF	Not Applicable	N/A	Typical	TYP
Drawing	DWG	Not to Scale	NTS	Uniform Building Code	UBC
Each	EA	Number / Pounds	#	Unless Noted Otherwise	UNO
Each End	EE	On Center	o.c.	Verify In Field	VIF
Each Side	ES	One Side	o/s	Vertical	VERT
Edge Nailing	E.N.	Over / On	o/	Welded Wire Fabric	WWF
Embedment	EMBED	Parallel Strand Lumber	PSL	Welded Wire Mesh	WWM
Equal	EQ	Plate	,	With	w/
Existing	(E)	Plywood	PLY		
Exterior	EXT	Pounds Per Square Foot	PSF		
Field Nail / Face Nail	F.N.	Pounds Per Square Inch	PSI		
Floor	FLR				

HOLDOWNS

HOLDOWN SCHEDULE

- (2L) HDU2-SDS2.5 or LTT20B o/ (2) 2x STUDS, U.N.O. (Nail Double Studs w/ (2) 16d @ 8" o.c. Staggered)
- (2H) HDU2-SDS2.5 or MTT28B o/ (2) 2x STUDS , U.N.O. (Nail Double Studs w/ (2) 16d @ 6" o.c. Staggered)
- (4H) HDU4-SDS2.5 or MTT28B o/ (2) 2x STUDS U.N.O. (Nail Studs w/ (2) 16d @ 6" o.c.)
- (5) HDU5-SDS2.5 or (2) 2x STUDS U.N.O. (Nail Studs w/ (2) 16d @ 4" o.c.)
- (8) HDU8-SDS2.5 or (2) 2x STUDS U.N.O. (Nail Studs w/ (2) 16d @ 4" o.c.)
- (11) HDU11-SDS2.5 o/ 6x STUDS U.N.O.
- (14) HDU14-SDS2.5 o/ 6x STUDS U.N.O.
- (HP) HPAHD22 o/ 4x4 STUD or FACE of (2) 2x STUDS, U.N.O. (Nail Dbl. Studs w/ (2) 16d @ 6" o.c. Stagg.)
- (PA) PAHD42 o/ 4x4 STUD or FACE of (2) 2x STUDS, U.N.O. (Nail Dbl. Studs w/ (2) 16d @ 12" o.c. Stagg.)
- (HT) HTT16 o/ (2) 2x STUD, U.N.O. (Nail Double Studs w/ (2) 16d @ 4½" o.c. Staggered)
- (S18) STHD8 (RJ) o/ (2) 2x STUDS, U.N.O. (Nail Dbl. Studs w/ (2) 16d @ 6" o.c. Stagg.)
- (S10) STHD10 (RJ) o/ (2) 2x STUDS, U.N.O. (Nail Dbl. Studs w/ (2) 16d @ 6" o.c. Stagg.)
- (S14) STHD14 (RJ) o/ (2) 2x STUDS, U.N.O. (Nail Dbl. Studs w/ (2) 16d @ 4" o.c. Stagg.)
- (P7) PHD2 or HTT22 o/ (2) 2x STUD U.N.O. (Nail Studs w/ (2) 16d @ 4½" o.c.)
- (P5) PHD5 or HTT22 o/ (2) STUDS U.N.O.
- (P6) PHD6 o/ (2) STUDS U.N.O.
- (P8) PHD8 o/ (2) STUDS U.N.O.
- (Q8) HDQ8-SDS2 o/ 4x STUD U.N.O.
- (Q11) HHDQ11-SDS2.5 o/ 4x STUD U.N.O.
- (Q14) HHDQ14-SDS2.5 o/ 6x STUD U.N.O.

HOLDOWN INFORMATION

- All Holdowns To Be Installed Per Manufacturers Specifications.
- All Holdown Anchor Bolts Shall Be Specified Per Plan And Shall Meet Manufacturers Minimum Installation Requirements.
- All Holdowns To Be Bolted, Nailed, Or Screwed To (2) Studs Min, U.N.O. Above.
- All Threaded Rod Options To Be Tied To (1) #4 Vertical - (2) #4 Vertical for HDU2A Or HDQ8 & Greater, Developed Into Ftng. w/ 90° Bend. Provide (1) #4 Horizontal @ Top of Stemwall @ All HD Anchor Bolts.
- Holdown SSTB Anchor Bolts At Blocked Out Footings Shall Have (1) #4 Vertical - (2) #4 Vertical for HDU2A Or HDQ8 & Greater, Developed Into Footing w/ 90° Bend.
- Holdown Anchor Bolts Are Designed For Uplift Only, Standard Mudsill Anchor Bolts Are Required (Spacing Per Plan)
- Provide Rim Joist Or Solid Blocking @ HD2A, HD5A, LTT20B, MTT28B, HPAHD22, PAHD42, PHD2, PHD5, HTT22, & HTT16 Holdowns.
- Provide Double Solid Blocking @ HD6A, HDU2A, HD15A, HDU5A, PHD6, PHD8, & Straps Across Floors.
- Screws For PHD Holdowns Shall Be Simpson SDS6¼x3.
- All End Conditions For Threaded Rods Shall Have (2) Nuts And (1) Washer Per Manufacturer.

HOLDOWN SPECIFICATION TABLE

(ALSO SEE SIMPSON STRONG-TIE CATALOG)

H. DOWN	CL	MIN. THKNESS	STUD BOLTS	FOR THREADED-ROD ANCHOR @	FOR THREADED-ROD EMBEDMENT	SSTB BOLT (MONOPOUR)	SSTB BOLT EMBEDMENT
HDU2-SDS2.5	1¼"	3"	6-SDS¼"x2½"	⅝"ø	13"	SSTB 16	13"
HDU4-SDS2.5	1¼"	3"	10-SDS¼"x2½"	⅝"ø	14"	SSTB 20	17"
HDU5-SDS2.5	1¼"	3"	14-SDS¼"x2½"	⅝"ø	20"	SSTB 24	25"
HDU8-SDS2.5	1¼"	3"	20-SDS¼"x2½"	⅞"ø	26"	N / A	N / A
HDU11-SDS2.5	1¼"	5½"	30-SDS¼"x2½"	1" ø	26"	N / A	N / A
HDU14-SDS2.5	1 9/16"	5½"	36-SDS¼"x2½"	1" ø	26"	N / A	N / A
HTT16	1½"	3"	(18) 16d'S	⅝"ø	21"	SSTB 16	13"
HTT22	1½"	3"	(32) 16d SINKERS	⅝"ø	21"	SSTB 24	21"
PHD2	1⅜"	3"	10-SDS¼x3	⅝"ø	13"	SSTB 16	13"
PHD5	1⅜"	3"	14-SDS¼x3	⅝"ø	17"	SSTB 20	17"
PHD6	1⅜"	3"	18-SDS¼x3	⅞"ø	18"	SSTB 28	25"
PHD8	1⅜"	3"	24-SDS¼x3	⅞"ø	25"	SSTB 28	25"
HDQ8	1¼"	3"	20-SDS¼x3	⅞"ø	25"	SSTB 28	25"
HHDQ11	1½"	3½"	24-SDS¼	1"ø	26"	N / A	N / A
HHDQ14	1½"	3½"	30-SDS¼	1"ø	26"	N / A	N / A

DESIGN CRITERIA

SNOW, WIND, & SEISMIC DESIGN FACTORS

Site Elevation: VALLEY Ft. Design Wind Speed: 105 mph Seismic Design Category: D
Ground Snow Load: 30 PSF Exposure: C Seismic Base Shear: .134 W

ROOF FRAMING DESIGN LOADS

Truss Loading: Truss Spacing= 24 "o.c.

			Rafter Loading:		
T.C. LIVE LOAD =	30	PSF	LIVE/SNOW LOAD =	30	PSF
T.C. DEAD LOAD =	10	PSF	DEAD LOAD =	15	PSF
B.C. DEAD LOAD =	10	PSF	TOTAL LOAD =	45	PSF
TOTAL LOAD =	50	PSF			

ROOF PLYWOOD

5 / 8 " CDX APA Rated (48/24) Or OSB Equivalent-Apply Face Grain Perpendicular To Framing. Stagger Panels And Nail w/ 8d Common Per IBC Table 2306.3.1, uno. Edge Nail At Supported Edges, Gable Ends, And Frieze Blocks.

TOP PL SPLICES

Use (10) 16d Nails At All Top Splices (48" Long), U.N.O.

HEADER FRAMING

Use 6 x 8 DF #2 @ Typical Header, U.N.O.
Use (2) Trimmers @ Openings 5'-0" And Greater.

WALL FRAMING

Use 2 x 6 D.F. #2 @ 16" o.c. (UNO)
Use 2 x 6 D.F. #2 @ 16" o.c. @ Garage (UNO)

FLOOR FRAMING DESIGN LOADS

Floor Live Load =	40	PSF
Floor and Deck Dead Load =	15	PSF
Total Floor Load =	55	PSF

Assumed Soil Bearing Pressure (IBC Table 1804.2) = 1000 PSF

FLOOR PLYWOOD

Provide 3 / 4 " T&G APA Rated Plywood (Or Oriented Strand Board). Apply Face Grain Perpendicular To Framing Members. Stagger Panels & Nail w/ 8d At 6" o.c. At All Edges And Boundaries (Blocking At Interior Shear Walls, Drag Members, etc.), And 10" o.c. In The Field, U.N.O.

FLOOR JOISTS

Use DF #2 As Per IBC Table 2308.8.
Use Truss Joist MacMillan I-Joists (TJI) Or Approved Equal As Specified On The Plans. I-Joists Shall Be Installed Per Manufacturers Specifications.

NO.	DATE	REVISION BLOCK	BY

1 0 1 2
4 0 4 8
SCALE: N.T.S.

R|O|Anderson
1603 ESMERALDA AVENUE / POST OFFICE BOX 2229
MINDEN, NEVADA 89423
PHONE: (775) 782-2322 / FAX: (775) 782-7084
WEB SITE: WWW.ROANDERSON.COM

WATER SYSTEM IMPROVEMENTS

SIERRA EAST HOMEOWNERS ASSOCIATION

STRUCTURAL SPECIFICATIONS
WATER TREATMENT

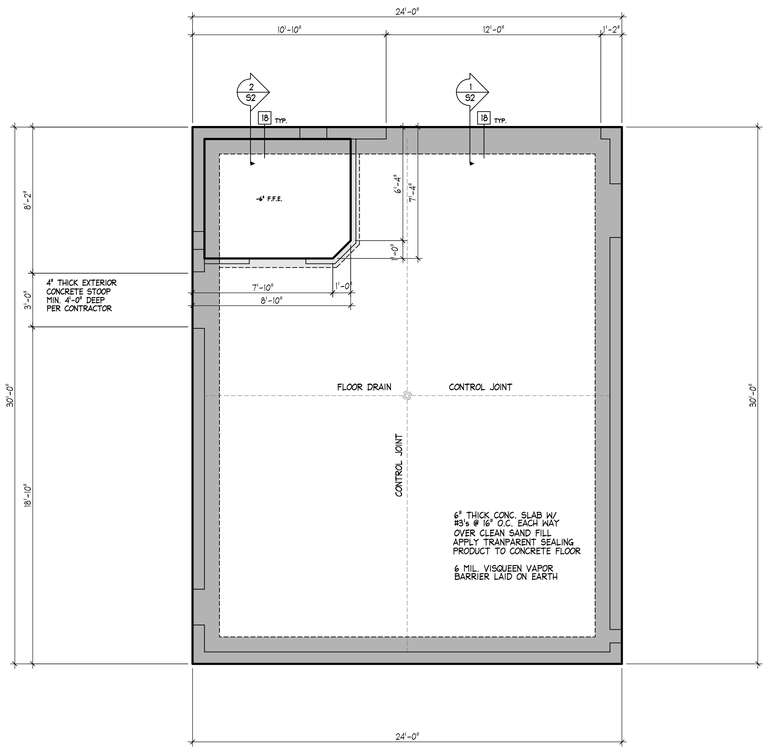
DRAWN: W.A.N.	JOB: 2088-001
ENGINEER: R.V.	DRAWING: 2088-001S1
SCALE: N.T.S.	SHEET: S1
DATE: 3/17/15	OF: 6 SHEETS

VAPOR BARRIER:
6 MIL. VISQUEEN VAPOR BARRIER (OR EQUIVALENT) LAID ON SOIL.

LANDINGS:
PER 2006 IRC SECTION 311.4.3

SLABS:
PROVIDE 4" CONCRETE SLAB ON GRADE WITH #3's @ 16" O.C. EACH WAY REINFORCEMENT. PREPARE GRADE WITH 4" OF SAND & GRAVEL AGGREGATE BASE COMPACTED TO 95% OF RELATIVE COMPACTION, SEE DETAIL.

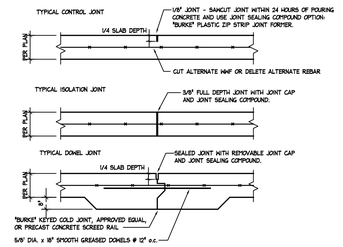
□ = SYMBOL INDICATES A FOOTING - SEE FOOTING SCHEDULE, SHEET S1.



FOUNDATION PLAN

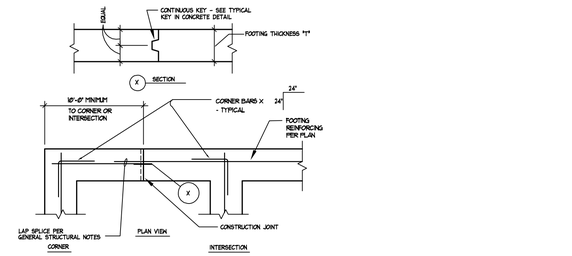
720 SQ. FT.

SCALE: 1/4" = 1'-0"



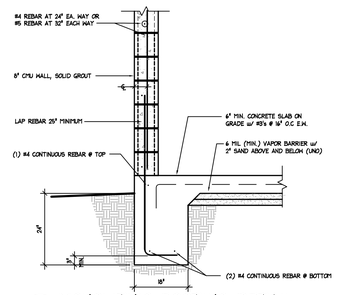
TYPICAL CONCRETE SLAB JOINTS

SCALE: N.T.S.



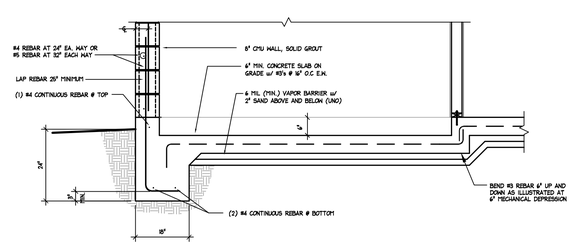
TYP. CORNER REINF. AND CONSTRUCTION JOINTS IN CONCRETE FOOTINGS

SCALE: N.T.S.



1 MONOLITHIC FOOTING DETAIL

SCALE: 1/2" = 1'-0"



2 MONOLITHIC FOOTING DETAIL

SCALE: 1/2" = 1'-0"

NO.	DATE	REVISION BLOCK	BY

SCALE: 1/4" = 1'-0"

R|O|Anderson
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WATER SYSTEM IMPROVEMENTS

SIERRA EAST HOMEOWNERS ASSOCIATION

FOUNDATION PLAN
WATER TREATMENT

DRAWN: W.A.N.	JOB: 2088-001
ENGINEER: R.V.	DRAWING: 2088-001FND
SCALE: 1/4" = 1'-0"	SHEET: S2
DATE: 3/19/15	OF: 6 SHEETS

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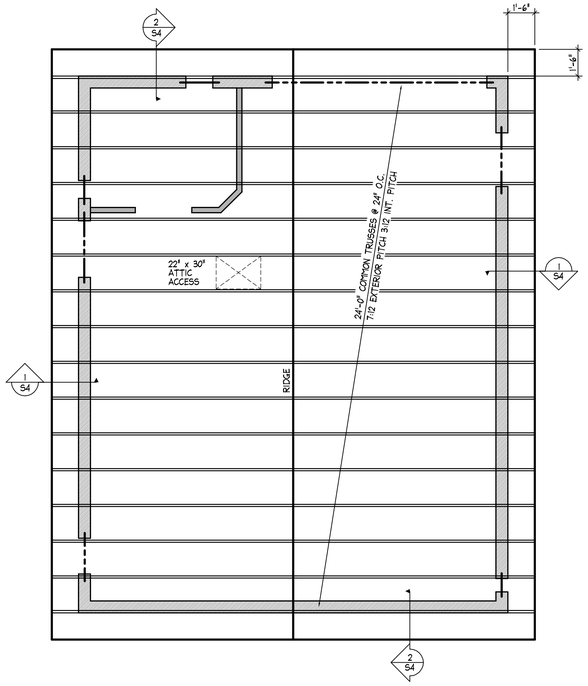


ROOF FRAMING PLAN

720 SQ. FT. SCALE: 1/4" = 1'-0"

ATTIC VENTILATION CALCULATIONS:

$$\frac{720 \text{ SQ. FT.}}{150} = 4.8 \text{ SQ. FT. OF REQUIRED VENTILATION}$$

PROVIDED A MINIMUM OF 50% OF THE REQUIRED VENTILATING AREA IS PROVIDED BY VENTS LOCATED IN THE UPPER PORTION OF THE SPACE TO BE VENTILATED AT LEAST 3'-0" ABOVE EAVE OR CORNICE VENTS
PROVIDE 2.4 SQ. FT. OF VENTILATION AT OR NEAR RIDGE.
PROVIDE 2.4 SQ. FT. OF VENTILATION AT EAVE LINE.

ATTIC VENTILATION PER 2012 IBC SECTION R1203.2

NOTE: THE VENTILATING AREA MAY BE 1/300 OF THE AREA OF SPACE VENTILATED PROVIDED A VAPOR RETARDER I ACCORDANCE WITH ASTM E 96 IS INSTALLED ON THE WARM SIDE OF THE ATTIC INSULATION

ROOFING:

RAISED SEAM METAL ROOFING INSTALL PER MANUFACTURER'S SPECIFICATIONS AND 2012 IBC SECTION 1507.4, OVER UNDERLAYMENT PER TABLE 1507.2

SHEATHING:

5/8" CDX PLYWOOD (OR EQUAL) EXPOSURE 1, APA SPAN RATED (40/20).
STAGGER JOINTS - NAIL WITH 8d COMMON PER 2012 IBC TABLE 2306.3.1, UNO.

TRUSSES:

PRE-MANUFACTURED ENGINEERED TRUSSES @ 24" o.c.
PROVIDE 2x STUD PER TRUSS PLY @ ALL GIRDER BRG. POINTS, U.N.O. DOWN TO HEADER OR SOLE PLATE. SOLID VERTICAL BLOCK AT FLOOR SYSTEM. STACK IN WALL FRAMING IN ALL LEVELS DOWN TO FOUNDATION.

NOTE: SEE TRUSS CALCULATIONS FOR TRUSS DESCRIPTIONS

HEADERS:

C.M.U. HEADER PER DETAILS PROVIDED

METAL CONNECTORS:

TRUSS HANGERS PER MANUFACTURERS
SIMPSON HGA10 CLIPS @ ALL TRUSS BEARING POINTS ON PLATES

OUTLOOKERS:

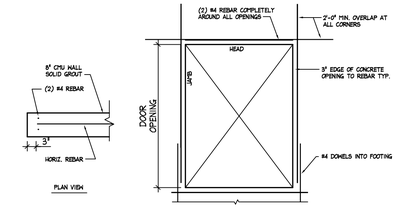
2x6 D.F. #2 OUTLOOKERS AT 24" O.C.

ATTIC ACCESS:

22"x30" MIN. - PER 2012 IBC 1209.2.1

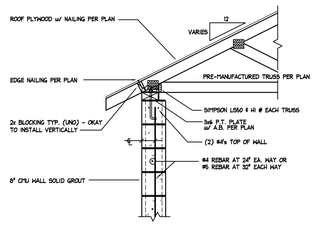
STRUCTURAL ENGINEERING NOTES

- SEE SHEET S2 FOR STANDARD STRUCTURAL DETAILS PER APPLICATION.
- WHERE POSTS AND MULTIPLE STUDS ARE SPECIFIED, THEY ARE TO BE STACKED IN ALL WALL FRAMING AND SOLID VERTICAL GRAIN BLOCKING SHALL BE PROVIDED AT ALL FLOOR LEVELS DOWN TO THE FOUNDATION OR HEADOUT.
- CONTRACTOR TO PROVIDE TRUSS CALCS FOR REVIEW AND APPROVAL BY PROJECT ENGINEER. DO NOT CHANGE TRUSS MANUFACTURERS OR TRUSS LAYOUT SHOWN HERE WITHOUT THE APPROVAL OF THIS PROJECT ENGINEER.
- CONTRACTOR TO VERIFY TRUSS SPANS, DEFLECTIONS, PROFILES, CONNECTIONS, ETC. WITH TRUSS MANUFACTURER PRIOR TO CONSTRUCTION. DO NOT DEVIATE FROM HANGERS SPECIFIED ON PLANS UNLESS VERIFIED BY PROJECT ENGINEER.



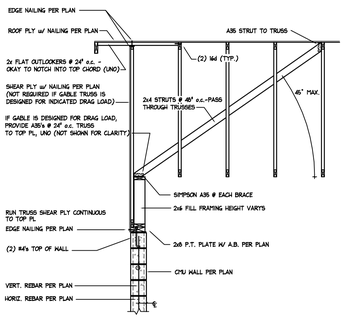
TYP. REBAR AROUND DOOR

FRM 021 SCALE: N.T.S.



1 CMU WALL TO TRUSS CONNECTION

RFP 0001 SCALE: 1/2" = 1'-0"



2 GABLE TRUSS TO CMU WALL CONNECTION

RFP 0025 SCALE: 1/2" = 1'-0"

NO.	DATE	REVISION BLOCK	BY

1 0 1 2
4 0 4 8
SCALE: 1/4" = 1'-0"

R|O|Anderson
1603 ESMERALDA AVENUE / POST OFFICE BOX 2229
MINDEN, NEVADA 89423
PHONE: (775) 782-2322 / FAX: (775) 782-7084
WEB SITE: WWW.ROANDERSON.COM

WATER SYSTEM IMPROVEMENTS

SIERRA EAST HOMEOWNERS ASSOCIATION

ROOF FRAMING PLAN
WATER TREATMENT

DRAWN: W.A.N.	JOB: 2088-001
ENGINEER: R.V.	DRAWING: 2088-001RFP
SCALE: 1/4" = 1'-0"	SHEET: S3
DATE: 3/17/15	OF: 6 SHEETS

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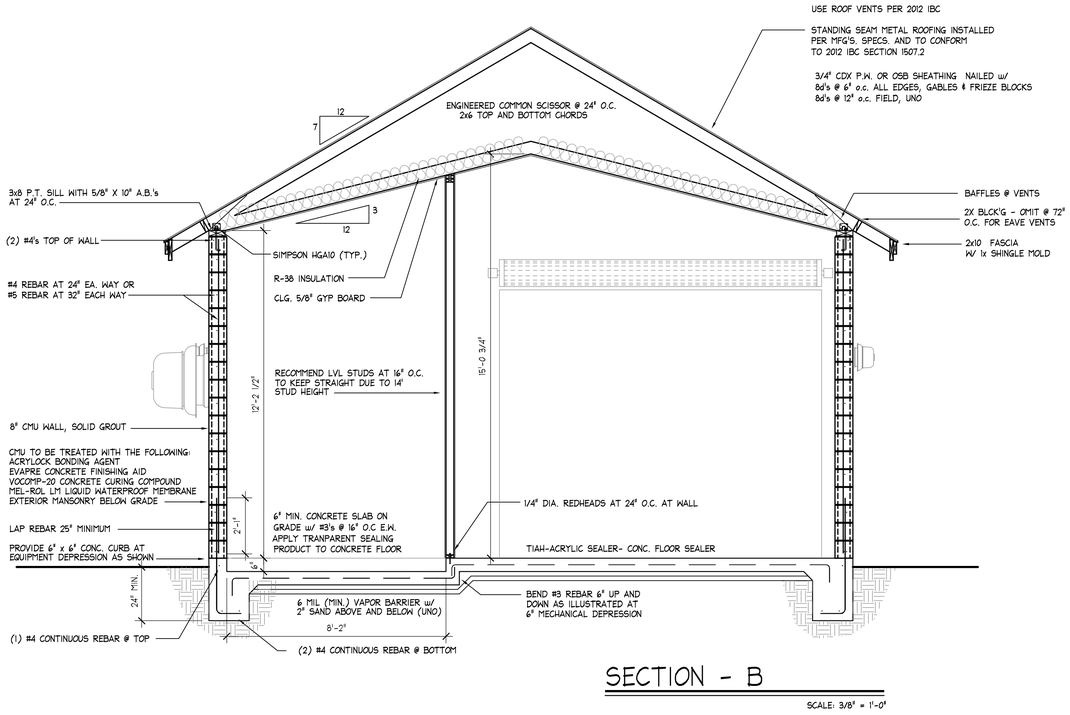


SECTION - B

SCALE: 3/8" = 1'-0"

ROOFING:
STANDING SEAM METAL ROOFING INSTALLED PER MANUFACTURER'S SPECIFICATIONS AND 2012 IBC SECTION 1507.2

SHEATHING:
3/4" CDX PLYWOOD (OR EQUAL) EXPOSURE 1, APA SPAN RATED (40/20).
STAGGER JOINTS - NAIL WITH 8d @ 6"o.c. ALL EDGES, GABLE ENDS, AND FRIEZE BLOCKS, 8d @ 12" O.C. FIELD

TRUSSES:
PRE-MANUFACTURED ENGINEERED TRUSSES @ 24"o.c.
PROVIDE 2x STUD PER TRUSS PLY @ ALL GIRDER BRG. POINTS @ PLATES. U.N.O.
NOTE: SEE TRUSS CALCULATIONS FOR TRUSS DESCRIPTIONS

FILL SECTIONS:

RIDGE	2x8 DF #2 OR BETTER
RAFTERS	2x6 DF #2
VALLEY KICKER	2x8 DF #2

(TYPICAL UNLESS OTHERWISE NOTED)

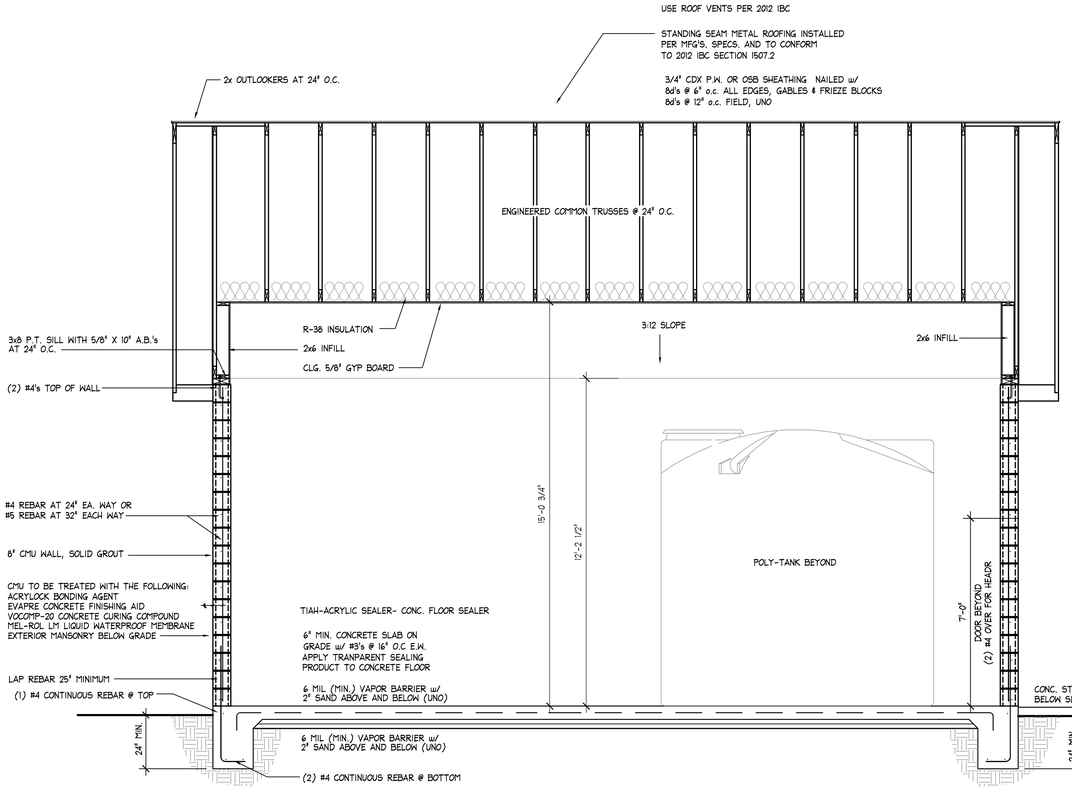
EXTERIOR FLATWORK:
PROVIDE 4" CONCRETE SLAB ON GRADE .
PREPARE GRADE WITH 4" OF SAND & GRAVEL AGGREGATE BASE COMPACTED TO 95% OF RELATIVE COMPACTION.

ANCHOR BOLTS:
5/8" DIA.x 10" A.B. @ 24" o.c. (UNO). MAX. 2 ANCHOR BOLTS PER BOARD MINIMUM, 12" FROM ENDS MAXIMUM. ANCHOR BOLTS EMBEDDED 7" INTO CONC. MINIMUM. INSTALL 3" x 3" x 1/4" PLATE WASHERS ON EACH ANCHOR BOLT.

VAPOR BARRIER:
6 MIL. VISQUEEN VAPOR BARRIER (OR EQUIVALENT) LAID ON SOIL.

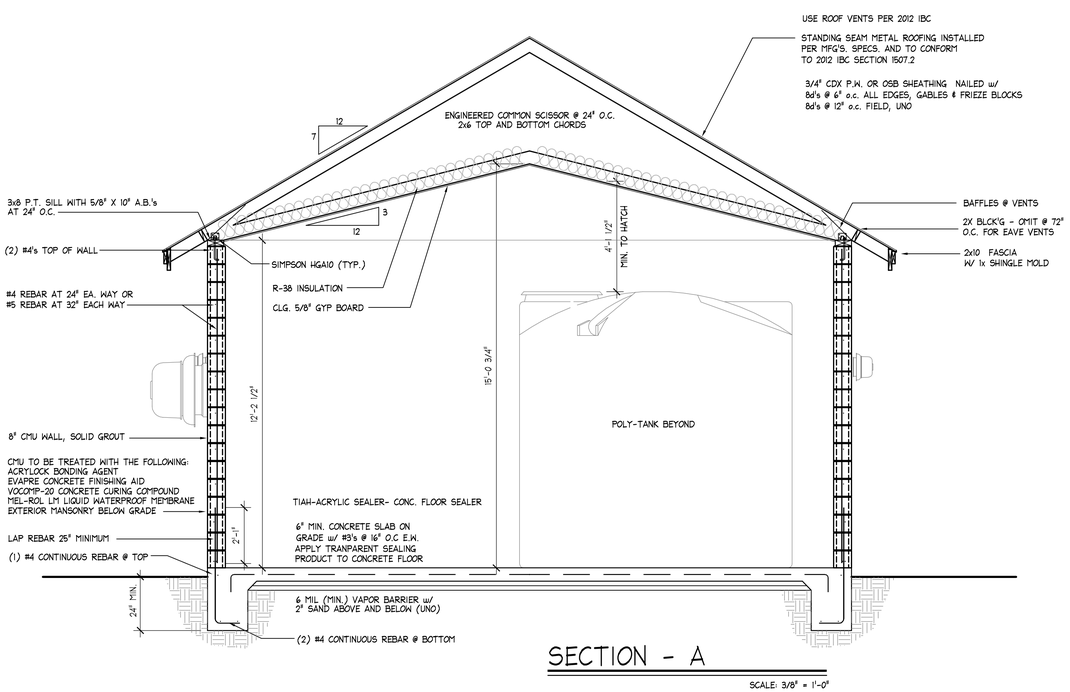
LANDINGS:
PER 2012 IBC SECTION 1008.1.5

METAL CONNECTORS:
ALL HANGERS SPECIFIED ARE SIMPSON STRONG TIE OR EQUIVALENT.



SECTION - B

SCALE: 3/8" = 1'-0"



SECTION - A

SCALE: 3/8" = 1'-0"

NO.	DATE	REVISION BLOCK	BY

1 0 1 2
4 0 4 8
SCALE: 3/8" = 1'-0"

R|O|Anderson
1603 ESMERALDA AVENUE / POST OFFICE BOX 2229
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WEB SITE: WWW.ROANDERSON.COM

WATER SYSTEM IMPROVEMENTS

SIERRA EAST HOMEOWNERS ASSOCIATION

SECTIONS
WATER TREATMENT

DRAWN: W.A.N.	JOB: 2088-001
ENGINEER: R.V.	DRAWING: 2088-001SC1
SCALE: 3/8" = 1'-0"	SHEET: S4
DATE: 3/17/15	OF: 6 SHEETS

Appendix C

SEHOA Biological Resources Memorandum

(Sierra Ecotone Solutions, March 26, 2015)

SIERRA ECOTONE SOLUTIONS
530.416.2440 • PO Box 1297 Zephyr Cove, NV 89448 • SierraEcotoneSolutions.com

26 March 2015

Ms. Coleen Shade
RO Anderson Engineering
595 Tahoe Keys Blvd, Suite A-2
South Lake Tahoe, CA 96150

RE: SIERRA EAST HOMEOWNERS ASSOCIATION WATER SYSTEM IMPROVEMENT PROJECT BIOLOGICAL ASSESSMENT MEMORANDUM

Dear Ms. Shade:

This memorandum documents the potential for sensitive biological resources to occur on the project site, such as those considered sensitive under the California Environmental Quality Act or the Endangered Species Act of 1973, and those subject to regulation by a resource agency, requiring a permit or other formal authorization for project-related impacts (i.e. US Fish and Wildlife Service or California Department of Fish and Wildlife). The results of the literature review and field reconnaissance are outlined below. A description of the biological setting of the site and surrounding area is included below (vegetation communities, special status species, sensitive natural communities, and potentially jurisdictional waters and wetlands). Potential impacts to biological resources are discussed below that would result from implementation of the Sierra East Homeowners Association Water System Improvement Project. No impacts to biological resources are expected to occur if construction occurs outside the nesting period and if specific resources are avoided as noted below.

The Sierra East Homeowners Association (SEHOA) is a small community in Antelope Valley about three miles south of the town of Coleville, California (see Figure 1 and 2). The SEHOA owns and operates a small community water system and is responsible for providing safe drinking water to its residents. The water system receives its source water from two groundwater wells and services approximately 29 single family residential connections. Historically, both source wells have tested positive for high arsenic levels. One of the source wells has, in addition to the high arsenic level, tested positive for bacteriological contamination on occasion. In February of 2012 the SEHOA received a compliance order from the Mono County Health Department Division of Environmental Health, which requires that the SEHOA cease and desist from continuing its use of the existing system's source water and provide the system with water of satisfactory quality per the California Health and Safety Code (RO Anderson 2015).

Highly varied groundwater quality, resulting from a complex range of hydrogeological conditions in the Antelope Valley, presents the SEHOA with various groundwater quality challenges. One of the two source wells for the SEHOA has hot water (up to 145°F) while the other source well this is about 500 feet away has cold water. Both wells have arsenic concentrations several times the Federal Maximum Contaminant Level (MCL) (RO Anderson 2015).

The system proposed for the Sierra East Homeowners Association (SEHOA) water system improvement project is to remove arsenic from the local residential water supply. The proposed project for arsenic removal is an adsorption system. The adsorption system will be installed at the point where source water enters the water supply distribution system upstream of domestic connections. The existing infrastructure for the SEHOA water distribution system is approximately 32 years old and is arranged as a single path or tree system with 3-inch mains and ¾ inch service laterals for each domestic connection. The proposed project includes the following project components: adsorption system; new mechanical building; redrill the cold well; rehabilitate the hot well; hot well cooling loop; water meters; and emergency generator. For a detailed description of the proposed project and the above components, please refer to the Initial Study Negative Declaration prepared for the project (RO Anderson 2015).

DATABASE SEARCH

The Project site is located within the United States Geological Survey (USGS) Coleville 7.5-minute topographic quadrangle. The California Department of Fish and Widllife Natural Diversity Database (CNDDB 2015) for records of special-status species occurrences within the Coleville 7.5 min Quad map and surrounding 7.5 min Quads (Topaz Lake, Heenan Lake, Wolf Creek, Disaster Peak, Lont Cannon Peak, Chris Flat, Risue Canyon, Long Dry Canyon) was run on 19 March 2015. Additionally a species list was obtained from the US Fish and Wildlife Service for Inyo County on 19 March 2015 and a report was run for the Coleville 7.5 min Quad Map (and associated 9 Quads noted above) to focus the data from USFWS. Additionally, the California Native Plant Society (CNPS) database was searched for sensitive and rare plants in Riparian forest habitat in the nine 7.5 min Quad Maps surrounding and including Coleville CA. The database query results and a copy of the USFWS letter are available in Appendix A.

SITE RECONNAISSANCE SURVEY

A reconnaissance level field survey to assess habitat conditions and evaluate the site's potential to support special-status plant and/or animal species was performed by Sierra Ecotone Solutions (SES) biologists on 12 May 2014. SES biologists Amy Parravano and Garth Alling walked the project area in order to perform the visual survey to record the existing vegetation types, wildlife habitat presence of sensitive natural communities and the approximate location and extent of wetland features. A detailed botanical survey was

performed to the extent possible as well as a passive survey for wildlife species observed within the project area. Photographs of the project site are provided in Appendix B.

RESULTS

Table 1 below summarizes the database searches noted above for species that may occur in the project area, provides a general habitat description and determines if suitable habitat is present onsite.

Table 1

Regional Species and Habitats of Concern

Common Name Scientific Name	Status	General Habitat Description (Zeiner et al 1990 and Calflora 2015)	Habitat Present/ Absent/Unknown	Rationale
Fish				
Hypomesus transpacificus delta smelt	FT	Native to the lower and middle reaches of the Sacramento and San Joaquin River delta	A	No suitable habitat present onsite as the Sacramento and San Joaquin River delta are on the western slope of the Sierra Nevada.
Oncorhynchus (=Salmo) clarki henshawi Lahontan cutthroat trout	FT	Historically occurred in all accessible cold waters of the Lahonton Basin in a wide variety of water temps and conditions. Cannot tolerate presence of other salmonids. Gravel riffles in streams required for breeding.	A	Project area does not include suitable habitat as Walker River supports non-native salmonids. Closest known population of LCT is located 5 miles to the south of Project area in Mill Creek (CNDDB 2015)
Oncorhynchus (=Salmo) clarki seleniris Paiute cutthroat trout	FT	Population is known only to occur in the Silver King Creek basin in the Carson-Iceberg Wilderness Area in Alpine County, CA.	A	Project is outside the watershed of Silver King Creek basin where known isolated populations of Paiute cutthroat trout occur. Silver King Creek basin lies 8 miles to the west of the project area. (CNDDB 2015)
Amphibians				
Bufo canorus Yosemite toad	FT	Inhabits wet mountain meadows, willow thickets, and the borders of forests, usually not more than a hundred meters from permanent water. From 4,800 - 12,000 ft. (1,460 - 3,630 m.) elevation.	A	Project area does not contain high mountain meadows or conifer forested areas.

Table 1

Regional Species and Habitats of Concern

Common Name Scientific Name	Status	General Habitat Description (Zeiner et al 1990 and Calflora 2015)	Habitat Present/ Absent/Unknown	Rationale
Rana muscosa Sierra Nevada yellow-legged frog	FE	Streams, lakes, and ponds in montane riparian, lodgepole pine, subalpine conifer and wet meadow habitats. Always encountered within a few feet of water. Tadpoles may require 2 - 4 years to complete their aquatic development.	A	No suitable habitat within the project area. The ditch flowing along the eastern border of the project area does not contain suitable habitat due to periodic flows and lack of vegetation structure to support SNYLF. The rocky embankment in the north east corner of the project area along the edge of the Walker River drainage does not contain suitable habitat.
Birds				
Haliaeetus leucocephalus Bald eagle	D	Breeds and roosts in remote coniferous forests in close proximity to a river, stream, lake, reservoir, marsh, or other wetland area.	P	Suitable roosting habitat is located adjacent to the project area in cottonwood trees along the Walker River. Closest known occurrence is a nesting pair presumed to be extant at Topaz Lake approximately 10 miles to the north.
Mammals				
Martes pennanti Pacific fisher	FC	Extensive forested are as with continuous canopy in higher elevations. Avoids entering open areas that have no overstory or shrub cover.	A	No suitable habitat within the project area due to the absence of forested area and limited overstory cover.
Plants and Fungi				
Boechera cobrensis Masonic rockcress	2B.3	a perennial herb that is native to California that blooms in June and July in sandy habitat especially sagebrush.	P	Suitable habitat present onsite.
Carex occidentalis western sedge	2B.3	Grows in woodland and grassland habitats and blooms between June and August	A	No suitable habitat within the project area due to lack of woodland and grassland habitats.
Carex petasata Liddon's sedge	2B.3	Occurs in wet meadows and wetlands in yellow-pine forest and riparian areas. Blooms May through July.	P	Suitable habitat present along banks of irrigation ditch within project area.
Carex vallicola western valley sedge	2B.3	Occurs in both xeric and mesic habitats in both forest and grassland areas	A	Suitable habitat not present onsite as no grassland areas occur within the project area.

Table 1

Regional Species and Habitats of Concern

Common Name Scientific Name	Status	General Habitat Description (Zeiner et al 1990 and Calflora 2015)	Habitat Present/ Absent/Unknown	Rationale
Claytonia umbellate Great Basin claytonia	2B.3	Occurs in subalpine coniferous forest on talus slopes. Blooms May through August.	A	Suitable habitat not present onsite as no subalpine coniferous forest areas occur within the project area.
Glyceria grandis American manna grass	2B.3	Occurs in riparian habitats, streambanks, lake-margins, meadows, bogs/fens, edges.	P	Suitable habitat present along banks of irrigation ditch within project area.
Hymenopappus filifolius var. nanus little cutleaf	2B.3	Occurs in limestone soil, pinyon/juniper woodland, subalpine forest. Blooms May–Aug	A	Suitable habitat not present onsite as no pinyon/juniper woodland occurs within the project area.
Kobresia myosuroides seep kobresia	2B.2	Occurs in Alpine Fell-fields, Subalpine Forest, wetland-riparian; often associated with wetlands.	P	Suitable habitat present along banks of irrigation ditch within project area.
Polygala subspinosa spiny milkwort	2B.2	Occurs in desert scrub and volcanic mesas. Blooms May through August	A	No suitable habitat present onsite. Known occurrences to the south east in the Sweetwater mountains.
Viola purpurea ssp. Aurea golden violet	2B.2	Occurs in Sagebrush Scrub, Pinyon-Juniper Woodland. Blooms from may through July.	P	Suitable habitat present onsite in the form of Sagebrush Scrub habitat.

C- Candidate, T-Threatened, E – Endangered, SSC- Species of Special Concern, FP - Fully Protected, CNPS Rank 1B, 2.1, 2.2, 2.3, 3, 4.2 SES 2015

Table 2 summarizes the preliminary list of plant species scientific names and common names identified during the reconnaissance survey conducted on 12 May 2014. Site is below elevation range for species that came up in the database search noted above. The timing of the survey coincided with documented blooming periods for several species that occur in freshwater marshes, riparian, and other wetland habitat types. However, these species were not observed during the survey and the absence of these habitat types within the project area likely preclude the occurrence of these species. For the species documented from shrub-dominated and/or mesic grassland habitat within a similar elevation range as the Study Area, the timing of the survey would have been appropriate to detect these species.

Table 2
Plant Species Observed During Site Survey

Scientific Name	Common Name
Robinia pseudoacacia	Black locust
Prosopis glandulosa	mesquite

Table 2 Plant Species Observed During Site Survey	
Scientific Name	**Common Name**
Cupressus sp.	Ornamental cypress
Pinus sp.	Ornamental pine
Amelanchier utahensis	Pale leaved serviceberry
Artemesia tridentata ssp. tridentata	Great Basin sagebrush
Artemisia ludoviciana ssp. ludoviciana	Silver wormwood
Artemisia spinescens	Budsage
Bromus tectorum	Cheat grass
Ceanothus leucodermis	Chaparral whitethorn
Chrysothamnus viscidiflorus ssp. viscidiflorus	sticky leaved rabbitbrush
Ephedra viridis	Green ephedra
Ericameria nauseosa var. oreophila	Rubber rabbitbrush
Eriogonum umbellatum var. nevadense (no flrs)	Sulfur buckwheat
Erodium cicutarium	Redstem filaree
Eschscholzia californica	California poppy
Hordeum jubatum	Fox tail barley
Muhlenbergia minutissima	Annual muhly
Pinus monophylla	Pinyon pine
Populus balsamifera ssp. trichocarpa	Black cottonwood
Prunus emarginata	Bitter cherry
Purshia tridentata var. tridentata	Antelope brush
Rosa woodsii ssp. ultramontana	Interior rose
Salix exigua	Narrowleaf willow
Tetradymia canescens	Gray horsebrush

SES 2015

Table 3 summarizes the preliminary list of wildlife species observed and identified during the reconnaissance survey on 12 May 2014.

Table 3 Wildlife Species Observed	
Scientific Name	**Common Name**
Birds	
Agelaius phoeniceus	red-winged blackbird
Anas platyrhynchos	mallard
Buteo jamaicensis	red-tailed hawk
Carpodacus mexicanus	house finch
Cathartes aura	turkey vulture
Corvus corax	common raven

Table 3 Wildlife Species Observed	
Scientific Name	**Common Name**
Callipepla californica	California quail
Coccothraustes vespertinus	evening grosbeak
Euphagus cyanocephalus	Brewer's blackbird
Hirundo rustica	barn swallow
Turdus migratorius	American robin
Tyrannus verticalis	western kingbird
Zenaida macroura	morning dove
Mammals	
Odocoileus hemionus	mule deer

SES 2015

Wildlife species assemblage information was based upon existing documentation and information gathered from the *California Wildlife Habitat Relationships System* (CDFG 2008) and *A Guide to Wildlife Habitats of California* (Mayer and Laudenslayer 1988). Plant communities in the Project area include Desert Riparian, Sagebrush and Urban. Wildlife habitats onsite include Montane Cotonwood Riparian Forest, Great Basin Sagebrush Scrub (nomenclature follows Sawyer Keeler Wolf 2009). The Desert Riparian habitat is located only in the northeast corner of the project area where the flood zone of the Walker River is present. The remainder of the project area is Urban as it is currently developed and the remainder of the project area is designed as Sagebrush in the location where the proposed development is to occur. Based on the existing development, the site is currently heavily disturbed with rip-rap along the Walker River floodzone, fences and vegetation clearing with planning of ornamentals along he eastern portion of the site.

DISCUSSION

WILDLIFE

Based on the information provided in Table 1 above and a reconnaissance survey of the site performed on 12 May 2014, the project area is adjacent to suitable roosting habitat for bald eagle. Known nesting activity has been documented at Topaz Lake. Suitability is currently low for roosting eagles due to existing drought conditions and low flows in the Walker River. The site reconnaissance survey did not detect any bald eagle. The proposed project could potentially impact roosting bald eagles that may utilize trees adjacent to the project site. Construction during project activities could potentially impact the suitability of the adjacent roosting habitat. If construction is to occur between and including the months of April and August pre-construction surveys should be performed to determine if any raptors have active nests in the immediate vicinity. If construction is to occur outside these months, no pre-construction raptor nesting survey

will be necessary. All eagle nests are protected under The Bald and Golden Eagle Protection Act (16 U.S.C. 668-668c).

The Walker River is located outside the project area flowing from south to north toward Topaz Lake. No portion of the Walker River (banks, bed, or floodzone) is proposed to be disturbed in conjunction with this project. Historically, the Walker River basin supported Lahontan cutthroat trout (LCT). Introduction of European settlers into the area in the mid 1800's resulted in habitat degradation. The basin has been subjected to extensive human impacts from land and water development, population growth and recreation. These impacts have altered the physical and biological integrity of the Walker River basin causing water quality degradation, habitat fragmentation, geomorphic instability, and have resulted in a decline of native fish populations (WRRRIT 2003). Currently the Walker River in the vicinity of the project does not support LCT. No impacts to LCT will result from project implementation.

SPECIAL STATUS PLANTS

Plant species that are listed as endangered or threatened under the Federal Endangered Species Act (FESA) or California Endangered Species Act (CESA), or plant species that are proposed or candidates for listing as endangered or threatened, are protected by law and are considered special-status species. Plant species, which may not be listed as endangered, threatened, candidate, or proposed species under FESA or CESA, may be considered rare if assigned a rarity code by the California Native Plant Society (CNPS). The CNPS lists five categories of rarity (Lists 1A, 1B, 2, 3, and 4). Under CEQA, impact analyses are mandatory for List 1 and 2 species, but not for all List 3 and 4 species as some do not meet the definitions of the Federal Native Plant Protection Act or the California Endangered Species Act; however, List 3 and 4 impacts to these species are generally considered in most CEQA analyses and are recommended by the CNPS (2001). Based on the data compilation and background research, 10 special-status plant species were recorded to occur, or have the potential to occur, in the Project site vicinity (Table 1). Of these species, it has been determined that 5 species have no potential to occur, due to a lack of suitable habitat elements and/or because the site is located outside of species' documented elevation ranges. Based on the habitats present onsite, a total of 5 special-status plant species have the potential to occur within Project site.

A biological reconnaissance survey was performed on-site on 12 May 2014 to evaluate the suitability of onsite habitats to support the special status plants documented from the vicinity. During the site reconnaissance, a one focused plant survey was conducted by a qualified botanist following survey protocols issued by the CNPS (2001), CDFW (2000), and USFWS (1996). The habitat requirements of all species with potential to occur on-site were evaluated as compared to the conditions observed during the site survey. For purposes of this analysis, the 5 species listed above in Table 1 (*Boechera cobrensis, Carex petasata, Glyceria grandis, Kobresia myosuroides,* and *Viola purpurea* ssp. *Aurea*) have potential to be present onsite due to the presence of suitable habitat.

No special-status plants (including those listed above in Table 1) were encountered on the Project site during the 2014 site survey, therefore no further mitigation is required.

SENSITIVE NATURAL COMMUNITIES

Sensitive vegetation communities are natural communities and habitats that are either unique, of relatively limited distribution in the region, or of particularly high wildlife value. However, these communities may or may not necessarily contain special-status species. Sensitive natural communities are usually identified in local or regional plans, policies or regulations. The California Department of Fish and Wildlife (CDFW) ranks sensitive communities as 'threatened' or 'very threatened' and keeps records of their occurrences in its Natural Diversity Database. Sensitive plant communities are also identified by CDFW on their List of California Natural Communities. In addition, streams, lakes, and riparian vegetation that are subject to jurisdiction by the CDFW under Sections 1600-1616 of the California Fish and Game Code are also regulated as sensitive communities. Impacts to sensitive natural communities identified in local or regional plans, policies, or regulations or by the CDFW or the USFWS must be considered and evaluated under the California Environmental Quality Act (California Code of Regulations: Title 14, Div. 6, Chap. 3, Appendix G). According to a search of CNDDB, no sensitive natural communities have been documented within the Project site. However, the irrigation ditch supports (through transmissive losses) adjacent woody riparian habitat (*Salix sp.),* which is subject to regulation by CDFW.

WETLANDS

The U.S. Army Corps of Engineers (USACE) and the U.S. Environmental Protection Agency (EPA) regulate the discharge of dredged or fill material into waters of the United States, including wetlands, under Section 404 of the Clean Water Act (CWA) (33 USC 1344). Waters of the United States are defined in Title 33 CFR Part 328.3(a) and include a range of wet environments such as lakes, rivers, streams (including intermittent streams), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds. Section 404 of the CWA requires a federal license or permit before dredged or fill material may be discharged into waters of the United States, unless the activity is exempt from Section 404 regulation (e.g., certain farming and forestry activities). Section 401 of the CWA (33 U.S.C. 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 from the state in which the discharge originates or would originate, or, if appropriate, from the interstate water pollution control agency having jurisdiction over the affected waters at the point where the discharge originates or would originate. The responsibility for the protection of water quality in California rests with the Regional Water Quality Control Board (RWQCB).

On 12 May 2014, the Project site was assessed by biologists to determine if any wetlands and "waters" potentially subject to jurisdiction by the USACE, RWQCB, and CDFW were present. Based on the results of the site reconnaissance survey, no wetland areas are likely to occur within the project area. The northeast portion of the project site is within the high water line of the Walker River, which is a Water of the US. The irrigation canal that lies on the western portion of the site is connected directly to Walker River. The irrigation ditch is therefore likely a Water of the US and subject to US Army Corps of Engineers jurisdiction. The USFWS National Wetland Inventory (NWI) provides geospatial data and wetland maps generated through landscape-level aerial photographic interpretation and regional modeling. No wetlands or deepwater habitats have been mapped by the NWI within the Project site (USFWS 2015) as shown in Figure 3.

The Sierra East HOA should make efforts to avoid all jurisdictional features to the extent feasible. If waters regulated by CWA Section 404/401 are present (irrigation ditch) and cannot be avoided by Project construction, this would result in an impact. Any alterations of, or discharges into, waters of the United States, including Section 404 wetlands must be in conformance with the Sections 404 and 401 of the CWA via certification and/or permitting prior to any grading or construction that may impact jurisdictional area(s), as applicable.

REQUIRED PERMITTING

The following permits are required prior to implementation of the Sierra East HOA Water System Improvement Project.

California Department of Fish and Wildlife Section 1600 Notification

The Sierra East HOA shall avoid the removal of California Department of Fish and Wildlife regulated riparian vegetation within the Project area (associated with the irrigation ditch. If the regulated vegetation cannot be avoided, the Sierra East HOA shall replace the loss of CDFW-regulated riparian vegetation through the submittal of a Lake or Streambed Alteration Notification Package to the CDFW. Provided the project is authorized by the CDFW through issuance of a 1602 Lake or Streambed Alternation Agreement, the City shall be required to comply with all CDFW permit provisions, which may include replacement and re-establishment of riparian vegetation in order to compensate for loss of riparian habitat.

Consistency with the Migratory Bird Treaty Act

If project construction takes place during the nesting season between the months of April and August the Sierra East HOA shall protect existing active bird nests and/or nursery sites to be impacted by Project construction activities. The City shall develop an Active Raptor and Migratory Bird protection program (Program) to meet these needs. The Program shall include surveys, consultation with California Department of Fish and

Wildlife and US Fish and Wildlife Service (if necessary), and protective actions. Pre-construction surveys, conducted during the nesting/breeding season immediately prior to initial Project construction (e.g., excavation, grading and vegetation removal), shall be conducted to identify any active raptor or migratory bird nest sites within the project area that may not have occurred previously. During initial construction activities (vegetation removal and excavation for the construction), a qualified biological monitor shall be present to evaluate whether any raptors or migratory birds are occupying trees are within the project area. The biological monitor shall have the authority to stop construction near occupied trees or nursery sites if it appears to be having a negative impact on nursery sites, nesting raptors, migratory birds or their young observed within the construction zone. If construction must be stopped, the monitor shall consult with CDFW or USFWS (if applicable) staff within 24 hours to determine appropriate actions to restart construction while reducing impacts to identified nursery sites, raptors or migratory bird nests.

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Mayer, K. E. and W. F. Laudenslayer, Jr. 1988. A Guide to the Wildlife Habitats of California. California Department of Forestry and Fire Protection, Sacramento.

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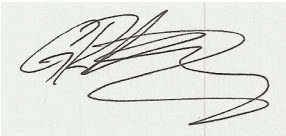
Sawyer, Keeler-Wolf and Evens. 2009. A Manual of California Vegetation. 2nd Edition.

WRRIT 2003. Walker River Basin Recovery Implementation Team. US Fish and Wildlife Service. Reno, NV. 44pp.

Zeiner, D. C., W. F. Laudenslayer Jr., and K. E. Mayer (editors). 1990. California's Wildlife. Resources Agency, Dept., Sacramento, California.

Sincerely,



Garth Alling
Principal Biologist
Sierra Ecotone Solutions, LLC

Attachments

- Figure 1 – Vicinity Map
- Figure 2 – Project Area
- Figure 3 – USFWS National Wetland Inventory Map
- Appendix A – Database Search Results
- Appendix A – Site Photographs

FIGURE 1- VICINITY MAP

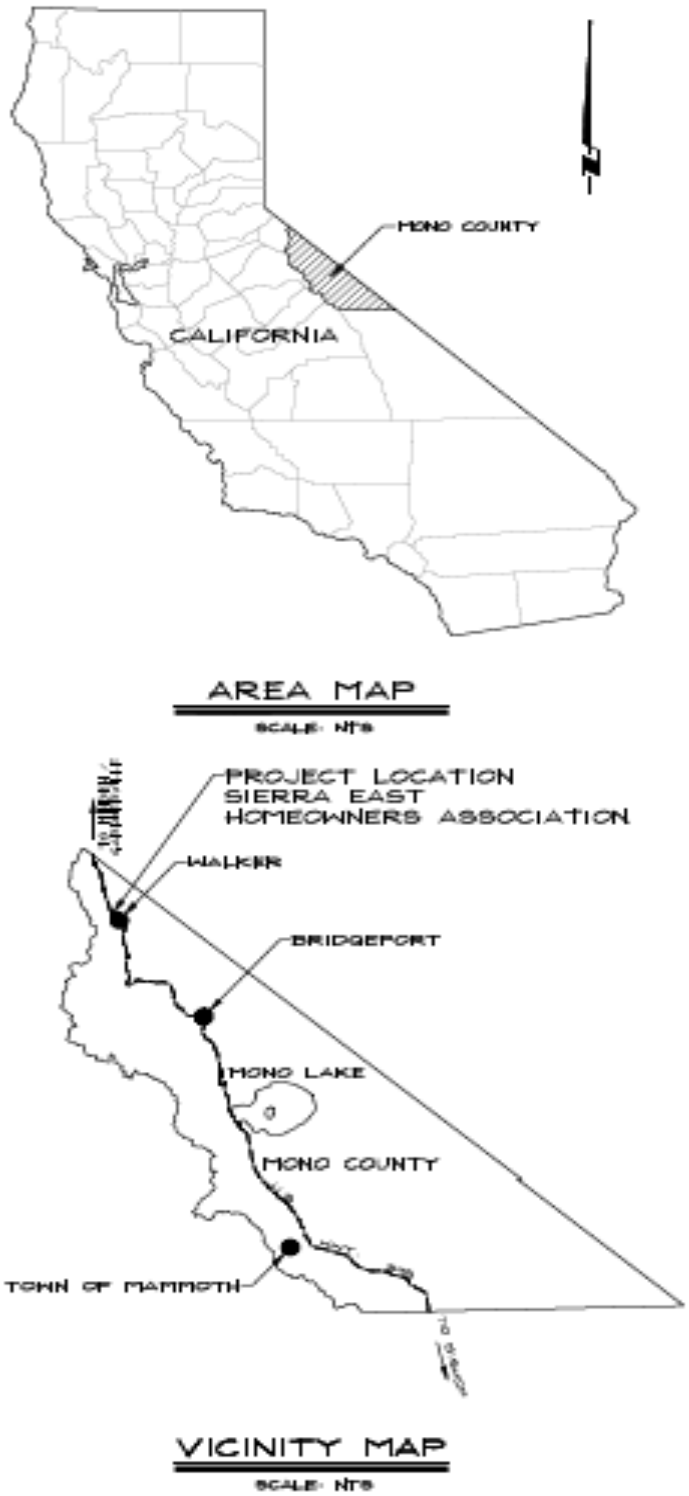


FIGURE 2 – PROJECT AREA

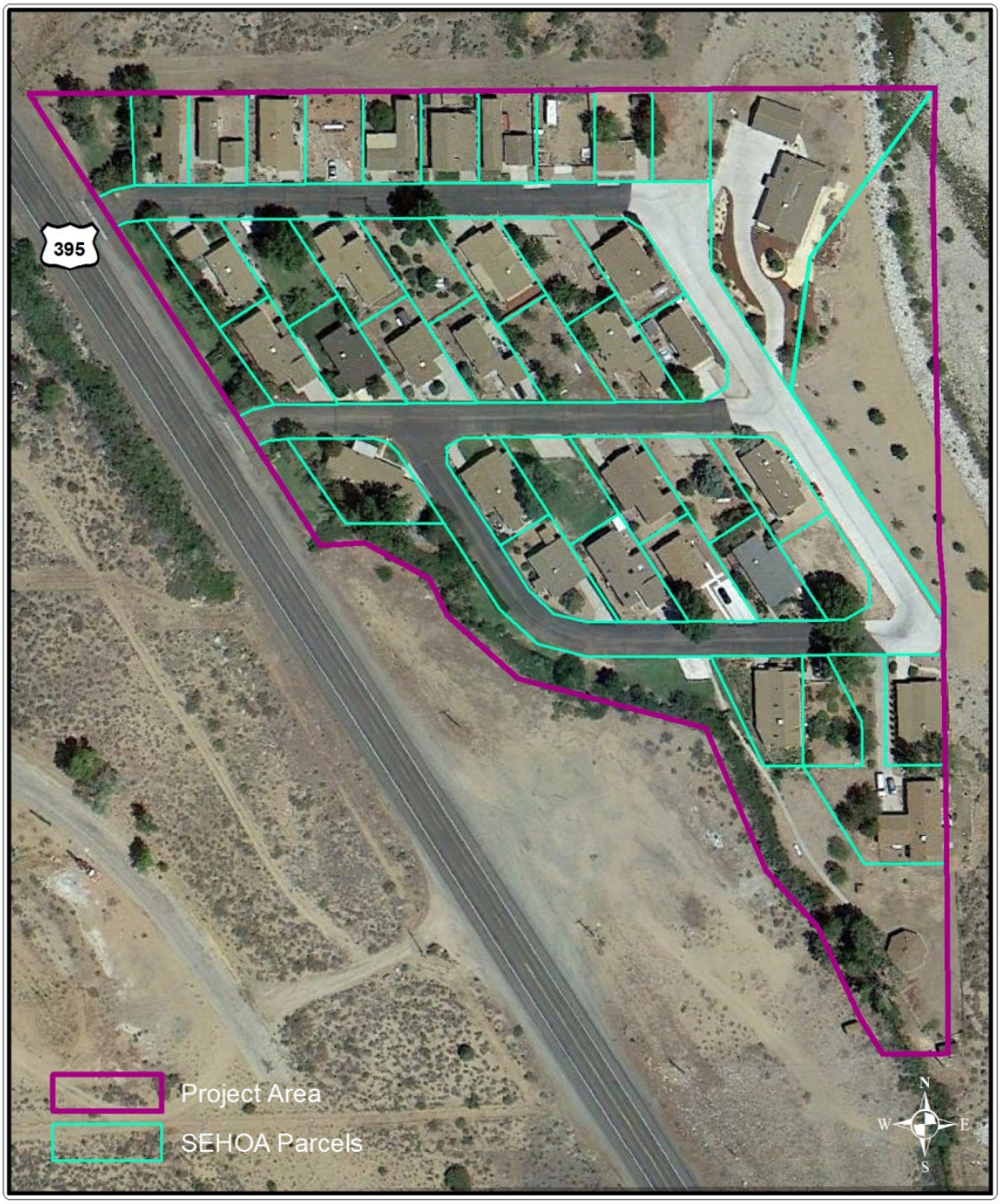
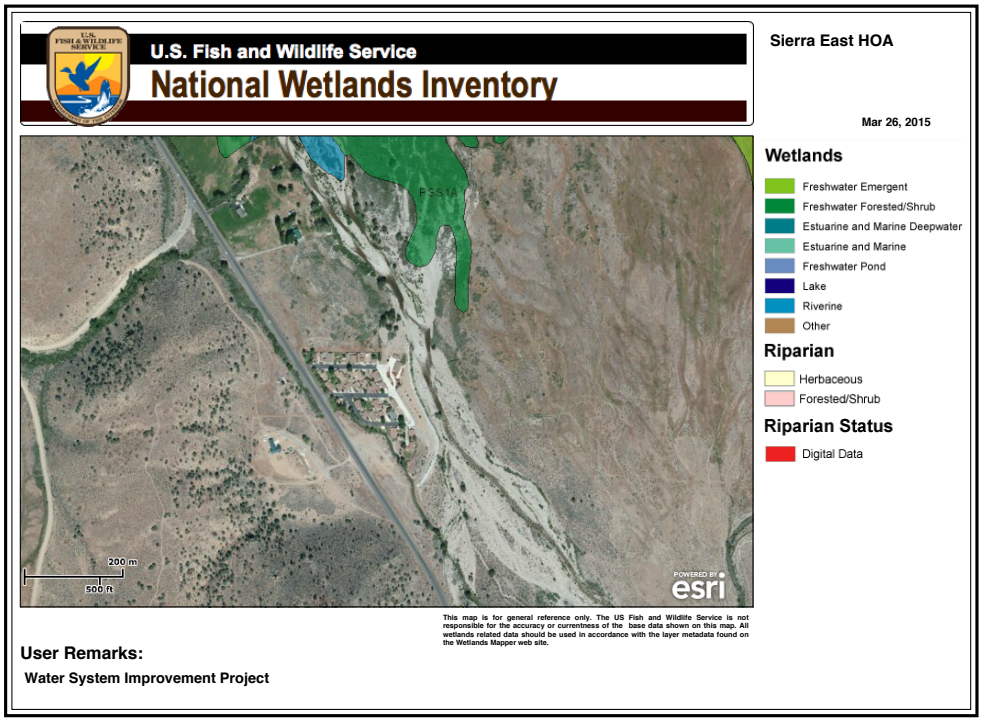


FIGURE 3- NATIONAL WETLANDS INVENTORY MAP



APPENDIX A- DATABASE SEARCH RESULTS

Multiple Occurrences per Page

California Department of Fish and Wildlife

California Natural Diversity Database

Query Criteria: Federal Listing Status is (Endangered or Threatened or Proposed Endangered or Proposed Threatened or Candidate or Delisted) AND State Listing Status is (Endangered or Threatened or Rare or Delisted or Candidate Endangered or Candidate Threatened) and Quad is (Coleville (3811955) or Topaz Lake (3811965) or Heenan Lake (3811966) or Wolf Creek (3811956) or Disaster Peak (3811946) or Lost Cannon Peak (3811945) or Chris Flat (3811944) or Risue Canyon (3811954) or Long Dry Canyon (3811964))

Rana sierrae **Element Code:** AAABH01340

Sierra Nevada yellow-legged frog

Listing Status:	**Federal:**	Endangered	**CNDDB Element Ranks:**	**Global:**	G1
	State:	Threatened		**State:**	S1
	Other:	CDFW_SSC-Species of Special Concern, IUCN_EN-Endangered, USFS_S-Sensitive			
Habitat:	**General:**	ALWAYS ENCOUNTERED WITHIN A FEW FEET OF WATER. TADPOLES MAY REQUIRE 2 - 4 YRS TO COMPLETE THEIR AQUATIC DEVELOPMENT.			
	Micro:	□			

Occurrence No.	43	**Map Index:**	33355	**EO Index:**	28919	**Element Last Seen:**	2006-08-23
Occ. Rank:	Fair			**Presence:**	Presumed Extant	**Site Last Seen:**	2006-08-23
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2014-09-03

Quad Summary: Lost Cannon Peak (3811945)

County Summary: Mono

Lat/Long:	38.37771 / -119.58648	**Accuracy:**	specific area
UTM:	Zone-11 N4250892 E274065	**Elevation (ft):**	9400
PLSS:	T06N, R22E, Sec. 08 (M)	**Acres:**	12.0

Location: CHANGO LAKE, 4.4 MILES NE OF SONORA PASS, WEST OF SILVER CREEK MEADOWS, TOIYABE NATIONAL FOREST.

Detailed Location:

Ecological: IN 1995: HABITAT CONSISTS OF A STAGNANT, BUT CLEAR, COLD POOL (WATER TEMP 10 DEGREES C AT 1430 HRS); SOME COVER PROVIDED BY UNDERCUT BANKS AND OVER-HANGING VEGETATION. STREAM WIDTH LESS THAN 1 METER; DEPTH 0.75 METER OR LESS.

General: 5 ADULTS AND 5+ JUVENILES OBSERVED ON 3 OCT 1995. 3 ADULTS AND 95 LARVAE OBSERVED 14 AUG 2001. 3 SUBADULTS OBSERVED 23 AUG 2006.

Owner/Manager: USFS-TOIYABE NF

Occurrence No.	265	**Map Index:**	70263	**EO Index:**	71148	**Element Last Seen:**	1958-08-10
Occ. Rank:	Unknown			**Presence:**	Presumed Extant	**Site Last Seen:**	1958-08-10
Occ. Type:	Natural/Native occurrence			**Trend:**	Unknown	**Record Last Updated:**	2014-12-30

Quad Summary: Disaster Peak (3811946)

County Summary: Alpine, Tuolumne

Lat/Long:	38.41776 / -119.70703	**Accuracy:**	3/5 mile
UTM:	Zone-11 N4255639 E263664	**Elevation (ft):**	6900
PLSS:	T07N, R21E, Sec. 30 (M)	**Acres:**	0.0

Location: 2 MILES EAST OF ICEBERG MEADOW ON CLARK FORK OF MIDDLE FORK OF STANISLAUS RIVER, STANISLAUS NATIONAL FOREST.

Detailed Location:

Ecological:

General: COLLECTION MADE BY G. CHRISTMAN ON 10 AUG 1958.

Owner/Manager: USFS-STANISLAUS NF

Haliaeetus leucocephalus **Element Code:** ABNKC10010

bald eagle

Listing Status:	**Federal:**	Delisted	**CNDDB Element Ranks:**	**Global:**	G5
	State:	Endangered		**State:**	S2
	Other:	BLM_S-Sensitive, CDF_S-Sensitive, CDFW_FP-Fully Protected, IUCN_LC-Least Concern, USFS_S-Sensitive, USFWS_BCC-Birds of Conservation Concern			
Habitat:	**General:**	OCEAN SHORE, LAKE MARGINS, & RIVERS FOR BOTH NESTING & WINTERING. MOST NESTS WITHIN 1 MI OF WATER.			
	Micro:	NESTS IN LARGE, OLD-GROWTH, OR DOMINANT LIVE TREE W/OPEN BRANCHES, ESPECIALLY PONDEROSA PINE. ROOSTS COMMUNALLY IN WINTER.			

Occurrence No.	129	**Map Index:** 21519	**EO Index:** 12900	**Element Last Seen:**	1997-XX-XX
Occ. Rank:	Good		**Presence:** Presumed Extant	**Site Last Seen:**	1997-XX-XX
Occ. Type:	Natural/Native occurrence		**Trend:** Unknown	**Record Last Updated:**	1999-06-03

Quad Summary: Heenan Lake (3811966)

County Summary: Alpine

Lat/Long:	38.64723 / -119.66468	**Accuracy:**	1/10 mile
UTM:	Zone-11 N4280999 E268100	**Elevation (ft):**	7000
PLSS:	T09N, R21E, Sec. 10 (M)	**Acres:**	0.0

Location: HEENAN LAKE TERRITORY; SOUTHWEST CORNER OF HEENAN LAKE, SOUTH OF HWY 89 AT SAGEHEN FLAT, ALPINE COUNTY.

Detailed Location: NEST IS IN AN 80-FT JEFFREY PINE, 100 FT ABOVE THE ROAD ON THE WEST SIDE OF THE LAKE.

Ecological: NEST TREE IS A JEFFREY PINE; SURROUNDING HABITAT IS JEFFREY PINE FOREST INTERSPERSED WITH SAGEBRUSH/BITTERBRUSH.

General: NEST DISCOVERED IN 1992; 2 ADULTS AND 2 JUVENILES OBSERVED (1 FLEDGED). 1 YOUNG FLEDGED IN 1993. OCCUPIED/UNSUCCESSFUL IN 1994. 1 YOUNG FLEDGED IN 1995. 2 YOUNG FLEDGED IN 1996. 1 YOUNG FLEDGED IN 1997.

Owner/Manager: DFG-HEENAN LAKE WA

Occurrence No.	135	**Map Index:** 26046	**EO Index:** 5089	**Element Last Seen:**	1996-XX-XX
Occ. Rank:	Unknown		**Presence:** Presumed Extant	**Site Last Seen:**	1996-XX-XX
Occ. Type:	Natural/Native occurrence		**Trend:** Stable	**Record Last Updated:**	1999-06-10

Quad Summary: Topaz Lake (3811965)

County Summary: Mono

Lat/Long:	38.65795 / -119.52086	**Accuracy:**	1/10 mile
UTM:	Zone-11 N4281835 E280651	**Elevation (ft):**	5000
PLSS:	T09N, R22E, Sec. 01 (M)	**Acres:**	0.0

Location: TOPAZ LAKE TERRITORY; ALONG THE CALIFORNIA/NEVADA BORDER.

Detailed Location: TOPAZ LAKE IS LOCATED ALONG THE CALIFORNIA-NEVADA BORDER, WITH HALF OF TOPAZ LAKE IN NEVADA. OTHER NEST SITE OCCUPIED SINCE 1990 WAS IN THE NW 1/4 OF THE SW 1/4 OF SECTION 1.

Ecological: NESTING TERRITORY.

General: 1 YOUNG FLEDGED IN 1989. 1 FLEDGED IN 1990. 2 FLEDGED IN 1991. 3 FLEDGED IN 1992. UNOCCUPIED IN 1993 1 FLEDGED IN 1994. 2 FLEDGED IN 1995 AND IN 1996. SITE NOT CHECKED IN 1997.

Owner/Manager: PVT

CALIFORNIA DEPARTMENT OF FISH and WILDLIFE BIOS

Graphics and Selections

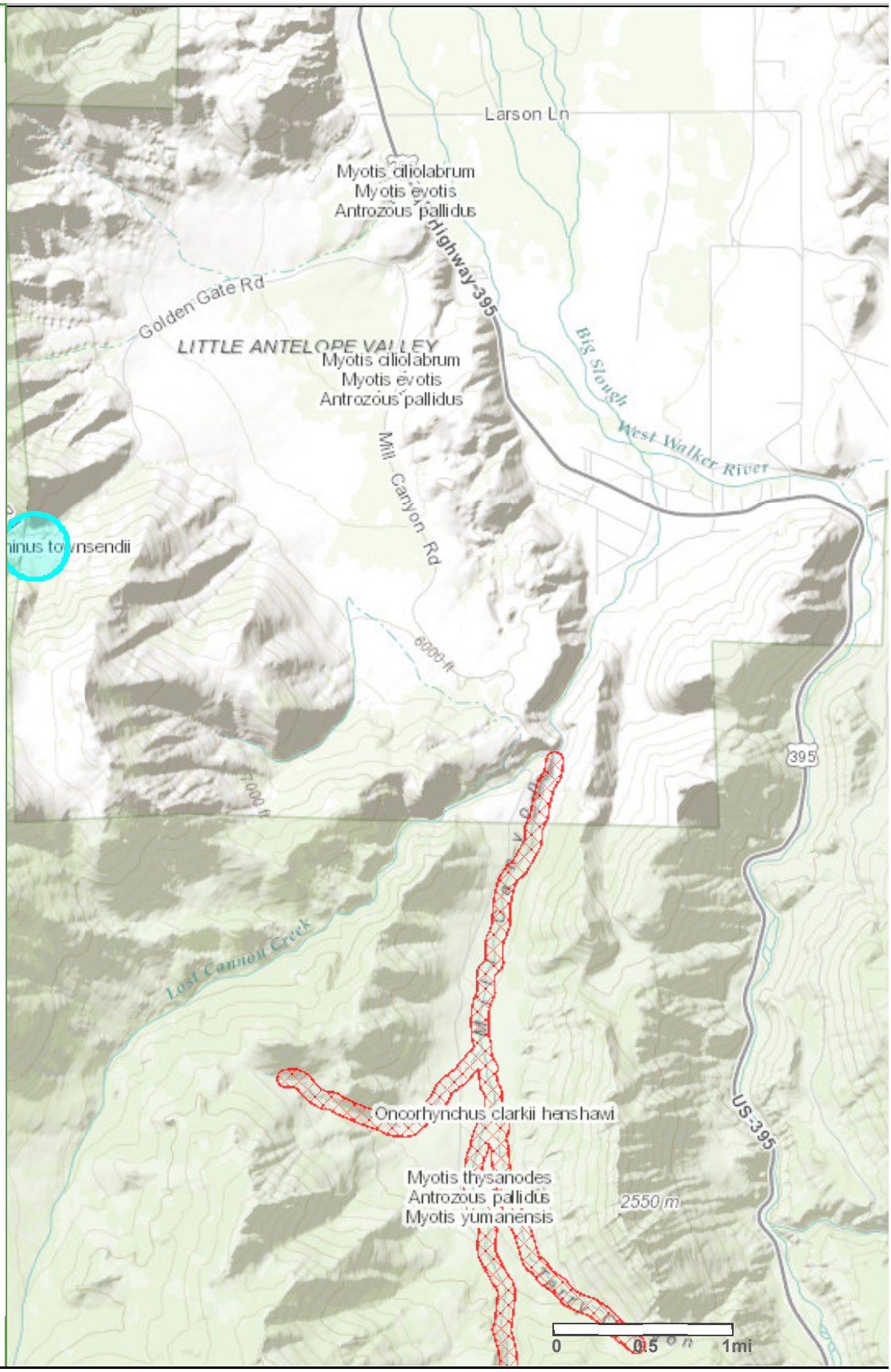
Identify Graphic X

BIOS Layers

California Natural Diversity Database (com ed) [ds85] Go + RF ? X

Symbology

- Plant (80m)
- Plant (specific)
- Plant (non-specific)
- Plant (circular)
- Animal (80m)
- Animal (specific)
- Animal (non-specific)
- Animal (circular)
- Terrestrial Comm. (80m)
- Terrestrial Comm. (specific)
- Terrestrial Comm. (non-specific)
- Terrestrial Comm. (circular)
- Aquatic Comm. (80m)
- Aquatic Comm. (specific)
- Aquatic Comm. (non-specific)
- Aquatic Comm. (circular)
- Multiple (80m)
- Multiple (specific)
- Multiple (non-specific)
- Multiple (circular)
- Sensitive EO's (Commercial only)



United States Department of the Interior

FISH AND WILDLIFE SERVICE

Sacramento Fish and Wildlife Office
2800 Cottage Way, Room W-2605
Sacramento, California 95825

March 19, 2015

Document Number: 150319120808

Garth Alling
Sierra Ecotone Solutions LLC
PO Box 1297
Zephyr Cove , NV 89448

Subject: Species List for Sierra East Homeowners Association

Dear: Mr. Alling

We are sending this official species list in response to your March 19, 2015 request for information about endangered and threatened species. The list covers the California counties and/or U.S. Geological Survey 7½ minute quad or quads you requested.

Our database was developed primarily to assist Federal agencies that are consulting with us. Therefore, our lists include all of the sensitive species that have been found in a certain area *and also ones that may be affected by projects in the area*. For example, a fish may be on the list for a quad if it lives somewhere downstream from that quad. Birds are included even if they only migrate through an area. In other words, we include all of the species we want people to consider when they do something that affects the environment.

Please read Important Information About Your Species List (below). It explains how we made the list and describes your responsibilities under the Endangered Species Act.

Our database is constantly updated as species are proposed, listed and delisted. If you address proposed and candidate species in your planning, this should not be a problem. However, we recommend that you get an updated list every 90 days. That would be June 17, 2015.

Please contact us if your project may affect endangered or threatened species or if you have any questions about the attached list or your responsibilities under the Endangered Species Act. A list of Endangered Species Program contacts can be found here.

Endangered Species Division

TAKE PRIDE IN AMERICA

U.S. Fish & Wildlife Service

Sacramento Fish & Wildlife Office

Federal Endangered and Threatened Species that Occur in or may be Affected by Projects in the Counties and/or U.S.G.S. 7 1/2 Minute Quads you requested

Document Number: 150319120808

Current as of: March 19, 2015

Quad Lists

Listed Species

Fish

Hypomesus transpacificus
delta smelt (T)

Oncorhynchus (=Salmo) clarki henshawi
Lahontan cutthroat trout (T)

Oncorhynchus (=Salmo) clarki seleniris
Paiute cutthroat trout (T)

Amphibians

Rana sierrae
Mountain yellow legged frog (PX)

Proposed Species

Amphibians

Anaxyrus canorus
Yosemite toad (PX)

Candidate Species

Amphibians

Bufo canorus
Yosemite toad (C)

Rana muscosa
mountain yellow-legged frog (C)

Mammals

Martes pennanti
fisher (C)

Quads Containing Listed, Proposed or Candidate Species:

CHRIS FLAT (488B)

LOST CANNON PEAK (489A)

DISASTER PEAK (489B)

RISUE CANYON (504C)

TOPAZ LAKE (505A)

HEENAN LAKE (505B)

WOLF CREEK (505C)

COLEVILLE (505D)

County Lists

No county species lists requested.

Key:

(E) *Endangered* - Listed as being in danger of extinction.
(T) *Threatened* - Listed as likely to become endangered within the foreseeable future.
(P) *Proposed* - Officially proposed in the Federal Register for listing as endangered or threatened.
(NMFS) Species under the Jurisdiction of the National Oceanic & Atmospheric Administration Fisheries Service. Consult with them directly about these species.
Critical Habitat - Area essential to the conservation of a species.
(PX) *Proposed Critical Habitat* - The species is already listed. Critical habitat is being proposed for it.
(C) *Candidate* - Candidate to become a proposed species.
(V) Vacated by a court order. Not currently in effect. Being reviewed by the Service.
(X) *Critical Habitat* designated for this species

Important Information About Your Species List

How We Make Species Lists

We store information about endangered and threatened species lists by U.S. Geological Survey 7½ minute quads. The United States is divided into these quads, which are about the size of San Francisco.

The animals on your species list are ones that occur within, **or may be affected by** projects within, the quads covered by the list.

- Fish and other aquatic species appear on your list if they are in the same watershed as your quad or if water use in your quad might affect them.
- Amphibians will be on the list for a quad or county if pesticides applied in that area may be carried to their habitat by air currents.
- Birds are shown regardless of whether they are resident or migratory. Relevant birds on the county list should be considered regardless of whether they appear on a quad list.

Plants

Any plants on your list are ones that have actually been observed in the area covered by the list. Plants may exist in an area without ever having been detected there. You can find out what's in the surrounding quads through the California Native Plant Society's online Inventory of Rare and Endangered Plants.

Surveying

Some of the species on your list may not be affected by your project. A trained biologist and/or botanist, familiar with the habitat requirements of the species on your list, should determine whether they or habitats suitable for them may be affected by your project. We recommend that your surveys include any proposed and candidate species on your list. See our Protocol and Recovery Permits pages.

For plant surveys, we recommend using the Guidelines for Conducting and Reporting Botanical Inventories. The results of your surveys should be published in any environmental documents prepared for your project.

Your Responsibilities Under the Endangered Species Act

All animals identified as listed above are fully protected under the Endangered Species Act of 1973, as amended. Section 9 of the Act and its implementing regulations prohibit the take of a federally listed wildlife species. Take is defined by the Act as "to harass, harm,

pursue, hunt, shoot, wound, kill, trap, capture, or collect" any such animal.

> Take may include significant habitat modification or degradation where it actually kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding, or shelter (50 CFR §17.3).

Take incidental to an otherwise lawful activity may be authorized by one of two procedures:

- If a Federal agency is involved with the permitting, funding, or carrying out of a project that may result in take, then that agency must engage in a formal consultation with the Service.

  During formal consultation, the Federal agency, the applicant and the Service work together to avoid or minimize the impact on listed species and their habitat. Such consultation would result in a biological opinion by the Service addressing the anticipated effect of the project on listed and proposed species. The opinion may authorize a limited level of incidental take.

- If no Federal agency is involved with the project, and federally listed species may be taken as part of the project, then you, the applicant, should apply for an incidental take permit. The Service may issue such a permit if you submit a satisfactory conservation plan for the species that would be affected by your project.

  Should your survey determine that federally listed or proposed species occur in the area and are likely to be affected by the project, we recommend that you work with this office and the California Department of Fish and Game to develop a plan that minimizes the project's direct and indirect impacts to listed species and compensates for project-related loss of habitat. You should include the plan in any environmental documents you file.

Critical Habitat

When a species is listed as endangered or threatened, areas of habitat considered essential to its conservation may be designated as critical habitat. These areas may require special management considerations or protection. They provide needed space for growth and normal behavior; food, water, air, light, other nutritional or physiological requirements; cover or shelter; and sites for breeding, reproduction, rearing of offspring, germination or seed dispersal.

Although critical habitat may be designated on private or State lands, activities on these lands are not restricted unless there is Federal involvement in the activities or direct harm to listed wildlife.

If any species has proposed or designated critical habitat within a quad, there will be a separate line for this on the species list. Boundary descriptions of the critical habitat may be found in the Federal Register. The information is also reprinted in the Code of Federal Regulations (50 CFR 17.95). See our Map Room page.

Candidate Species

We recommend that you address impacts to candidate species. We put plants and animals on our candidate list when we have enough scientific information to eventually propose them for listing as threatened or endangered. By considering these species early in your planning process you may be able to avoid the problems that could develop if one of these candidates was listed before the end of your project.

Species of Concern

The Sacramento Fish & Wildlife Office no longer maintains a list of species of concern. However, various other agencies and organizations maintain lists of at-risk species. These lists provide essential information for land management planning and conservation efforts.

More info

Wetlands

If your project will impact wetlands, riparian habitat, or other jurisdictional waters as defined by section 404 of the Clean Water Act and/or section 10 of the Rivers and Harbors Act, you will need to obtain a permit from the U.S. Army Corps of Engineers. Impacts to wetland habitats require site specific mitigation and monitoring. For questions regarding wetlands, please contact Mark Littlefield of this office at (916) 414-6520.

Updates

Our database is constantly updated as species are proposed, listed and delisted. If you address proposed and candidate species in your planning, this should not be a problem. However, we recommend that you get an updated list every 90 days. That would be June 17, 2015.

Sierra East HOA - CNPS Database Searh March 2015

Scientific Name	Common Name	Family	Lifeform	Rare Plant Ra	State Rank	Global Rank	CESA	FESA	Elevation Hig	Elevation Lov	CA Endemic
Boechera cobrensis	Masonic rockcress	Brassicaceae	perennial herb	2B.3	S2	G5	None	None	3105	1375	F
Carex occidentalis	western sedge	Cyperaceae	perennial rhizomatous herb	2B.3	S3	G4	None	None	3135	1645	F
Carex petasata	Liddon's sedge	Cyperaceae	perennial herb	2B.3	S2	G5	None	None	3320	600	F
Carex vallicola	western valley sedge	Cyperaceae	perennial rhizomatous herb	2B.3	S2	G5	None	None	2805	1525	F
Caulanthus major var. nevadensis	slender jewelflower	Brassicaceae	perennial herb	4.3	S3	G4T3?	None	None	2895	1705	F
Claytonia umbellata	Great Basin claytonia	Montiaceae	perennial herb	2B.3	S2	G5?	None	None	3500	1705	F
Glyceria grandis	American manna grass	Poaceae	perennial rhizomatous herb	2B.3	S2	G5	None	None	1980	15	F
Hymenopappus filifolius var. nanus	little cutleaf	Asteraceae	perennial herb	2B.3	S2S3	G5T4	None	None	3050	1500	F
Kobresia myosuroides	seep kobresia	Cyperaceae	perennial rhizomatous herb	2B.2	S1	G5	None	None	3245	1490	F
Polygala subspinosa	spiny milkwort	Polygalaceae	perennial herb	2B.2	S3	G4?	None	None	1705	1330	F
Viola purpurea ssp. aurea	golden violet	Violaceae	perennial herb	2B.2	S2S3	G5T2T3	None	None	2500	1000	F

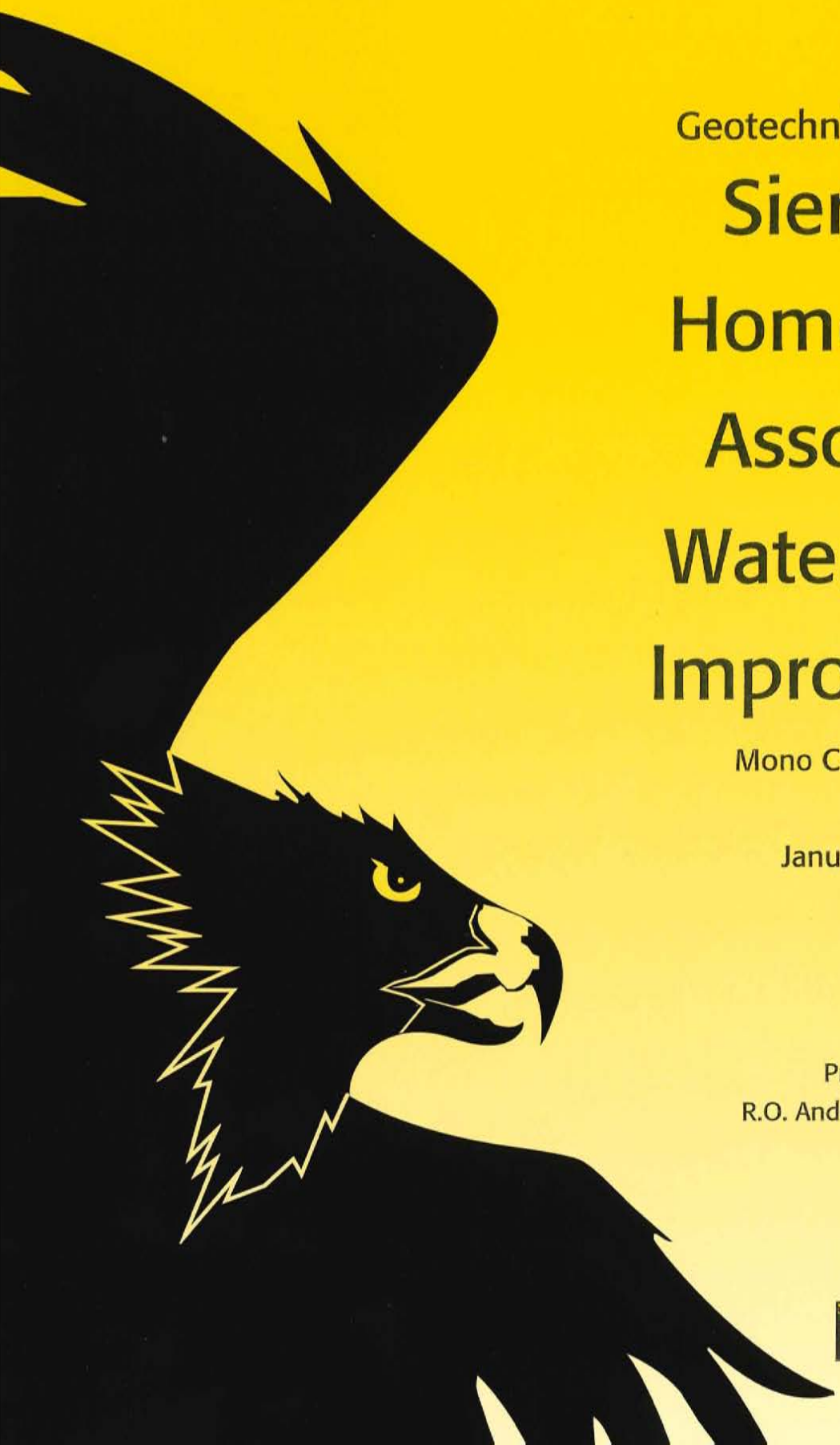
APPENDIX B- SITE PHOTOGRAPHS

Appendix D

SEHOA Geotechnical Evaluation

(Black Eagle Consulting, Inc., January 22, 2015)

Black Eagle Consulting, Inc.



Geotechnical Investigation

Sierra East Homeowners Association Water System Improvements

Mono County, California

January 22, 2015

Prepared for
R.O. Anderson Engineering

Black Eagle Consulting, Inc.
Geotechnical & Construction Services

Mr. Kent Neddenriep
R.O. Anderson Engineering
1603 Esmeralda Avenue
Minden, Nevada 89423

January 22, 2015
Project No.: 0127-98-1

L

RE: Geotechnical Investigation
Sierra East Homeowners Association Water System Improvements
Mono County, California

Dear Mr. Neddenriep:

Black Eagle Consulting, Inc. (BEC) is pleased to present the results of our geotechnical investigation for the above-referenced project. Our investigation consisted of research, field exploration, laboratory testing, and engineering analysis to allow formulation of geotechnical conclusions and recommendations for design and construction of the proposed water system improvements.

The proposed improvements to the existing water system within the Sierra East residential community will include the design and construction of a 24-foot-wide by 30-foot-long mechanical building to host new pumps, treatment devices, and two water storage tanks. The site will be raised by about 1 to 2 feet above the existing ground surface to place the improvements above flood elevations.

The site exhibits coarse alluvium to 7 feet or more below existing ground surface. Properly prepared native materials will provide excellent support for the proposed improvements. The abundance of cobbles and boulders within the alluvium will make excavating and trenching difficult and will make neat line trenching and excavation impossible. No evidence of faulting or ground rupture was identified in the fault trench that was excavated about 10 feet north of the proposed mechanical building.

We appreciate having the opportunity to work with you on this project. If you have any questions regarding the content of the attached report, please do not hesitate to contact us.

Sincerely,

Black Eagle Consulting, Inc.

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Introduction

Presented herein are the results of Black Eagle Consulting, Inc.'s (BEC's) geotechnical investigation, laboratory testing, and associated geotechnical design recommendations for the proposed water system improvements to the Sierra East residential community located in Mono County, California. These recommendations are based on surface and subsurface conditions encountered in our explorations, and on details of the proposed project as described in this report. The objectives of this study were to:

1. Determine general soil and ground water conditions pertaining to design and construction of the proposed water system improvements.

2. Determine if the mapped fault in the general area is present in the vicinity of the building and if a building setback is necessary.

3. Provide recommendations for design and construction of the project, as related to these geotechnical conditions.

The area covered by this report is shown on Plate 1 (Plot Plan). Our investigation included field exploration, laboratory testing, and engineering analysis to determine the physical and mechanical properties of the various on-site materials. Results of our field exploration and testing programs are included in this report and form the basis for all conclusions and recommendations.

The services described above were conducted in accordance with the BEC proposal dated December 8, 2014 and the Professional Service Agreement signed by Mr. Kent Neddenriep of R.O. Anderson Engineering, Inc. (R.O. Anderson).

Project Description

The proposed project will include water system improvements in a triangular area of approximately 0.22 acres within the Sierra East residential community in Mono County, California. The site is entirely contained in the southeast quarter of Section 18, Township 18 North, Range 23 East, Mount Diablo Meridian. The small triangular parcel is bordered to the north by the Sierra East residential community; to the east by the West Walker River; to the south by undeveloped land; and to the west by a drainage ditch and the existing United States (US) Highway 395. The area is presently developed and hosts the existing water system and community buildings. Access to the site is obtained by existing roads within the Sierra East mobile home community.

Structure and Development Information

The proposed improvements to the existing water system within the Sierra East residential community will include the design and construction of a 24-foot-wide by 30-foot-long mechanical building to host pumps, treatment devices, and 2 water storage tanks. The mechanical building will be constructed using concrete masonry unit (CMU) blocks and supported by a Portland cement concrete (PCC) slab-on-grade floor with thickened edges. In addition to the building, site improvements will include a PCC exterior slab to host an emergency generator, installation of a ground heat sink loop to cool water from the hot (geothermal) well, and installation of various underground utilities. The heat sink loop will be located north of the existing community center building and will consist of high density polyethylene (HDPE) pipes installed below the ground surface. The heat sink system will include 15 pipes about 30 feet long, spaced approximately 3 feet on center.

Grading Concepts

A final grading plan was not available at the time of this report. Based on the information from R.O. Anderson, the building and the generator pads will be elevated between 1 and 2 feet above the existing nearly-flat ground surface to be above the flood plain associated with the nearby West Walker River.

Site Conditions

Existing Structures

Structures near the proposed building and associated improvements include a small shed and an octagonal building, both to the north (Refer to Plate 1). The small shed is about 4 feet by 8 feet in size and appears to house a pump for the well. The octagonal building houses the existing water system and a community hot tub, which was out of service at the time of our field investigation. A short rockery wall, around 1.5 feet tall, exists along the western and southern perimeters of the common area to be developed. A drainage ditch of about 6 feet wide and 3 feet deep is present west of the project and intercepts the West Walker River south of the proposed project improvements. The drainage ditch collects and diverts the water northwest of the project site. A wooden fence is located along the eastern property line.

Site Conditions

The West Walker River is present east of the project site and flows to the north feeding, Topaz Lake while progressing further northeast towards Smith Valley. A rock-lined slope exists beyond the eastern limits of the project site, adjacent to the seasonal flood zone of the West Walker River.

Topography and Drainage

The site to host the proposed improvements is within a relatively flat area that gently slopes at about 1 percent to the east towards the West Walker River. Vertical relief across the site is less than 2 feet. The short rockery wall creates a grade break in the slope between the western portion of the property and the area of proposed improvements.

Site drainage is primarily accomplished sheet flow to the east, towards West Walker River.

Vegetation

The site has previously been stripped of native vegetation and has been partially landscaped with grass. Native sage brush is located beyond the limits of the proposed improvements, east and south of the project site.

Exploration

Test Pits

The location of the proposed water system improvements within the Sierra East residential development was explored December 18, 2014 by excavating 2 test pits (test pit TP-01 and TP-02) using a Case® 590 Super M rubber-tired backhoe. Locations of the test pits are shown on Plate 1. The maximum depth of exploration was 7 feet below the existing ground surface. Bulk samples for index testing were collected from the trench wall sides at specific depths in each soil horizon. The test pits were backfilled immediately after exploration. Backfill was loosely placed and the area re-graded to the extent possible with equipment on hand.

Fault Trench

Because the site is located in the general area of a known active fault, the Antelope Valley fault, a fault trench (FT-01) was excavated on December 18, 2014 just north of the proposed mechanical building. The fault trench was approximately 48 feet in length and was excavated using a Case® 590 Super M rubber-tired backhoe to an approximate depth of 6 feet below existing ground surface. The fault trench was located approximately perpendicular to the Antelope Valley fault alignment in the general area of the project site. The approximate location of the fault trench is shown on Plate 1. A geologist observed the excavation and examined the soils profile along the walls of the fault trenches. No evidence of faulting was observed in the fault trench. The fault trench was backfilled immediately after examination. Backfill was loosely placed and the area re-graded to the extent possible with equipment on hand.

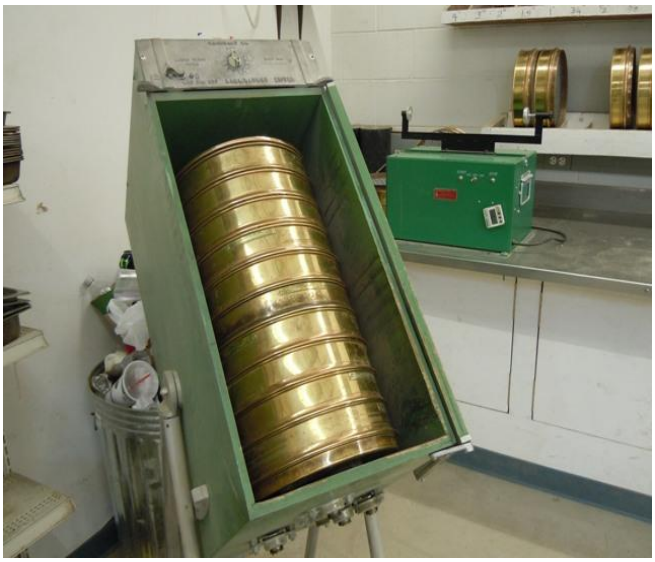
Excavated Fault Trench

Material Classification

A geologist examined and identified all materials in the field in accordance with American Society for Testing and Materials (ASTM) D 2488. During test pit and fault trench excavation, representative bulk samples were placed in sealed plastic bags and returned to our Reno, Nevada laboratory for testing. Additional soil classification was subsequently performed in accordance with ASTM 2487 (Unified Soil Classification System [USCS]) upon completion of laboratory testing as described in the Laboratory Testing section. Logs of the test pits are presented as Plate 2 (Test Pit Logs), and a USCS chart has been included as Plate 3 (Graphic Soils Classification Chart).

Laboratory Testing

All soils testing performed in the BEC soils laboratory is conducted in general accordance with the standards and methodologies described in Volume 4.08 of the ASTM Standards.



Grain Size Analysis

Index Tests

Samples of each significant soil type were analyzed to determine their in-situ moisture content (ASTM D 2216), grain size distribution (ASTM D 422), and plasticity index (ASTM D 4318). The results of these tests are shown on Plate 4 (Index Test Results). Test results were used to classify the soils according to ASTM D 2487 and to verify field logs, which were then updated as appropriate. Classification in this manner provides an indication of the soil's mechanical properties and can be correlated with published charts (Bowles, 1996; Naval Facilities Engineering Command [NAVFAC], 1986a and b) to evaluate bearing capacity, lateral earth pressures, and settlement potential.

Chemical Tests

Chemical testing was performed on representative samples of site foundation soils to evaluate the site materials' potential to corrode steel and PCC in contact with the ground. The samples were tested for pH, resistivity, redox potential, soluble sulfates, and sulfides. The results of the chemical tests are shown on Appendix A (Chemical Test Results). Chemical testing was performed by Sierra Environmental Monitoring of Reno, Nevada.

Geologic and General Soil Conditions

The site lies in the fault-bounded Antelope Valley located on the Eastern Sierra range front. Within the valley, the site lies along the broad flood plain of the West Walker River. The site soils are mapped by the California Geological Survey (CGS) as Quaternary Alluvium (Koenig, 1992). This geologic unit is described as *stream and river alluvium; glacial outwash; and recent fan deposits.*

The soils encountered during exploration are consistent with the geologic map and consist entirely of sand and gravel with non-plastic fines through the maximum depth of exploration, about 7 feet below the existing ground surface. Cobbles and boulders were common in the sand and gravel deposits within the site.

The upper soil layer is about 0.5 to 1.5 feet in thickness and generally contains silty sand to silty sand with gravel soils. These surficial soils are described as being brown to dark brown, dry to slightly moist, medium dense, and as consisting of approximately 20 to 31 percent non-plastic fines, 60 to 64 percent fine to coarse sand, and 5 to 20 percent fine to coarse subrounded to rounded gravel. This layer contained sod, topsoil, and roots. Locally in test pit TP-02, the excavated total mass of this surficial soil layer contained approximately 15 percent rounded cobbles up to 12 inches in size.

The surficial soil layer is underlain by poorly graded gravel with silt, sand, cobbles and boulders to the maximum depth of exploration. This sand and gravel soil unit is described as brown to grey, slightly moist, medium dense to very dense, and as consisting of approximately 2 to 10 percent non-plastic fines, 43 to 45 percent fine to coarse sand and 40 to 53 percent rounded to subrounded fine to coarse gravel. Cobbles and boulders were abundant within this soil layer. Cobbles make up the majority of the oversized particles, but boulders up to 3 feet in diameter were also common. Oversized particles are of granitic rock and account for approximately 15 to 50 percent of the total soil mass. The highest concentration of oversized material is located near the proposed building

Ground water was not encountered during exploration, which extended to 7 feet below the existing ground surface, and is expected to lie at a depth similar to the elevation of the West Walker River. At this depth, ground water is not anticipated to affect the design and construction of the project that is to include relatively shallow excavations. During the river flood stage the depth of ground water would rise to the surface, meeting the flood waters.

Geologic Hazards

Seismicity

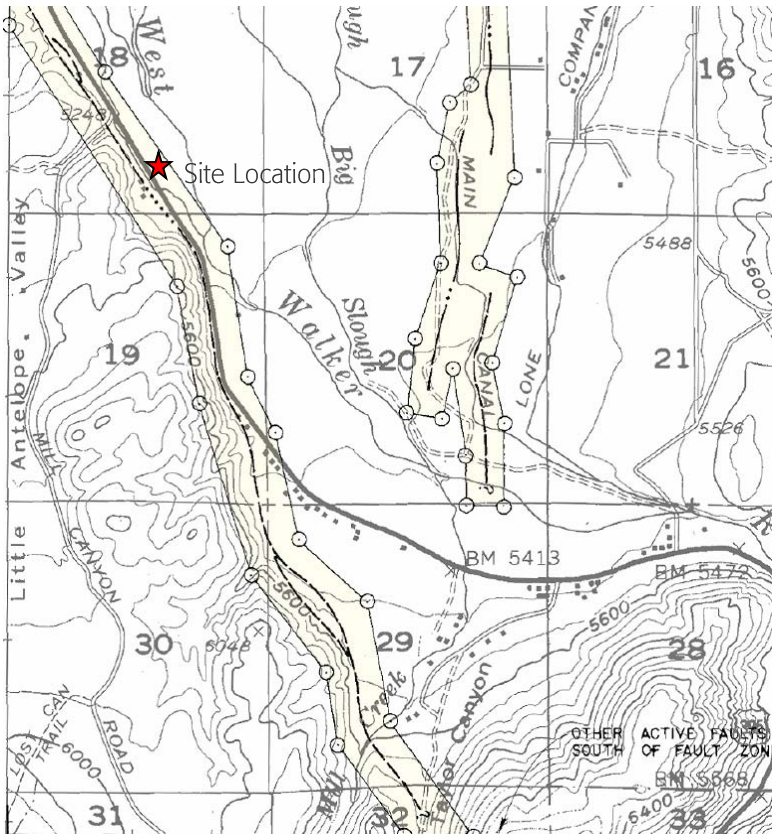
The Antelope Valley is located within an area with a high potential for earthquake shaking due to the presence of the potentially active Antelope Valley fault. Table 1 (Seismicity in the Project Area) summarizes historic seismicity in the region between 1800 and 2007. EQSEARCH™ Version 3.00 software was used to search an abbreviated and modified version of the published CGS earthquake catalog for California (Blake, 2006a). The site latitude and longitude inputs were 38.531 degrees and -119.489 degrees, respectively. The range of historic earthquake magnitudes selected was 6.0 to 9.0, and the search radius was 70 miles. The attenuation relationship used was that recommended by Boore, et al. (1997) for Site Class D. The locations of each seismic event were obtained from the California Historical Online Database (CGS, October 2007) and the Fault Activity Map of California (California Division of Mines and Geology [CDMG], 1994).

TABLE 1 - SEISMICITY IN THE PROJECT AREA

Latitude North	Longitude West	Date	Depth (km)	Earthquake Magnitude	Site Acceleration (g)	Site Modified Mercali Scale Intensity	Approximate Distance (miles)	CGS Earthquake Database
38.819	119.652	9/12/1994	14.0	6.1	0.111	VII	21.7	Minden/Gardnerville, NV
39.080	119.330	06/25/1933	0.0	6.1	0.071	VI	38.9	Yerington, NV
39.200	119.800	6/03/1887	0.0	6.3	0.066	VI	49.1	Carson City, NV
39.080	118.820	06/23/1959	0.0	6.1	0.056	VI	52.3	East of Yerington, NV
39.300	120.000	9/03/1857	0.0	6.0	0.048	VI	59.8	East of Truckee, CA
39.400	119.700	12/27/1869	0.0	6.1	0.50	VI	61.1	Near Virginia City, NV
39.280	118.360	1/30/1934	0.0	6.3	0.54	VI	63.5	Southeast of Fallon, NV
39.500	119.500	3/15/1860	0.0	6.3	0.052	VI	66.9	East of Reno, NV
39.500	119.800	4/24/1914	0.0	6.4	0.053	VI	68.9	Truckee region, CA

Faulting and Ground Rupture

The *Alquist-Priolo Earthquake Fault Zoning Act* (1993) was originally signed into law in 1972 as *the Alquist-Priolo Geologic Hazard Zones Act* in order to prohibit the location of most structures for human occupancy across the traces of active faults and to thereby mitigate the hazard of fault rupture (CGS, 2007). Under this act, the State Geologist is required to delineate Earthquake Fault Zones (EFZs), and counties affected by the zones must withhold development permits for sites within them until geologic investigations demonstrate that the sites are not threatened by surface displacement from future faulting. As defined by this act, a fault is a fracture or zone of closely associated fractures along which rocks on one side have been displaced with respect to those on the other side; a fault zone has significant width, ranging from a few feet to several miles; an active fault is one which has had surface displacement within Holocene time (about the last 11,000 years); and a potentially active fault is one with evidence of displacement during Quaternary time (within the last 1.6 million years) and that exhibits a relatively high potential for ground rupture (it is sufficiently active and well-defined). Classification of a fault as potentially active requires investigation, analysis, and judgment by a qualified geologist (Hart and Bryant, 2007)



Fault Zone Map

The project site is located within the EFZ defined by *Alquist-Priolo Earthquake Fault Zoning Act* (1993), as shown on the map for Desert Creek Peak SW ¼ Quadrangle (Hart and Bryant, 2007). The EFZ is associated with the Holocene active Antelope Valley fault. The Antelope Valley fault is mapped on the west side of US Highway 395 with associated EFZ extending on both sides of the approximate fault alignment. The United States Geological Survey (USGS) Quaternary fault and fold database for the United States (USGS, 2015) maps the subject Antelope Valley fault about 500 feet west of the project site.

Although the fault scarp is apparent on the west side of US Highway 395, a fault trench was excavated crossing the site in a west to east orientation as shown on Plate 1. The trench was excavated near the northern edge of the proposed building footprint, perpendicular to the general alignment of the Antelope Valley fault. The eastern and western limits of the fault trench extended greater than 10 feet past the building envelope. No evidence of past surface rupture or offset stratigraphy was observed in the fault trench sidewalls. No soil development was observed and the geologic unit is considered to be Holocene in age.

Soil Profile in Fault Trench

The Antelope Valley fault is a high angle normal fault that dips steeply beneath the sight at significant depth, however, where surface rupture would most likely occur lies well west of the water treatment facility.

Because no evidence of faulting or ground rupture was found in the fault trench, no further fault investigation or fault setback for the proposed building are necessary. Though the likelihood of ground rupture is low based on our fault investigation, the potential for severe ground shaking is high because of site's proximity to the potentially active Antelope Valley fault

Ground Motion and Liquefaction

Mapping by the USGS (2013) indicates that there is a 2 percent probability that a bedrock ground acceleration of 0.64g will be exceeded in any 50-year interval.

EQFAULT™ Version 3.00 is a computer program for the deterministic estimation of peak site acceleration using three-dimensional articulated planar elements (faults) to model seismogenic sources (Blake, 2006b). The site latitude and longitude inputs were 38.531 degrees and -119.489 degrees, respectively, and the search radius was 70 miles. The attenuation relationship used was that recommended by Boore, et al. (1997) for Site Class D. The resulting deterministic peak ground accelerations for each fault are summarized in Table 2 (Estimated Deterministic Peak Ground Accelerations).

TABLE 2 - ESTIMATED DETERMINISTIC PEAK GROUND ACCELERATIONS				
Fault Name, Zone or System	Approximate Distance (miles)	Estimated Maximum Earthquake Event		
		Maximum Earthquake Magnitude (Mw)	Peak Site Acceleration (g)	Estimated Site Intensity (Modified Mercali Scale)
Antelope Valley	0.0	6.7	0.640	X
Western Nevada Zone 2	5.4	7.3	0.446	X
Western Nevada Zone 1	7.2	7.3	0.376	IX
Genoa (Carson Range Flt. Zone)	16.0	6.9	0.213	VIII
Western Nevada Zone 3	17.1	7.3	0.205	VIII
Robinson Creek	19.4	6.4	0.141	VIII
Western Nevada Zone 4	29.0	7.3	0.138	VIII
Mono Lake	30.9	6.6	0.110	VII
Western Nevada Zone 5	40.9	7.3	0.105	VII
Hartley Springs	52.1	6.6	0.073	VII
Foothills Fault System 3	56.9	6.5	0.065	VI
Foothills Fault System 2	62.9	6.5	0.060	VI
Hilton Creek	66.7	6.7	0.064	VI

A detailed liquefaction analysis was not considered necessary for the proposed water system improvements project and, therefore, was excluded from BEC's scope on this project. It is our opinion that the potential for soil liquefaction at the site is negligible due to the dense nature of site soils, presence of oversized particles, and a relatively deep ground water table.

Flood Plains

The Federal Emergency Management Agency (FEMA) has identified the site as lying in Zone AE with a 100-year base flood elevation of 5,264 feet above mean sea level (FEMA, 2011). The civil engineering design is to account for this flood elevation by placing the improvements adequately above the existing ground surface.

Other Geologic Hazards

A moderate to high potential for dust generation is present if grading is performed in dry weather. Abundant cobbles and boulders exist within the subsurface profile. No other geologic hazards were identified.

Discussion and Recommendations

General Information

Sand and gravel soils extend to 7 feet or more below existing ground surface within the site. These soils will provide excellent support suitable to host the proposed water system improvement project, subject to the requirements of this report. The fault trench in the building area did not reveal evidence of faulting or ground rupture. The Antelope Valley fault surely underlies this site at considerable depth. Fault rupture, during a seismic event along the Antelope Valley fault, would most likely surface near the existing scarp, across the highway and well west of the project. Ground shaking from rupture of the Antelope Valley fault would be intense.

Cobbles and boulders within the site soils account up to 50 percent of the total excavated soil mass and will make trenching and excavation difficult as discussed in the **Trenching and Excavation** section. The very minimal fine contents in the subsurface soils will allow the excavation and trench sidewalls to slough and cave. Neat line trenching will not be possible. Fill generated from native soils will be considered rock fill due to the content of oversized particles and will require proper compaction efforts and field control measures, as described in the **Site Preparation** and **Mass Grading** sections.

The recommendations provided herein, and particularly under **Geotechnical Design Recommendations, Civil Engineering and Construction Recommendations,** and **Quality Control**, are intended to minimize risks of structural distress related to consolidation or expansion of native soils and/or structural fills. These recommendations, along with proper design and construction of the structure and associated improvements, work together as a system to improve overall performance. If any aspect of this system is ignored or is poorly implemented, the performance of the project will suffer. Sufficient quality control should be performed to verify that the recommendations presented in this report are followed.

Structural areas referred to in this report include all areas of buildings, concrete slabs, as well as pads for any minor structures. The term engineer, as presented below, pertains to the civil or geological engineer that has prepared the geotechnical engineering report for the project or who serves as a qualified geotechnical professional on behalf of the owner.

All compaction requirements presented in this report are relative to ASTM D 1557.

Any evaluation of the site for the presence of surface or subsurface hazardous substances is beyond the scope of this investigation. When suspected hazardous substances are encountered during routine geotechnical investigations, they are noted in the exploration logs and immediately reported to the client. No such substances were revealed during our exploration.

Geotechnical Design Recommendations

Seismic Design Parameters

The 2013 *California Building Code* (*CBC*) (California Building Standards Commission [CBSC], 2013)], adopted by Mono County, requires a detailed soils evaluation to a depth of 100 feet to develop appropriate soils criteria. However, the code states that a Site Class D may be used as a default value when the soil properties are not known in sufficient detail to determine the soil profile type. The Site Class D soil profile is for stiff soils with a shear velocity between 600 and 1,200 feet per second, or with an N (Standard Penetration Test [SPT]) value between 15 and 50 or an undrained shear strength between 1,000 and 2,000 pounds per square foot (psf). Based on our experience and the geology at the Sierra East residential development, it is our opinion that the default Site Class D is appropriate. With that assumption, the recommended seismic design criteria are presented in Table 3 (Seismic Design Criteria Using 2013 *California Building Code*).

TABLE 3 - SEISMIC DESIGN CRITERIA USING 2013 *CALIFORNIA BUILDING CODE* (USGS, 2013)	
Approximate Latitude	38.531
Approximate Longitude	-119.489
Spectral Response at Short Periods, S_s, percent of gravity	158.4
Spectral Response at 1-Second Period, S_1, percent of gravity	57.2
Site Class	D
Occupancy Category	III
Site Coefficient F_a, decimal	1.00
Site Coefficient F_v, decimal	1.50
Site Adjusted Spectral Response at Short Periods, S_{MS}, percent of gravity	158.4
Site Adjusted Spectral Response at Long Periods, S_{M1}, percent of gravity	85.8
Design Spectral Response at Short Periods, S_{DS}, percent of gravity	105.6
Design Spectral Response at Long Periods, S_{D1}, percent of gravity	57.2
Seismic Design Category	D

Foundation Design Parameters

Native materials, when properly prepared, will provide excellent support for the proposed building and associated improvements. Individual column footings and continuous wall footings underlain by native granular soils, structural fill, or rock fill can be designed for a net maximum allowable bearing pressure of 3,000 pounds per square foot (psf), and should have minimum footing widths of 24 and 12 inches, respectively. The net allowable bearing pressure is the pressure at the base of the footing in excess of the adjacent overburden pressure. This allowable bearing value should be used for dead plus ordinary live loads. Ordinary live loads are that portion of the design live load which will be present during the majority of the life of the structure. Design live loads are loads which are produced by the use

and occupancy of the building, such as by moveable objects, including people or equipment, as well as snow loads. This bearing value may be increased by one-third for total loads. Total loads are defined as the maximum load imposed by the required combinations of dead load, design live loads, snow loads, and wind or seismic loads.

With this allowable bearing pressure, total foundation movements of approximately ¾ inch should be anticipated. Differential movement between footings with similar loads, dimensions, and base elevations should not exceed ½ inch. The majority of the anticipated movement will occur during the construction period as loads are applied.

Lateral loads, such as wind or seismic, may be resisted by passive soil pressure and friction on the bottom of the footing. The recommended coefficient of base friction is 0.45 and has been reduced by a factor of 1.5 on the ultimate soil strength. Design values for active and passive equivalent fluid pressures are 35 and 439 pounds per square foot per foot of depth, respectively. These design values are based on spread footings bearing on and backfilled with structural fill. All exterior footings should be placed a minimum 2 feet below adjacent finish grade for frost protection.

Metal Pipe Design Parameters

Laboratory testing was performed to evaluate the corrosion potential of the soils with respect to metal pipe in contact with the ground. The results of the laboratory testing indicate that the site foundation soils are not corrosive to buried metal (American Water Works Association [AWWA], 1999). As a result, metal pipe in contact with the ground will not require corrosion protection.

Portland Cement Concrete Mix Design Parameters

Soluble sulfate content has been determined for representative samples of the site foundation soils. The sulfate was extracted from the soil at a 10:1 water to soil ratio in order to assure that all soluble sodium sulfate was dissolved. The results are reported in milligrams of sulfate per kilogram of soil and can be directly converted to percent by dividing by 10,000. The percent sulfate in the soil is used to determine the sulfate exposure Class (S) from the information presented in Table 4 (Sulfate Exposure Class).

TABLE 4 - SULFATE EXPOSURE CLASS*

			Water-Soluble Sulfate (SO_4) in Soil, Percent by Weight	Dissolved Sulfate (SO_4) in Water, ppm
S Sulfate	Not Applicable	S0	$SO_4 < 0.10$	$SO_4 < 150$
	Moderate	S1	$0.10 \leq SO_4 < 0.20$	$150 \leq SO_4 < 1,500$ Seawater
	Severe	S2	$0.20 \leq SO_4 \leq 2.00$	$1,500 \leq SO_4 \leq 10,000$
	Very Severe	S3	$SO_4 > 2.00$	$SO_4 > 10,000$

*From Table 4.2.1 Exposure Categories and Classes. ACI 318, *Buildings Code and Comments.*

The results of the testing (Appendix A) indicate that concrete in contact with the site foundation soils should be designed for Class S0 Sulfate exposure. Therefore, Type I or II cement can be used for all concrete work.

Portland Cement Concrete Floor Slab Design

Final design of the floor slab shall be performed by the project structural engineer. Any interior concrete slab-on-grade floors shall be a minimum of 4 inches thick. The thickness of base material beneath PCC flatwork shall be 4 inches. Floor slab reinforcement, as a minimum, shall consist of No. 3 reinforcing steel placed on 24-inch-centers in each direction, or flat sheets of 6x6, W4.0xW4.0 welded wire mesh (WWM).

Civil Engineering and Construction Recommendations

Site Preparation

The proposed mechanical building will be located within the vacant area south of the community center building. This area is partially covered with grass. All vegetation shall be stripped and grubbed from structural areas and removed from the site. A stripping depth of 0.2 to 0.4 feet is anticipated.

The test pits and fault trenches were excavated by backhoe at the approximate locations shown on the site plan. Locations were determined in the field to be outside of the building footprint by approximate means. All test pits were backfilled upon completion of the field portion of our study. The backfill was compacted to the extent possible with equipment on hand. However, the backfill was not compacted to the requirements presented herein under **Mass Grading**. If structures, concrete flatwork, pavement, utilities, or other improvements are to be located in the vicinity of any of the test pits, the backfill should be removed and recompacted in accordance with the requirements contained in the soils report. Failure to properly compact backfill could result in excessive settlement of improvements located over test pits.

All areas to receive structural fill or structural loading shall be densified to, at least, 90 percent relative compaction. The alluvial materials commonly retain greater than 30 percent on the ¾-inch sieve. Such materials are too coarse for standard density testing techniques. As a result, compaction verification will be based on a diligent testing and inspection program that includes observing compactive effort to verify the compacted surface is firm and unyielding. A minimum 5 single passes with a *minimum* 10-ton roller in mass grading, or 5 complete passes with hand compactors in footing and utility trenches is recommended to sufficiently compact the rock fill. This alternate has proved to provide adequate project performance, as long as all other geotechnical recommendations are closely followed. In all cases, the final surface shall be smooth, firm, and exhibit no signs of deflection.

The site soils are generally granular and free draining, however, it possible that localized areas of surface soil over optimum moisture may exist following wet weather. If this occurs, surface soils may be well above optimum moisture

and difficult to compact. Moisture conditioning should be possible by scarifying the top 12 inches of subgrade and allowing it to air dry to near-optimum moisture, prior to compaction.

If loose, soft, wet, or disturbed soils are encountered at the foundation subgrade, these soils should be removed to expose undisturbed native soils, and the resulting over-excavation backfilled with compacted structural fill. The base of all excavations should be dry and free of loose soils at the time of concrete placement.

Trenching and Excavation

The project will include improvements to the existing water system within the Sierra East residential community. A small mechanical building will be constructed. The project will require trenching for the installation of utility lines to connect to the existing utilities in the area, as well as for the installation of the heat sink loop. The subsurface soils include abundant cobbles and boulders that could pose difficulties in excavation and trenching. Since the gravel soils that exist about 0.5 to 1.5 feet below the existing ground surface exhibit very minimal fine content and are relatively dry, the sidewalls of the excavation and trenches can ravel and cave-in, particularly when they are allowed to dry out. Adequate water shall be sprayed on these sidewalls to maintain stability, to the extent possible. Neat line trenching will not be possible due to cobbles and boulders; as such, excavation and backfill quantities will be higher. Large boulders that encroach into excavations for footings and utility trenches will require removal and backfill with structural fill.

Temporary trenches with near-vertical sidewalls should be stable to a depth of approximately 3 feet. Temporary trenches are defined as those that will be open for less than 24 hours. Excavations to greater depths will require shoring or laying back of sidewalls to maintain adequate stability. Regulations contained in Part 1926, Subpart P, of Title 29 of the Code of Federal Regulations (CFR, 2010) require that temporary sidewall slopes be no greater than those presented in Table 5 (Maximum Allowable Temporary Slopes).

TABLE 5 - MAXIMUM ALLOWABLE TEMPORARY SLOPES

Soil or Rock Type	Maximum Allowable Slopes[1] for Deep Excavations less than 20 Feet Deep[2]
Stable Rock	Vertical (90 degrees)
Type A[3]	3H:4V (53 degrees)
Type B	1H:1V (45 degrees)
Type C	3H:2V (34 degrees)

Notes:

[1] Numbers shown in parentheses next to maximum allowable slopes are angles expressed in degrees from the horizontal. Angles have been rounded off.
[2] Sloping or benching for excavations greater than 20 feet deep shall be designed by a registered professional engineer.
[3] A short-term (open 24 hours or less) maximum allowable slope of 1H:2V (63 degrees) is allowed in excavation in Type A soils that are 12 feet or less in depth. Short-term maximum allowable slopes for excavations greater than 12 feet in depth shall be 3H:4V (53 degrees).

The State of California, Department of Industrial Relations, Division of Occupational Safety and Health Administration (Cal/OSHA), has adopted and strictly enforces these regulations, including the classification system and the maximum slopes. In general, Type A soils are cohesive, non-fissured soils, with an unconfined compressive strength of 1.5 tons per square foot (tsf) or greater. Type B are cohesive soils with an unconfined compressive strength between 0.5 and 1.5 tsf. Type C soils have an unconfined compressive strength below 0.5 tsf. Numerous additional factors and exclusions are included in the formal definitions. The client, owner, design engineer, and contractor shall refer to Appendix A and B of Subpart P of the, previously referenced, Federal Register for complete definitions and requirements on sloping and benching of trench sidewalls. Appendices C through F of Subpart P apply to requirements and methodologies for shoring.

On the basis of our exploration, the native granular soils are exclusively Type C. All trenching shall be performed and stabilized in accordance with local, state, and OSHA standards.

Mass Grading

Earthwork associated with this project will include raising the site area to host building and generator pads about 1 to 2 feet above the existing ground surface such that they are above the flood elevations associated with the adjacent West Walker River, located east of the project site. Raising the subject pads will require import of structural fill.

Native granular soils will be suitable for structural fill provided particles larger than 6 inches are removed. Particles up to 6 inches can be allowed when native granular soils are placed and compacted as rock fill, as described below. This larger particle size, however, will hinder finish grading and neat line trenching for footings and utilities in the fill. Oversized rocks can be stockpiled for later use as erosion protection. Grading will require imported structural fill to raise the building pad. We recommend imported structural fill on this project satisfy the specifications presented in Table 6 (Guideline Specification for Imported Structural Fill).

TABLE 6 - GUIDELINE SPECIFICATION FOR IMPORTED STRUCTURAL FILL		
Sieve Size	**Percent by Weight Passing**	
4 Inch	100	
3/4 Inch	70 – 100	
No. 40	15 – 70	
No. 200	5 – 30	
Percent Passing No. 200 Sieve	**Maximum Liquid Limit**	**Maximum Plastic Index**
5 – 10	50	20
11 – 20	40	15
21 – 30	35	10

These recommendations are intended as guidelines to specify a readily available, prequalified material. Adjustments to the recommended limits can be provided to allow the use of other granular, non-expansive material. Any such adjustments must be made and approved by the engineer, in writing, prior to importing fill to the site. Any structural fill within the building area shall be placed in maximum 8-inch-thick (loose) lifts, each densified to, at least, 95 percent relative compaction. Nonstructural fill shall be densified to, at least, 85 percent relative compaction to minimize consolidation and erosion.

Where native soils are to be reused as fill, they will have greater than 30 percent retained on the ¾-inch sieve such that standard density testing is not valid. These materials will be treated as rock fill with a maximum 12-inch lift thickness and a maximum particle size of 6 inches. A proof rolling program of at least 5 single passes of a minimum CAT® 815 roller or equal in mass grading or at least 5 complete passes with hand compactors in footing trenches is recommended. If the coarser (12 inch minus), on-site, or other locally-derived alluvium is used unscreened, neat line trenching for footings and underground utilities will not be possible.

Properly constructed rock fills have a long history of excellent performance. Acceptance of this rock fill is based upon observation of particle size, lift thickness, moisture content, and applied compactive effort. Compaction must continue to the satisfaction of the engineer. In all cases, the finished surface shall be firm and show no signs of deflection.

Grading shall not be performed with or on frozen soils.

Utility Trench Backfill

Waterlines, the heat sink, and other utilities associated with the maintenance building will require trench backfill to be placed and compacted as specified by the following recommendations.

The maximum particle size in trench backfill shall be 4 inches which will require screening of on-site materials. Bedding and initial backfill 12 inches over the pipe will require import and shall conform to the requirements of the utility having jurisdiction. Bedding and initial backfill shall be densified to at least 90 percent relative compaction. Native granular soil will provide adequate final backfill as long as particles larger than 4 inches are excluded, and shall be placed in maximum 8-inch-thick loose lifts that are compacted to a minimum of 90 percent relative compaction in all structural areas.

Backfill around the heat sink shall follow the designer's specification for bedding, compaction, and final backfill material requirements. The material gradation, moisture content, and degree of compaction is of critical importance for dissipating heat. Steady-state heat dissipation is ultimately a function of the material gradation and degree of compaction when the material is in its dry state ,as this would be the long term condition. However, to facilitate compaction during construction, moisture conditioning is required. A zone of aggregate road base compacted around the pipe can improve heat dissipation over native materials due to the higher density and lower air voids of the manufactured product.

Subsidence and Shrinkage

Subsidence of granular alluvial soils exposed in cut should be negligible. Granular alluvial soils excavated and recompacted as rock fill should experience quantity shrinkage of approximately 10 to 20 percent including removal of particles larger than 12 inches. Granular soils excavated, screened, and recompacted as final trench backfill could experience quantity shrinkage up to 35 percent.

Erosion Control

There are no major cut or fill slopes planned for this project. Erosion protection shall be installed on the slopes of the raised building pad if the slopes are greater than 3H:1V (horizontal to vertical) to prevent erosion. Protection may also be necessary to prevent erosion by flooding of the West Walker River. Stockpiling of rock excavated from utility and heat sink trenches and excavations will produce abundant particles that can be used as erosion protection on this surface.

Dust potential at this site will be moderate to severe during dry periods. Temporary (during construction) and permanent (after construction) erosion control will be required for all disturbed areas. The contractor shall prevent dust from being generated during construction in compliance with all applicable city, county, state, and federal regulations. The contractor shall submit an acceptable dust control plan to the Mono County District Health Department prior to starting site preparation or earthwork. Project specifications should include an indemnification by the contractor of the owner and engineer for any dust generation during the construction period. The owner will be responsible for mitigation of dust after accepting the project.

In order to minimize erosion and downstream impacts to sedimentation runoff from this site, best management practices with respect to storm water discharge shall be implemented.

Site Drainage

Adequate surface drainage shall be provided so moisture is directed away from the structure. A system of roof gutters and downspouts is recommended to collect roof drainage and direct it away from the foundations unless pavement extends to the walls.

The ponding of water on finish grade or at the edge of improvements shall be prevented by grading the site in accordance with *CBC* (CBSC, 2013) requirements.

Portland Cement Concrete Flatwork

All concrete slabs shall be directly underlain by imported Class 2, ¾-inch aggregate base (California Department of Transportation [Caltrans], 2012). Aggregate base courses shall be densified to at least 95 percent relative compaction.

The Antelope Valley area is a region with low relative humidity. As a consequence, concrete flatwork is prone to excessive shrinking and curling. Concrete mix proportions and construction techniques, including the addition of water and improper curing, can adversely affect the finished quality of concrete and result in cracking, curling, and spalling of slabs. We recommend that all placement and curing be performed in accordance with procedures outlined by the American Concrete Institute (ACI, 2008) and this report. Special considerations shall be given to concrete placed and cured during hot or cold weather temperatures, low humidity conditions, and windy conditions such as are common along the West Walker River between the communities of Topaz Lake and Walker.

Proper control joints and reinforcement shall be provided to minimize any damage resulting from shrinkage as discussed below. In particular, crack-control joints shall be installed on maximum 10-foot-centers and shall be installed to a minimum depth of 25 percent of the slab thickness. Saw-cuts, zip strips, and/or trowel joints are acceptable; however, saw-cut joints must be installed as soon as initial set allows and prior to the development of internal stresses that will result in a random crack pattern.

Rolls of WWM are not recommended for use since vertically centered placement of rolled WWM within a floor slab is difficult to achieve. All reinforcing steel and WWM shall be centered in the floor slab through the use of concrete dobies or approved equivalent.

Concrete shall not be placed on frozen in-place soils.

The base layer that overlies the moisture barrier membrane shall remain compacted and a uniform thickness maintained during the concrete pour, as its intended purpose is to facilitate even curing of the concrete and minimize curling of the slab. Extra attention shall be given during construction to ensure that rebar reinforcement and equipment do not damage the integrity of the vapor barrier. Care must be taken so that concrete discharge does not scour the base material from the vapor barrier. This can be accomplished by maintaining the discharge hose in the concrete and allowing the concrete to flow out over the base layer.

Anticipated Construction Problems

Difficulty will be encountered during excavating and trenching due to the abundance of cobbles and boulders that are present in the native alluvium. Neat line trenching and excavations will be impossible. Soils are relatively dry and exhibit a much lower fine content such that they can ravel and cave-in from the sidewalls of the excavations and trenches. Trench spoils will need to be screened for use as backfill. Depending on the season of construction soft, wet, surface soils may make it difficult for construction equipment to travel and operate.

Quality Control

All plans and specifications should be reviewed for conformance with this geotechnical report and approved by the engineer prior to submitting them to the building department for review.

The recommendations presented in this report are based on the assumption that sufficient field testing and construction review will be provided during all phases of construction. We should review the final plans and specifications to check for conformance with the intent of our recommendations. Prior to construction, a pre-job conference should be scheduled to include, but not be limited to the owner, architect, civil engineer, general contractor, earthwork and materials subcontractors, building official, and engineer. The conference will allow parties to review the project plans, specifications, and recommendations presented in this report and discuss applicable material quality and mix design requirements. All quality control reports should be submitted to and reviewed by the engineer.

During construction, we should have the opportunity to provide sufficient on-site observation of preparation and grading, over-excavation, fill placement, foundation installation, and paving. These observations would allow us to verify that the geotechnical conditions are as anticipated and that the contractor's work is in conformance with the approved plans and specifications.

Standard Limitations Clause

This report has been prepared in accordance with generally accepted geotechnical practices. The analyses and recommendations submitted are based on field exploration performed at the locations shown on Plate 1 of this report. This report does not reflect soils variations that may become evident during the construction period, at which time re-evaluation of the recommendations may be necessary. We recommend our firm be retained to perform construction observation in all phases of the project related to geotechnical factors to ensure compliance with our recommendations. The owner shall be responsible for distributing this geotechnical investigation to all designers and contractors whose work is related to geotechnical factors.

Equilibrium water level readings were made on the date shown on Plate 2 of this report (not encountered within the exploration depth at the time of exploration). Fluctuations in the water table may occur due to rainfall, temperature, seasonal runoff, or adjacent irrigation practices. Construction planning should be based on assumptions of possible variations in the water table.

This report has been produced to provide information allowing the architect or engineer to design the project. The owner is responsible for distributing this report to all designers and contractors whose work is affected by geotechnical aspects. In the event there are changes in the design, location, or ownership of the project from the time this report is issued, recommendations should be reviewed and possibly modified by the engineer. If the engineer is not granted the opportunity to make this recommended review, he or she can assume no responsibility for misinterpretation or misapplication of his or her recommendations or their validity in the event changes have been made in the original design concept without his or her prior review. The engineer makes no other warranties, either expressed or implied, as to the professional advice provided under the terms of this agreement and included in this report.

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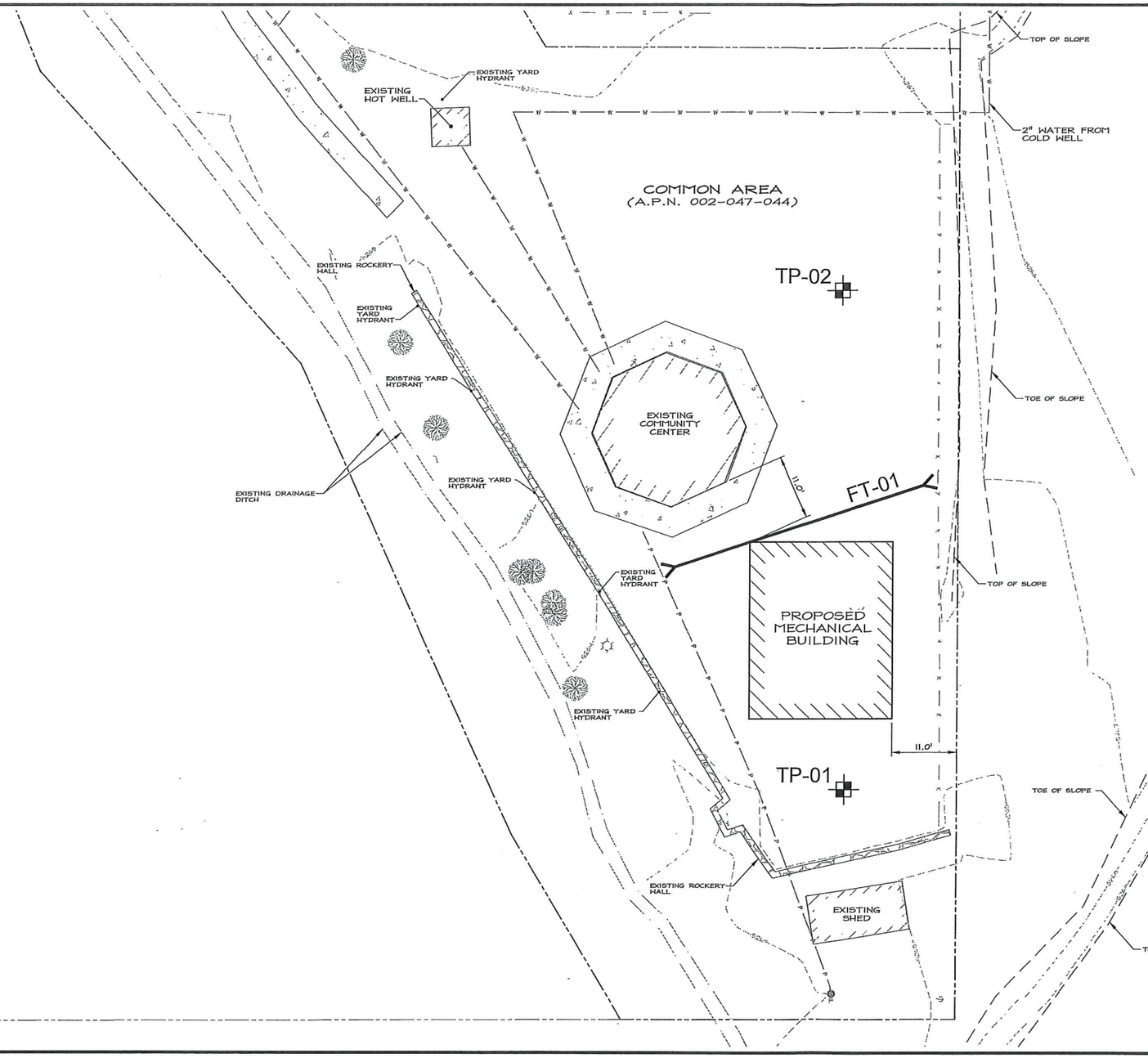
PLATES



SCALE: 1"=20'

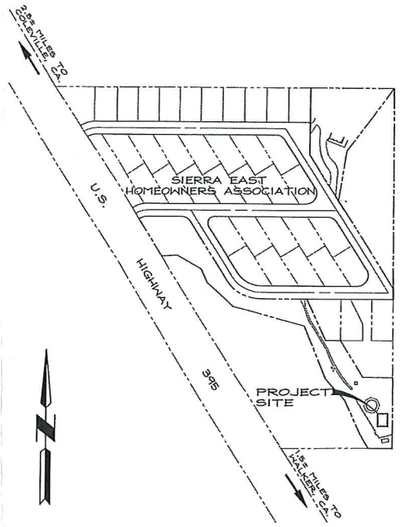
LEGEND

TP-01 APPROXIMATE TEST PIT LOCATION

APPROXIMATE FAULT TRENCH LOCATION

NOTES

1. BASE MAP PROVIDED BY R.O. ANDERSON ENGINEERING, INC.



SITE LOCATION MAP

N.T.S.

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R. O. ANDERSON ENGINEERING, INC.

PLOT PLAN

SIERRA EAST HOMOWNERS ASSOCIATION WATER SYSTEM IMPROVEMENTS

MONO COUNTY, CALIFORNIA

Project No.
0127-98-1

Plate 1

TEST PIT LOG

TEST PIT NO.: TP-01 | DATE: 12/18/2014

TYPE OF HOE: Case 590 Super M | DEPTH TO GROUND WATER (ft): NE

LOGGED BY: JP | GROUND ELEVATION (ft): NA

SAMPLE NO.	SAMPLE TYPE	PENETROMETER (tsf)	MOISTURE (%)	PLASTICITY INDEX	DEPTH (ft)	USCS SYMBOL	LITHOLOGY	DESCRIPTION
A	GRAB					SM		**Silty Sand** Brown to dark brown, dry to slightly moist, medium dense with an estimated 30% non-plastic to low plasticity fines, 60% fine to coarse sand, and 10% rounded to subrounded gravel up to 1 inch in diameter. Fine roots to 1.5 feet below ground surface (bgs). Weakly cemented.
					2	GP		**Poorly Graded Gravel with Sand** Brown to gray, slightly moist to moist, dense with 2% non-plastic fines, 45% fine to coarse sand, and 53% rounded to subrounded fine to coarse gravel. Rounded cobbles and boulders up to 2 feet in diameter make up approximatley 50% of the total soil mass (tsm). Cobbles between 3 and 12 inches in diameter account for 4/5 of the oversized mass. Cobbles and boulders are of granitic composition.
B	GRAB		2.8	NP	4			
					6	SP		**Poorly Graded Sand with Gravel** Brown to gray, slightly moist to moist, dense with an estimated 5% non-plastic fines, 55% fine to coarse sand, and 40% rounded to subrounded fine to coarse gravel. Rounded cobbles and boulders up to 2 feet in diameter make up approximatley 35% of the tsm. Cobbles between 3 and 12 inches in diameter account for 4/5 of the oversized mass. Cobbles and boulders are of granitic composition.

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Sierra East HOA Water System
Improvements
Mono County, California

PROJECT NO.: 0127-98-1

PLATE: 2a

SHEET 1 OF 1

TEST PIT LOG

TEST PIT NO.: TP-02 DATE: 12/18/2014

TYPE OF HOE: Case 590 Super M DEPTH TO GROUND WATER (ft): NE

LOGGED BY: JP GROUND ELEVATION (ft): NA

SAMPLE NO.	SAMPLE TYPE	PENETROMETER (tsf)	MOISTURE (%)	PLASTICITY INDEX	DEPTH (ft)	USCS SYMBOL	LITHOLOGY	DESCRIPTION
								Topsoil Sod, topsoil, and fine roots.
						SM		**Silty Sand with Gravel** Brown, slightly moist, medium dense to dense with an estimated 20% non-plastic fines, 60% fine to coarse sand, and 20% rounded to subrounded fine to coarse gravel. Rounded cobbles up to 12 inches in diameter make up about 15% of the tsm. Cobbles are of granitic composition.
					2	GP		**Poorly Graded Gravel with Sand** Brown to gray, dense to very dense with an estimated 5% non-plastic fines, 45% fine to coarse sand, and 50% rounded to subrounded fine to coarse gravel. Rounded cobbles up to 12 inches in diameter make up approximatley 30% of the tsm. Cobbles between 3 and 8 inches in diameter account for 2/3 of the oversized mass. Cobbles are of granitic composition.
					4			
					6			

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PROJECT NO.: 0127-98-1

PLATE: 2b

SHEET 1 OF 1

BORING_LOG 0127981.GPJ BLKEAGLE.GDT 1/19/2015

TEST PIT LOG

TEST PIT NO.: FT-01 | DATE: 12/18/2014

TYPE OF HOE: Case 590 Super M | DEPTH TO GROUND WATER (ft): NE

LOGGED BY: JP | GROUND ELEVATION (ft): NA

SAMPLE NO.	SAMPLE TYPE	PENETROMETER (tsf)	MOISTURE (%)	PLASTICITY INDEX	DEPTH (ft)	USCS SYMBOL	LITHOLOGY	DESCRIPTION
A	GRAB		4.3	NP		SM		**Silty Sand** Brown, dry to slightly moist, medium dense, with 31% non-plastic fines, 64% fine to coarse sand, and 5% rounded to subrounded gravel up to 1 inch in diameter. Minor organics debris throughout soil layer. Weakly cemented.
					2	GP-GM		**Poorly Graded Gravel with Silt and Sand** Brown to gray, slightly moist, medium dense to dense with an estimated 10% non-plastic fines, 40% fine to coarse sand, and 50% rounded to subrounded fine to coarse gravel. Rounded cobbles and boulders up to 1.5 feet in diameter make up approximatley 35% of the tsm. Cobbles between 3 and 12 inches in diameter account for 4/5 of the oversized mass. Cobbles and boulders are of granitic composition. Massively bedded.
B	BULK				4	GP		**Poorly Graded Gravel with Sand** Brown to gray, slightly moist, medium dense to dense, with an estimated 5% non-plastic fines, 45% fine to coarse sand, and 50% rounded to subrounded fine to coarse gravel. Rounded cobbles and boulders up to 1.5 feet in diameter make up approximatley 15% of the tsm. Cobbles between 3 and 12 inches in diameter account for 2/3 of the oversized mass. Cobbles and boulders are of granitic composition. Well-bedded, 6 to 12 inch thick bedding.
					6			

48-foot-long trench running west-southwest by east-northeast

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Sierra East HOA Water System Improvements

Mono County, California

PROJECT NO.: 0127-98-1

PLATE: 2c

SHEET 1 OF 1

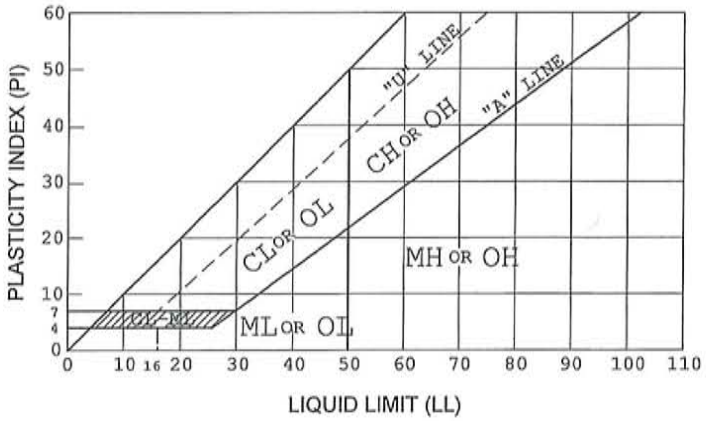
BORING_LOG 0127981.GPJ BLKEAGLE.GDT 1/19/2015

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS (MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE)	GRAVEL AND GRAVELLY SOILS (MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE)	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
	SAND AND SANDY SOILS (MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE)	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS (MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE)	SILTS AND CLAYS (LIQUID LIMIT LESS THAN 50)			ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS (LIQUID LIMIT GREATER THAN 50)			MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS
FILL MATERIAL				--	FILL MATERIAL, NON-NATIVE

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS.

PLASTICITY CHART



FOR CLASSIFICATION OF FINE-GRAINED SOILS AND FINE-GRAINED FRACTION OF COARSE-GRAINED SOILS

EXPLORATION SAMPLE TERMINOLOGY

Sample Type	Sample Symbol	Sample Code
Auger Cuttings		Auger
Bulk (Grab) Sample		Grab
Modified California Sampler		MC
Shelby Tube		SH or ST
Standard Penetration Test		SPT
Split Spoon		SS
No Sample		

GRAIN SIZE TERMINOLOGY

Component of Sample	Size Range
Boulders	Over 12 in. (300mm)
Cobbles	12 in. to 3 in. (300mm to 75mm)
Gravel	3 in. to #4 sieve (75mm to 2mm)
Sand	# 4 to #200 sieve (2mm to 0.074mm)
Silt or Clay	Passing #200 sieve (0.074mm)

RELATIVE DENSITY OF GRANULAR SOILS

N - Blows/ft	Relative Density
0 - 4	Very Loose
5 - 10	Loose
11 - 30	Medium Dense
31 - 50	Dense
greater than 50	Very Dense

CONSISTENCY OF COHESIVE SOILS

Unconfined Compressive Strength, psf	N - Blows/ft	Consistency
less than 500	0 - 1	Very Soft
500 - 1,000	2 - 4	Soft
1,000 - 2,000	5 - 8	Firm
2,000 - 4,000	9 - 15	Stiff
4,000 - 8,000	16 - 30	Very Stiff
8,000 - 16,000	31 - 60	Hard
greater than 16,000	greater than 60	Very Hard

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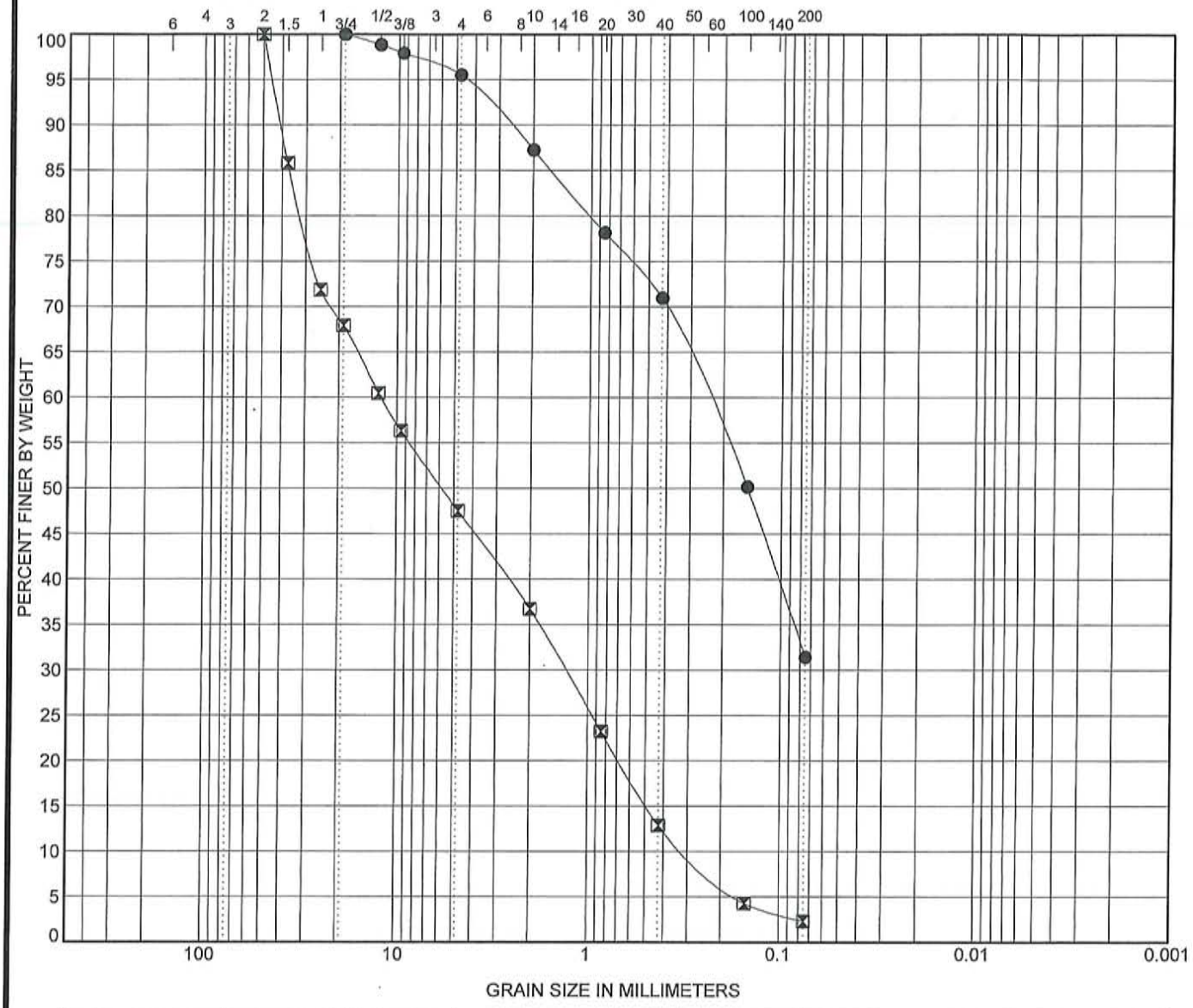
USCS Soil Classification Chart

Project: Sierra East HOA Water System Improvements
Location: Mono County, California
Project Number: 0127-98-1 Plate: 3

USCS CHART 0127981.GPJ US LAB.GDT 1/5/2015



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		USCS Classification	LL	PL	PI	Cc	Cu
●	FT-01	0.0'	SILTY SAND (SM)	NP	NP	NP		
⊠	TP-01	3.0'	POORLY GRADED GRAVEL with SAND (GP)	NP	NP	NP	0.47	40.39

	Specimen Identification		D100	D60	D30	D10	MC %	%Gravel	%Sand	%Silt	%Clay
●	FT-01	0.0'	19	0.245			4.3	4.5	64.1	31.4	
⊠	TP-01	3.0'	50	12.119	1.306	0.3	2.8	52.5	45.2	2.3	

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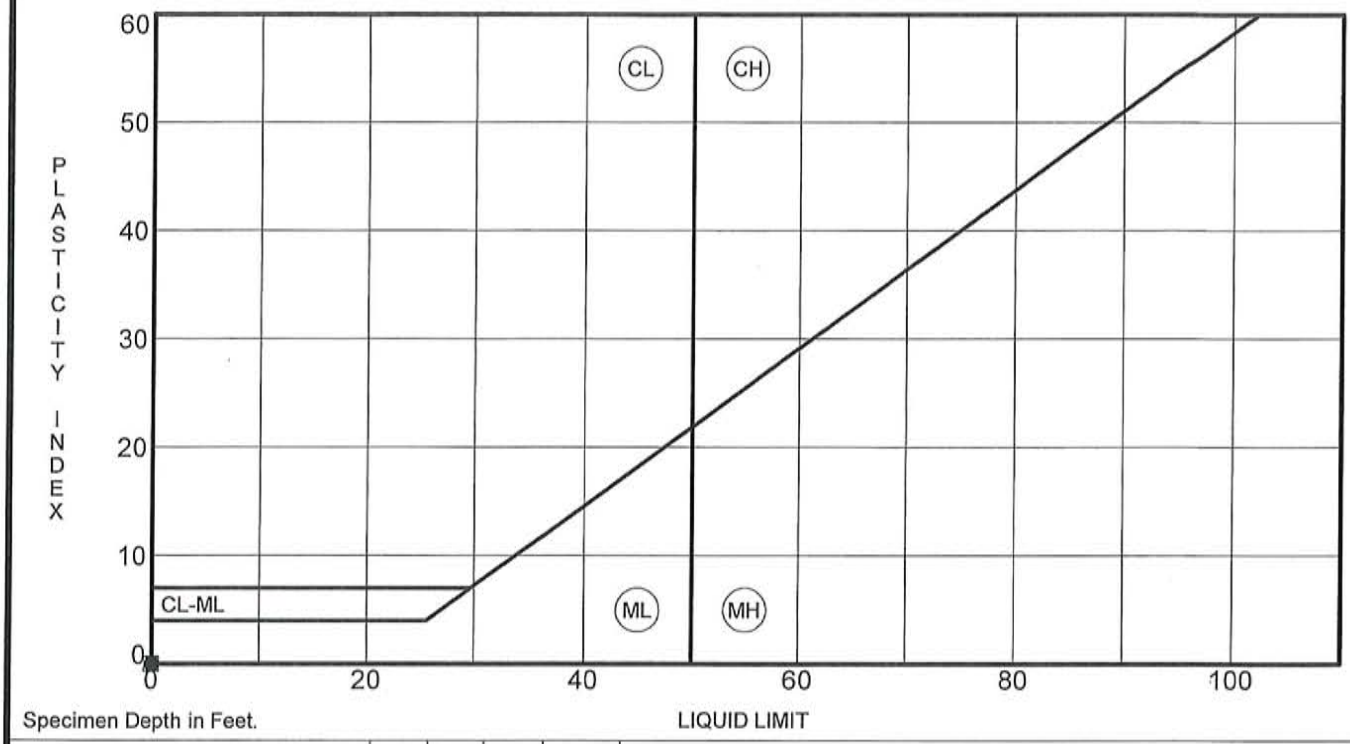
GRAIN SIZE DISTRIBUTION

Project: Sierra East HOA Water System Improvements
Location: Mono County, California
Project Number: 0127-98-1 Plate: 4a

US_GRAIN_SIZE2_0127981.GPJ US_LAB.GDT 1/5/2015



Specimen Depth in Feet.

	Specimen Identification			LL	PL	PI	Fines	USCS Classification
●	FT-01	A	0.0'	NP	NP	NP	31	SILTY SAND (SM)
⊠	TP-01	B	3.0'	NP	NP	NP	2	POORLY GRADED GRAVEL with SAND (GP)

Black Eagle Consulting, Inc.
1345 Capital Blvd., Suite A
Reno, Nevada 89502-7140
Telephone: (775) 359-6600
Fax: (775) 359-7766

ATTERBERG LIMITS RESULTS

Project: Sierra East HOA Water System Improvements
Location: Mono County, California
Project Number: 0127-98-1 Plate: 4b

APPENDIX A

CHEMICAL TEST RESULTS

Laboratory Report
Report ID: 139179

Sierra Environmental Monitoring, Inc.

Black Eagle Consulting, Inc.
Attn: Jeff Wilbrecht
1345 Capital Blvd., Suite A
Reno, NV 89502-7140

Date: 1/15/2015
Client: BEC-100
Taken by: j. Payne
PO #:

Analysis Report

Laboratory Accreditation Number: NV-0015

Laboratory Sample ID	Customer Sample ID	Date Sampled	Time Sampled	Date Received
S201412-1198	0127-98-1 FT-01A	12/18/2014	9:45 AM	12/29/2014

Parameter	Method	Result	Units	Reporting Limit	Analyst	Date Analyzed	Data Flag
pH - Saturated Paste	SW-846 9045A	6.57	pH Units		Malkiewich	1/9/2015	
pH - Temperature	SW-846 9045A	21.2	°C		Malkiewich	1/9/2015	
Redox Potential	SM 2580 B	409	MV		Faulstich	1/14/2015	
Resistivity	EPA 120.1	9600	ohm cm		Malkiewich	1/9/2015	
Sulfate - Ion Chromatography	EPA 300.0	8	mg/Kg	2	Faulstich	1/6/2015	
Sulfide	EPA 376.1	NEGATIVE	Pos/Neg	1	Faulstich	1/14/2015	

Data Flag Legend:

John Kobza, Ph.D
Laboratory Director

1135 Financial Blvd.
Reno, Nv 89502-2348
Phone (775) 857-2400 Fax
(888) 398-7002
jnava@sem-analytical.com

John Faulstich
Quality Assurance Manager

Appendix E

Cultural Resources Evaluation

ASM Affiliates (June 23, 2015 Memorandum, September 2015 Final)

ASM affiliates
archaeology
history
ethnography
architectural history

23 June 2015

Coleen Shade
Principal Planner
R.O. Anderson Engineering, Inc.
595 Tahoe Keys Blvd, Suite A-2
South Lake Tahoe, CA 96150

Re: Sierra East Homeowner's Association Water System Improvements

Dear Ms. Shade,

ASM Affiliates, Inc. (ASM) conducted a Class III cultural resources inventory for the Sierra East Homeowner's Association Water System Improvements project on June 16, 2015. The project's Area of Potential Effect (APE) is located on Sierra East Homeowners Association (SEHOA) property between Coleville and Walker in Mono County, California (Figure 1). Proposed ground-disturbing work includes the drilling and installation of a new Cold Well (northern parcel) as well as the construction of a pump and mechanical room and Hot Well cooling loop (southern parcel) (Figure 2).

ASM contacted the Native American Heritage Commission (NAHC) on May 4, 2015 in order to determine if there are any registered cultural resources, sacred lands, traditional cultural properties, or areas of heritage sensitivity within the project area. The NAHC responded on May 27, 2015 that they had no records pertaining to the presence of Native American cultural resources in the project area. As part of the consultation process, the NAHC provided information for six Native American contacts for four nearby groups including the Bridgeport Paiute Indian Colony, the Mono Lake Indian Community, the Washoe Tribe of Nevada and California, and the Walker River Paiute Tribe. ASM sent a letter via email and/or fax to the chairperson and/or Tribal Historic Preservation Officer (THPO) of each tribe in order to request information they might have concerning the project area. After two weeks, ASM had not received any replies to the letters and on June 12, 2015, followed up with phone calls to each of the contact organizations. In each case, a voicemail or message was left for the appropriate contact. As of June 22, 2015, none of the contacted tribes have responded to ASM's inquiry.

Results of a records search conducted by the Eastern Information Center at the University of California, Riverside, for the APE and a ½-mile buffer surrounding the APE were received on May 4, 2015. The search indicated that five cultural resource inventories had been conducted within a ½-mile radius, none of which overlapped the current APE. Identified cultural resources were limited to two isolated obsidian bifaces recorded within a ½-mile radius of the project area during a 1979 survey. ASM conducted a survey of historic maps, which indicated that the irrigation ditch following the western boundary of the SEHOA property likely dates to the first half of the twentieth century.

The northern parcel, slated as the location of the new Cold Well, is located in a landscaped area covered with decomposed granite approximately 90 feet (ft.) from the current course of the West Walker River. This location was inventoried, but the natural ground surface could not be inspected due to the presence of landscaping ground cover. A review of aerial photography and topographic maps of the area indicates that the terrace where the Cold Well will be installed was constructed between 1994 and 1998. The 1994 USGS Risue Canyon, CA, 7.5' topographic quadrangle and USGS aerial photography from 1993 confirm that the current Cold Well location is positioned right above where the West Walker River was located twenty years ago (see Figure 2). The upper layers of the terrace were undoubtedly constructed using fill

material or secondary alluvial material before being covered with decomposed granite. Although the natural ground surface could not be inspected, it would have been located in the West Walker River bed and, accordingly, is unlikely to retain any cultural resources even if the course of the West Walker River has changed over time.

The southern parcel is the designated area for a Hot Well cooling loop as well as a pump and mechanical room, both of which require ground-disturbing activities. Although the sandy silt at this location appears to represent the natural ground surface of the West Walker River floodplain, the ground within the APE has already been significantly impacted by the construction of a low rockery wall and four associated yard hydrants to create a low terrace. The interior of the APE also appears to have been graded to create a relatively level surface for use as a common area and the construction of an octagonal community center. Various utilities have also been installed including a light pole, Hot Well, and water lines that supply the existing community center. A small spoils pile in the southeast corner of the APE may be the result of various impacts to the area; it was inspected by ASM but did not appear to have any associated cultural material. Although the historic irrigation ditch is located just outside of the APE along the western edge of the southern parcel, it will not be disturbed or impacted by ground-disturbing activities (Personal communication, Coleen Shade and Melanie Greene [June 18, 2015]).

No cultural resources were identified on the ground surface of either parcel during the survey and no historic properties will be affected by the project as it is currently planned. Even though the proximity of the APE to the West Walker River increases the probability of encountering both prehistoric and historic cultural resources, modern modifications to the property including construction, landscaping, and utility work decreases the likelihood that an intact resource will be located. If buried cultural resources are uncovered during construction, ASM recommends that R.O. Anderson notify a qualified archaeologist to review any such findings.

ASM will provide a draft of the full report to R.O. Anderson by July 14, 2015.

Sincerely,

Shannon S. Mahoney

Shannon S. Mahoney, Ph.D., RPA
Senior Archaeologist
ASM Affiliates
10 State St.
Reno, NV 89501
(775) 324-6789

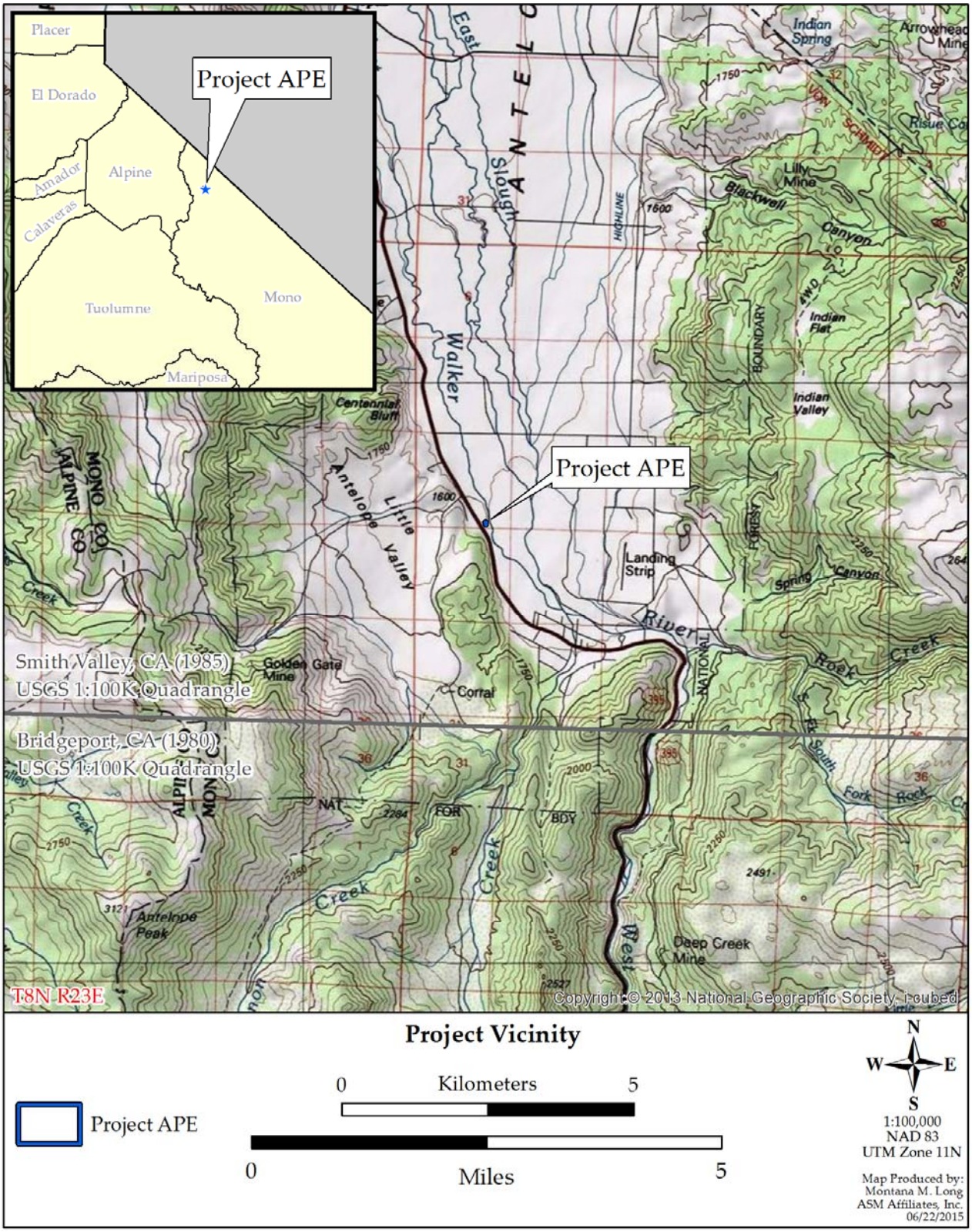


Figure 1. Project vicinity map.

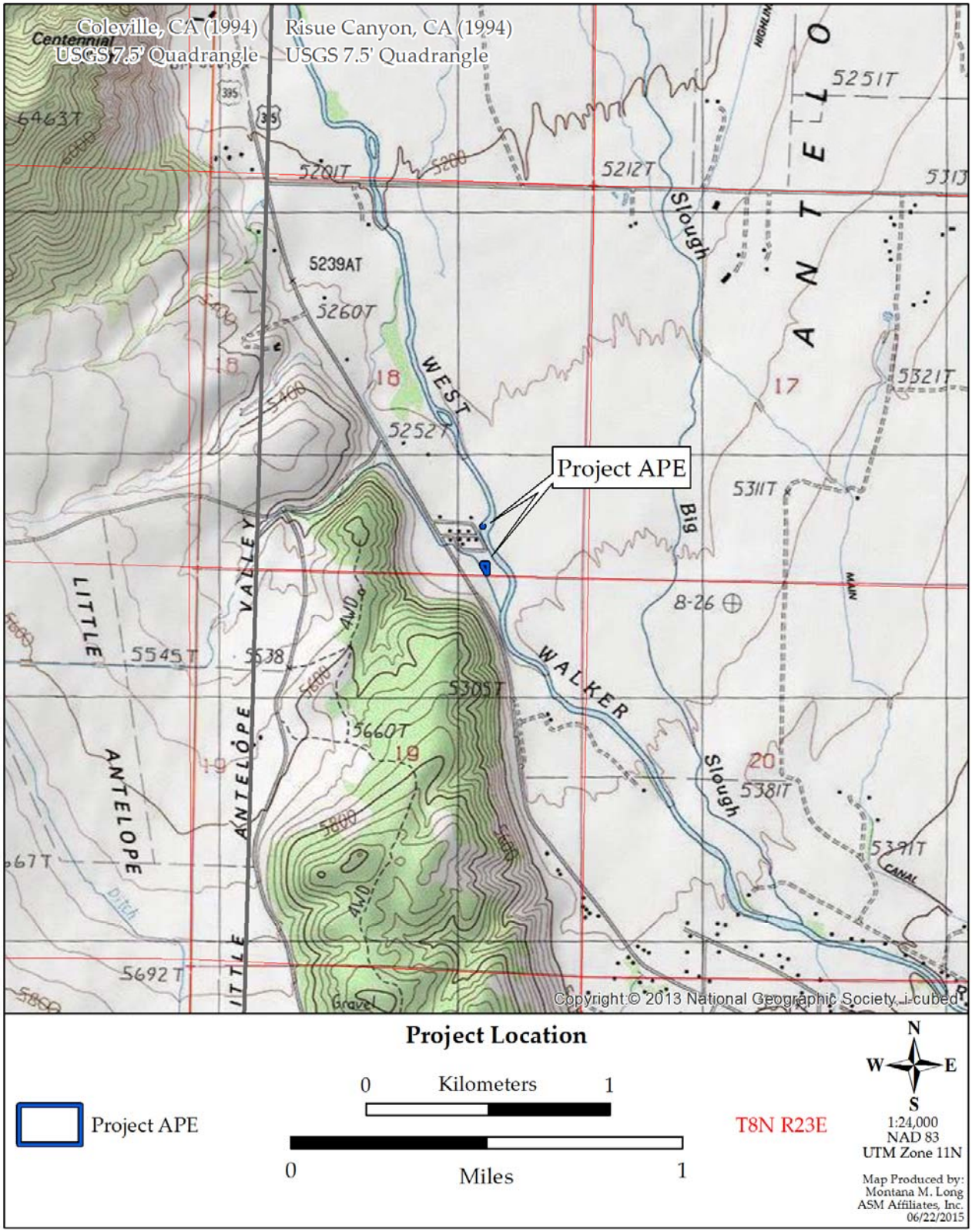


Figure 2. Project location map.

Class III Cultural Resources Inventory for the Sierra East Homeowner's Association Water Systems Improvement Project, Coleville, Mono County, California

FINAL VERSION | September 2015

Prepared for:

R.O. Anderson Engineering, Inc.
595 Tahoe Keys Blvd., Suite A-2
South Lake Tahoe, California 96150

Prepared by:

Shannon S. Mahoney, Ph.D., RPA

ASM affiliates

10 State Street
Reno, Nevada 89501
775-324-6789

ASM Project Number 24380

Class III Cultural Resources Inventory for the Sierra East Homeowner's Association Water Systems Improvement Project, Coleville, Mono County, California

Prepared for:

R.O. Anderson Engineering, Inc.
595 Tahoe Keys Blvd., Suite A-2
South Lake Tahoe, California 96150

Prepared by:

Shannon S. Mahoney, Ph.D., RPA
ASM Affiliates, Inc.
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Reno, Nevada 89501

September 2015
PN 24380

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EXECUTIVE SUMMARY

R.O. Anderson contracted ASM Affiliates, Inc. (ASM) to complete a Class III cultural resources inventory of 0.198 acres on the Sierra East Homeowners Association (SEHOA) property located between Coleville and Walker in Mono County, California. The SEHOA received a planning grant through the Safe Drinking Water State Revolving Fund (SDWSRF), which allows groups to modify existing systems and bring them in compliance with federal and state drinking water standards. Accordingly, the SEHOA water systems improvement project must comply with both the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). ASM contacted the Native American Heritage Commission (NAHC), the Bridgeport Paiute Indian Colony, the Mono Lake Indian Community, the Washoe Tribe of Nevada and California, and the Walker River Paiute Tribe in order to determine if there were any registered cultural resources, sacred lands, traditional cultural properties, or areas of heritage sensitivity within the project area. Those that responded had no records pertaining to the presence of Native American cultural resources in the project area. The Class III cultural resources inventory of the designated APE was conducted by Shannon S. Mahoney, Ph.D., RPA, on June 16, 2015. No cultural resources were identified on the ground surface of either parcel during the survey, and no historic properties will be affected by the project as it is currently planned. Even though the proximity of the APE to the West Walker River increases the probability of encountering both prehistoric and historic cultural resources, modern modifications to the property, including construction, landscaping, and utility work, decrease the likelihood that an intact resource will be located.

1. INTRODUCTION

In April 2015, R.O. Anderson contracted ASM Affiliates, Inc. (ASM) to complete a Class III cultural resources inventory of 0.198 acres on the Sierra East Homeowners Association (SEHOA) property located between Coleville and Walker in Mono County, California. The SEHOA received a planning grant to install an arsenic removal system into the current water supply for the small, rural residential housing area. The SEHOA Water System Improvements Project involves ground-disturbing activities associated with the relocation and redrilling of the existing Cold Well, the construction of a new pump and mechanical room, and the installation of a Hot Well cooling loop. Although the project is located on private property, the planning grant is funded through the Safe Drinking Water State Revolving Fund (SDWSRF), which allows groups to modify existing systems and bring them in compliance with federal and state drinking water standards. The Drinking Water State Revolving Fund (DWSRF) was established through the 1996 amendments to the Safe Drinking Water Act (SDWA) and is matched by California state funds. R.O. Anderson is developing the Preliminary Engineering Report and ensuring compliance with both the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). ASM conducted the Native American consultation and a Class III cultural resources inventory.

2. REGULATORY CONTEXT

The SEHOA received a planning grant (Agreement No. SRF13P120 and Project No. 2600622-001P) through the SDWSRF for a proposed arsenic removal system for their current water supply. The DWSRF was established through the 1996 amendments to the SDWA. The funds serve as loans to water providers to upgrade systems in order to meet state and federal safe drinking water standards. Federal capital contributions are matched by California state funds equal to 20 percent of the capital contribution, and the funds are administered by the California State Water Board (State Water Resources Control Board 2015). Accordingly, water improvement projects must comply with both the NEPA and the CEQA. The SEHOA subsequently contracted R.O. Anderson to prepare the preliminary engineering report and environmental documentation. ASM is providing the cultural resources study and report in compliance with both federal and California state legislation.

The purpose of the inventory was twofold: 1) to identify any existing cultural resources that may be affected by the proposed undertaking; and 2) to evaluate the eligibility of those resources for inclusion in the National Register of Historic Places (NRHP) or the California Register of Historical Resources (CRHR). Our work was carried out in accordance with guidelines set forth by Section 106 of the National Historic Preservation Act (NHPA), as amended, in accordance with 36 Code of Federal Regulations, Part 800. The project is also subject to CEQA requirements, which state that California state and local agencies must assess the potential environmental impacts of proposed development projects and adopt measures to mitigate such impacts.

NATIONAL HISTORIC PRESERVATION ACT (NHPA)

36 CFR 60.4 outlines criteria for determining eligibility for listing in the NRHP. Cultural resources may be considered eligible for listing if they possess integrity of location, design, setting, materials, workmanship, feeling, and association and meet one or more of the criteria:

- Criterion A: associated with events that have made a significant contribution to the broad patterns of America's history
- Criterion B: associated with the lives of persons significant to our past
- Criterion C: embodies the distinctive characteristics of a type, period or method of construction, or represents the work of a master, or possesses high artistic value or represents a significant and distinguishable entity whose components may lack individual distinction
- Criterion D: has yielded or may be likely to yield information important in prehistory or history

While it is often not possible to make firm NRHP-eligibility calls based on survey-level data, the current effort used these guidelines in preparing recommendations of likely eligibility in order to assist R.O. Anderson in planning efforts for the Water Systems Improvement Project.

CALIFORNIA ENVIRONMENTAL QUALITY ACT (CEQA)

Significant impacts under CEQA occur when "historically significant" or "unique" cultural resources (those defined by eligibility for or by listing in the CRHR) are adversely affected. Under CEQA, significant impacts to cultural resources are those that alter or destroy prehistoric or historical archaeological sites, features and artifacts, and historical properties (e.g., buildings) that are themselves determined to be significant or unique.

Historically significant archaeological and historical resources are defined under CEQA as those that:

(1) are associated with events that have made a significant contribution to the broad patterns of California's history and cultural heritage;

(2) are associated with the lives of persons important in our past;

(3) embody the distinctive characteristics of a type, period, region, or method of construction, or represent the work of an important creative individual, or possess high artistic values; or

(4) have yielded, or may be likely to yield, information important in prehistory or history.

Unique resources under CEQA, in slight contrast, are those that represent 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:

(1) Contains information needed to answer important scientific research questions and that there is a demonstrable public interest in that information;

(2) Has a special and particular quality such as being the oldest of its type or the best available example of its type;

(3) Is directly associated with a scientifically recognized important prehistoric or historic event or person (PRC § 21083.2 (g)).

3. AREA OF POTENTIAL EFFECT (APE)

The SEHOA property is located at the eastern base of the Sierra Nevada in southern Antelope Valley, midway between Coleville and Walker along Highway 395 in Mono County, California (Figure 1). The eastern boundary of the SEHOA property is adjacent to the West Walker River (Figure 2). The project area is located in the SW ¼ of the SE ¼ of Section 18 in Township 8 North, Range 23 East (T8N R23E) on the 1988 USGS Risue Canyon, CA 7.5-minute Topographic Quadrangle. Ground-disturbing activities for the proposed adjustments in the water system include relocating and redrilling for an existing Cold Well, installing a Hot Well cooling loop, and construction of a new mechanical building measuring 24 x 30 feet (ft.).

The APE is composed of two separate parcels, one north and one south. The northern parcel is the proposed location for the new Cold Well situated 25 ft. to the southeast of the current Cold Well. Pink flagging tape embedded in the ground at 283016 mE / 4267897 mN (NAD 83) was presumed to be a marker for the new location (Figure 3). The area that will be impacted by drilling is less than 2 ft. in diameter. A well truck will also require access to the area for drilling via an existing road and over a landscaped area. The southern parcel is an irregular rectangle encompassing a 0.194-acre area and measuring roughly 126 ft. along the northern edge and approximately 80 ft. along the eastern edge. The proposed work on the parcel includes the construction of a new pump and mechanical room and the installation of a Hot Well cooling loop.

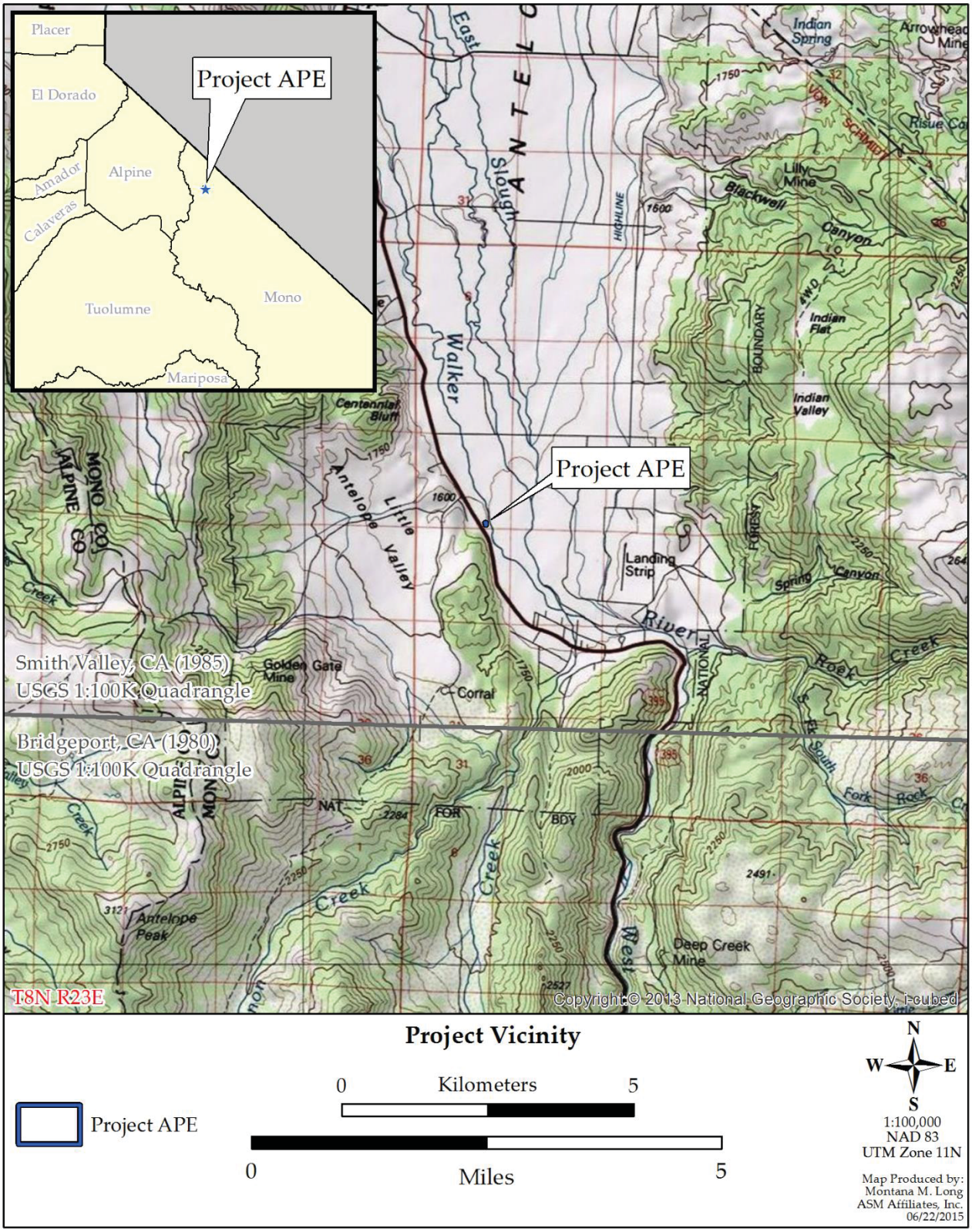

Figure 1. Project vicinity map.

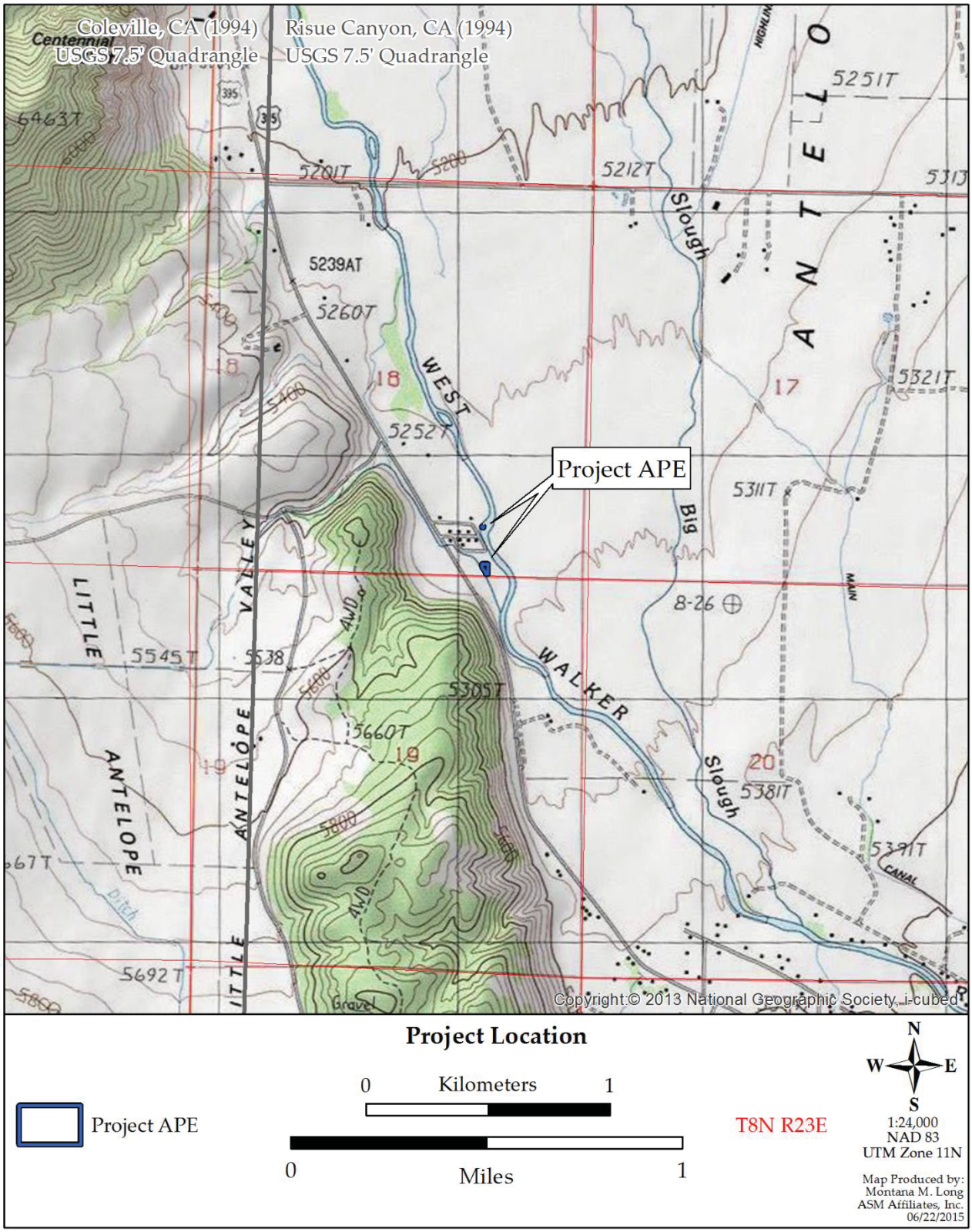

Figure 2. Project location map.

Figure 3. Location of the new Cold Well in the foreground (pink flagging) and location of the old Cold Well in the background.

4. NATURAL CONTEXT

GEOLOGY, GEOMORPHOLOGY, AND HYDROLOGY

Antelope Valley is situated at the extreme eastern edge of the Sierra Nevada at the contact between that mountain range and the western edge of the Great Basin physiographic province. The valley floor rests at about 5,000 ft. elevation, measures about 12 miles long (north–south) and 6 miles wide, and covers approximately 46,000 acres. Topaz Lake lies at the north end of the valley (half in Nevada and half in California), and Little Antelope Valley is situated to the south. Antelope Valley is divided from Slinkard Valley to the west by a narrow, unnamed mountain range that crests at over 8,000 ft. and is flanked to the east by a much broader range that tops out over 8,200 ft. The range fronting the west side of the valley is composed of block-faulted, Miocene deposits of undifferentiated andesite and basalt flows, flow breccias, lahars, minor shallow intrusive rocks, and minor volcaniclastic sediments (Slemmons 1953). These Miocene deposits also contain pockets of Late Cretaceous porphyritic quartz monzonite (Curtis 1951) marked by porphyritic biotite granite and granodiorite. Pleistocene and Holocene sedimentary deposits on the floor of Antelope Valley are derived from steep alluvial fans to the east and west (Johns et al. 1981). The majority of Pleistocene deposits, comprising poorly sorted sand and gravel, make up sections of the valley floor where there is little to no slope. Holocene sediments consist of the same poorly sorted sand and gravels, but deposits are restricted to the steeper slopes surrounding the valley floor.

The project area sits at about 5,250 ft. elevation near the base of a broad, moderately east-sloping alluvial fan composed of mixed Pleistocene and Holocene cobbles, gravels, and coarse sand. The West Walker River flows northward along the valley floor about 500 m east of U.S. 395 and between 30 and 80 m from the SEHOA project APE. No springs (perennial or otherwise) are evident in the immediate environs.

CONTEMPORARY FLORA AND FAUNA

Like most places along the eastern Sierra front, Antelope Valley supports a wide range of flora and fauna. The east and west slopes of the valley lie within the pinyon-sagebrush zone, which includes the pinyon-juniper woodland and sagebrush scrub communities (Whitney 1979). The valley floor is dominated by sagebrush scrub, while foothill and upland zones are covered by sparse pinyon-juniper woodland. Various upland zones around the valley also support mixed coniferous woodlands, wherein singleleaf pinyon (*Pinus monophylla*) grows in a hybrid woodland-mixed conifer forest in which western juniper (*Juniperus occidentalis*), Jeffrey pine (*Pinus jeffreyi*), white fir (*Abies concolor*), and lodgepole pine (*Pinus contorta*) are common associates. Understory brush is also a hybrid mixture that includes common scrub associates such as sagebrush (*Artemisia tridentata*), bitterbrush (*Purshia tridentata*), and rabbitbrush (*Chrysothamnus nauseousus*) as well as others common to mixed coniferous forests like mountain snowberry (*Symphoricarpus vaccinoide*), tobacco brush (*Ceanothus veluntinus*), western serviceberry (*Amelanchier pallida*), mountain spray (*Holodiscus microphyllus*), and plateau gooseberry (*Ribes velutinum*) (Whitney 1979:470). Other notable flora include the quaking aspen (*Populus tremuloides*), curl-leaf mountain mahogany (*Cercocarpus ledifolius*), Mormon tea (*Ephedra viridis*), willow (*Salix* spp.), golden currant (*Ribes aureum*), and prickly poppy (*Argemone munita*).

Prior to historic times, Antelope Valley probably hosted a variety of large game, including mule deer (*Odocoileus hemionus*), bighorn sheep (*Ovis canadensis*), and pronghorn antelope (*Antilocapra americana*). Today, the largest mammals common in the valley are grazing cattle; however, mule deer, black bear (*Eurarctos americanus*), coyote (*Canis latrans*), mountain lion (*Felis concolor*), and gray fox (*Urocyon cinereoargenteus*) are known to inhabit the area as well. Common small animals are the pinyon jay (*Gymnorhinus cyanocephalus*), sagebrush chipmunk (*Eutamias minimus*), pinyon mouse (*Peromyscus truei*), jackrabbit (*Lepus* spp.), Nuttall's cottontail (*Sylvilagus nuttallii*), and rattlesnake (*Crotalus* spp.), along with many other diminutive amphibians, reptiles, birds, and rodents.

5. CULTURAL CONTEXT

Most previous archaeological studies in the project vicinity have employed either the Tahoe Reach-Truckee Meadows prehistoric chronology presented by Elston et al. (1994) or the southwestern Great Basin chronology initially conceived by Bettinger and Taylor (1974) and refined frequently over the last three decades (e.g., Basgall and McGuire 1988; Bettinger 1989; Delacorte and McGuire 1993; Delacorte et al. 1995; Giambastiani 2004; Giambastiani et al. 2008; Gilreath and Hildebrandt 1997). Both of these chronologies and their implications for past human adaptations are briefly reviewed below and then followed by attenuated discussions of Native and Euro-American historic cultural contexts.

TAHOE REACH-TRUCKEE MEADOWS CHRONOLOGY

The Tahoe Reach-Truckee Meadows Chronology (Elston et al. 1977, 1994) has often been employed north of current project area at places like Bagley Valley (Ataman et al. 2001), Slinkard Valley (D. Giambastiani 2007; D. Giambastiani and M. Giambastiani 2010), and in the Pine Nut Mountains (Zeier et al. 2002). According to Elston (1986), the Archaic period differed from the Pre-Archaic in that it involved exploitation of a more diverse resource base, including the processing and storing of seeds within a smaller annual territory. This dependence on a more diversified resource base marked a shift to more complex settlement patterns that increased functional variation in site types (winter camps, seasonal base camps, and task sites) and involved a degree of winter sedentism characterized by the construction of more substantial shelters and storage facilities.

Specific to the eastern slope of the Sierra Nevada, Middle Archaic sites represent multipurpose camps for both seed processing and hunting and are found on meadow margins and upland valleys, while hunting base camps are found on ridges and saddles adjacent to springs and small streams (Elsasser 1960; Elston 1982, 1986). Seed-processing camps are located on valley margins near springs and creeks. Kobori et al. (1980) have also suggested that Middle Archaic sites between Antelope Valley and the Mono Basin are most likely small hunting camps at high altitudes. Elston (1986) suggested the more rugged, mountainous terrain along the eastern front was used intensively in the early to middle periods of the Middle Archaic but less intensively in the latter part of the Middle Archaic and into the Late Archaic.

The transition to the Late Archaic period is signaled by an increase in the diversity of resources and ecozones exploited. Subsistence strategies emphasize plant foods and small game rather than the more costly large game (Elston 1986). Technological shifts during this period are marked by a greater reliance on elaborate milling equipment and, most importantly, a shift in point morphology from dart points (Gatecliff and Elko series) to smaller arrow points (Rosegate and Desert series).

SOUTHWESTERN GREAT BASIN CHRONOLOGY

Late Pleistocene-Early Holocene (Lake Mohave Period, 11,000–7500 B.P.)

Previous archaeological research indicates that prehistoric people had inhabited eastern California for most of the Holocene era. The first occupations might have initiated sometime in the terminal Pleistocene or early Holocene, perhaps as far back as 11,000 B.P. Typically, sites of this age have been identified based on the presence of fluted-base projectile points similar to the well-known Clovis forms typically associated with ancient cultures of the Great Plains. Termed “Western Clovis” (Tuohy 1974; Willig and Aikens 1988), “Black Rock Concave Base” (Clewlow 1968), or “Great Basin Concave-Base” (Pendleton 1979), many types of Clovis-like points have been found in various locations throughout the western Great Basin and in California. Various stemmed projectile point forms have been fairly well dated to the early Holocene, roughly between 10,000 and 7500 B.P. Generally subsumed under the broader appellate “Great Basin Stemmed,” these artifacts are elongate, lanceolate forms often with subtle, sloping shoulders, but there are

many slightly different regional styles. In Nevada, both northern and southern forms are found (Hutchinson 1988; Pendleton 1979; Price and Johnston 1988; Rusco and Davis 1987; Tuohy 1969). Because of a tendency to occur along the shorelines of extinct lakes, stemmed point assemblages were once considered to represent a unique, lacustrine-based subsistence adaptation. The term "Western Pluvial Lakes Tradition" (WPLT), originally coined by Bedwell (1973), was applied to stemmed point sites in ancient shoreline contexts across the Great Basin.

Middle Holocene (Pinto/Little Lake Period, 7500–3150 B.P.)

Archaeological assemblages dating to this period in western Great Basin prehistory are typified by projectile points bearing weak shoulders and indented or split-stem bases. Historically, gracile split-stem points termed Little Lake (Bettinger and Taylor 1974; Harrington 1957), Gatecliff Split-Stem (Thomas 1981), and Bare-Creek Eared (O'Connell 1971) have been associated with this time period. These forms are morphologically distinct from Pinto points (Amsden 1937; Campbell and Campbell 1935; Rogers 1939), a more robust variety of southern geographic affiliation that includes the Inyo-Mono region (Basgall and Hall 1993; Delacorte et al. 1995). Little Lake/Gatecliff and Pinto points also diverge considerably in time, the former dated mainly to between 5500 and 3500 B.P., and the latter between 8500 and 5500 B.P. (Basgall 1993; Basgall and Hall 2000). In addition to projectile points, leaf-shaped bifaces, formal unifaces, flake tools, and consistent quantities of core-cobble implements characterize flaked stone assemblages of this period (Basgall 1993; Campbell and Campbell 1935; Delacorte et al. 1995; Hunt 1960; Rogers 1939). Raw material variability is high, presumably indicating a high degree of residential mobility, and milling equipment is clearly important, its morphology reflecting portability and little formality.

Early Late Holocene (Newberry Period, 3150–1350 B.P.)

Up until about 1,500 years ago, projectile technology in the western Great Basin was centered on the use of a throwing stick (atlatl) and a large, bifacial point (dart). Typical dart points of the early Late Holocene, or Newberry period in western Nevada/eastern California include those of the Elko series (Corner-notched, Side-notched, Contracting-Stem, and Eared variants), the Gatecliff series (primarily Split-Stem and Contracting-Stem forms), and the Humboldt series (Basal-notched, Concave-Base). These points fluoresced in use between about 3500 and 1500 B.P., with some regional styles being a bit younger or older than others.

Efforts to understand Newberry period adaptive systems in Owens Valley have often stressed archaeological evidence for seasonal, extended settlement moves and relatively high residential mobility (Basgall and McGuire 1988; Delacorte and McGuire 1993; Delacorte et al. 1995). Data obtained mainly from obsidian sourcing studies reflect the long-distance transport of Casa Diablo glass to southern Owens Valley, and have been taken to indicate the existence of a regularized north-south settlement system between Long Valley (Casa Diablo) in the north and the Coso area to the south. Occupations on and around the Volcanic Tableland at the north end of Owens Valley were also part of this system and may have been a more important resource procurement area than previously thought (Basgall 2003; Basgall and Giambastiani 1995; Giambastiani 2004).

Terminal Late Holocene (Haiwee and Marana Periods, 1350–150 B.P.)

Sometime around 1500 B.P. or shortly thereafter, the bow and arrow appeared in the Great Basin and brought with it a change in projectile technology. The first arrow point forms are Rose Spring or Eastgate, these being replaced around 600 B.P. by smaller Desert Side-notched and Cottonwood forms. There is also much evidence demonstrating shifts in subsistence organization that relate to the increased use of plant resources at this time (Basgall 1987; Basgall and Giambastiani 1995; Basgall and McGuire 1988; Bettinger 1989, 1990, 1991; Delacorte 1990). These shifts were characterized by a diversification of diet breadth to include more low-return or labor-intensive foodstuffs (both faunal and floral), and were accomplished

through the development or incorporation of new technology (use of water in leaching acorn; seedbeater, specialized baskets, and extensive milling features for bulk seed procurement; pottery for cooking and storage) and/or by the adjustment of plant collection and processing techniques in an effort to extend plant harvests (green-cone collection and roasting pine nuts; green-seed collection and flash-burning; dry storage). Population pressure, combined with small-scale environmental changes, has been given credit for increasing resource competition among Great Basin hunter-gatherers and forcing alterations to subsistence strategies.

In an effort to explain these developments, some researchers have argued for the occurrence of a Numic population spread throughout the western Great Basin around 1,000 years ago (Aikens and Witherspoon 1986; Bettinger 1982, 1994; Bettinger and Baumhoff 1982; Lamb 1958; Layton 1985; Sutton 1986). Various models would have Numic populations spreading north and east through the Great Basin, perhaps originating in southern Owens Valley or entering the basin from there. Armed with the more intensive adaptive strategies outlined above, Numic groups either replaced or assimilated through resource competition any pre-Numic populations already present. Recent attempts to associate Desert Side-notched points with the supposed migration offer promising hypotheses (e.g., Delacorte 2008), but the "Numic Spread" remains a subject of contention even today because attempts to show clear-cut cultural replacement have not been totally convincing (see Madsen and Rhode 1994).

PRE-CONTACT SETTLEMENT SYSTEMS

While most ethnographic studies have placed the west side of Antelope Valley within the bounds of Washoe territory just prior to historic times (Barrett 1917; d'Azevedo 1986; Fowler and Liljeblad 1986; Kroeber 1925; Siskin 1938), others have the valley (and particularly its eastern half) within Northern Paiute territory (Stewart 1966: Maps 21-29). Stewart (1944:122) initially assigned the community of Coleville to both Paiute and Washoe but later (1966) reversed his position by placing the Northern Paiute/Washoe boundary west of Slinkard Valley and assigning Coleville to the Northern Paiute. Appropriately, pre-contact lifeways of the Washoe and Northern Paiute are discussed below; again, the reader is advised to see Giambastiani (2009) and D. Giambastiani (2007) for more details.

Washoe

According to d'Azevedo (1986), Washoe territory encompasses the area just south of Honey Lake in the north, to the Pine Nut Mountains in the east, to somewhere near Antelope Valley in the south, and up along the west side of Lake Tahoe (d'Azevedo 1986). Available ethnographic data indicate that Washoe winter camps were located at lower elevations on valley bottoms and that the peripheral, higher elevation valleys and surrounding hills were targeted in the late summer and fall for logistical forays (d'Azevedo 1986). Several permanent settlement sites were established throughout Washoe territory, providing elders and young children a place to reside while temporary groups mobilized in search of food. Procurement activities depended on the availability of resources in proximity to habitation areas. Southern Washoe populations were known to split up into smaller groups to pursue various food sources, but would eventually reconvene to share resources (Freed 1960).

During the summer months, an annual tribal gathering took place at Lake Tahoe where the majority of temporary groups would congregate and remain throughout the season (Downs 1966). Many Washoe would move to Lake Tahoe for fishing, mainly to catch large cutthroat trout and whitefish (Freed 1966:76). Fishing also occurred year-round along the Walker and Carson Rivers where spearing, netting, and angling (in the winter) through ice holes were common activities (Downs 1966). In the fall, groups would move from Lake Tahoe to the Pine Nut Hills for the annual pinyon harvest (Nevers 1976). Several Washoe families owned rights to series of pinyon groves in the Pine Nut Range that they returned to frequently (Lowie 1939). At times, families or individuals might choose to remain in the hills throughout the winter (Freed 1966:75). In years of overproduction, families would often cache the season's crop of pine nuts with the intention of

storing it until the following year (Price 1962). If the pine nut crop was meager in certain years, groups of southern Washoe would venture to Sierra Nevada acorn groves in October and occasionally winter there on western slopes (Price 1962:40).

Northern Paiute

The Northern Paiute inhabited a large area from south-central Oregon and southwestern Idaho in the north, through central Nevada down to northern Owens Valley in the south, and back up through eastern Antelope Valley and Honey Lake to the west (Fowler and Liljeblad 1986). According to ethnographic accounts (Fowler 1989), during the winter and spring months, the Northern Paiute of western Nevada established camps near rivers where they fished and gathered green plants within the riparian corridor. In the winter, groups camped along the shore, and, in the spring, structures would be moved away from the river to allow for rising waters from winter snow melt. In the summertime, seeds were collected (Underhill 1941), and, in the early fall, populations established camps adjacent to productive gathering areas like pinyon groves in the Pine Nut Hills. If harvests were productive, some populations chose to remain in the hills and subsist on pine nuts through the fall and winter only to return to the rivers in the springtime. Men were known to leave women in the hills with the pine nuts during the winter while they returned to the river for fish.

HISTORIC EURO-AMERICAN CONTEXT

Despite the early entry of various explorers into the northern Mono County region (Jedediah Smith in 1826, Peter Ogden in 1829–1830, Joseph Walker between 1834 and 1845, and John Fremont in 1843), it wasn't until the discovery of the Comstock Lode in 1858 that substantial numbers of Euro-American settlers descended upon Antelope Valley and its environs. From the late 1850s to early 1860s, the Alpine County mining towns of Kongsberg or Silver Mountain City (roughly 15 miles west of the project location), Monitor or Loope (about 10 miles west), and Mogul (two miles west of Monitor) were founded and quickly grew to a combined population of a few thousand, flourishing from the 1860s to 1870s (Nadeau 1965).

In 1859, Mr. Hod Raymond was the first recorded Euro-American settler in the valley and the first to drive stock herds into the area (Maule 1938:10). Others quickly followed in his footsteps and took possession of the fertile lands along the tributaries of the Walker River. Thomas B. Rickey also arrived in Antelope Valley in 1859, establishing a ranching empire that eventually settled at Topaz. Due to a drought in central California during 1862–1864, more ranchers from the Central Valley drove their thirsty stock into the meadows and river valleys of Mono County (Cain 1961). One of the first ranches in Antelope Valley was established by Samuel Swager in 1859 and was formerly located just north of Topaz and south of the junction of U.S. 395 and Highway 89 (now Summers Ranch). In the last quarter of the nineteenth century, large cattle ranches began to develop in the Walker River valleys. Two of the largest ranches were the Walker River Ranch in Mason Valley, owned by the Pacific Livestock Company, and the Rickey Ranch, which included a series of individual ranches in Antelope, Slinkard, and Bridgeport valleys (Kersten 1961). According to Kersten (1961:122), by the last decade of the nineteenth century, the Rickey Ranch encompassed 200,000 acres of land in Antelope, Huntoon, Bridgeport, Slinkard, and Silver King valleys.

Coleville (first known as Centerville) was the first settlement in Antelope Valley. It originated as a stage station, complete with a blacksmith's shop and general store, built by Mr. Fred Cole in 1867 to service the Carson City-Bodie Stage Line; the settlement also had a popular hotel, Barnett's, that had an orchard of apples, peaches, and plums to which hotel guests were given free access (Cain 1961). The post office at Coleville was established in 1868, while the office at Topaz did not open until 1885, closed in 1922, and reopened in 1926. The current route of U.S. Highway 395 between Coleville and Topaz appears largely unchanged from the original wagon road that passed along the west side of Antelope Valley. This former wagon road might have been established as early as the 1840s, was surely in regular use by the late 1850s–early 1860s, and generally held an alignment similar to the present one by the early 1870s, as indicated on the 1874 BLM GLO map for T9N/R22E.

6. METHODS

RECORDS SEARCH

A records search for the APE and a ½-mile buffer surrounding the APE was requested from Eastern Information Center at the University of California, Riverside on May 4, 2015. The search indicated that five cultural resource inventories had been conducted within a ½-mile radius, none of which overlapped the current APE (Table 1). Identified cultural resources were limited to two isolated obsidian bifaces (P-26-5284 and P-26-5446) recorded within a ½-mile radius of the project area during a 1979 survey (Table 2) (Lanigan 1979a; 1979b).

Table 1. Previous Cultural Inventories within a ½-Mile Radius of the APE

Report No.	Title	Author	Year
MN-00044	Archaeological Reconnaissance Survey from Virginia Lakes Road to Nevada State Line.	Young, Daniel L.	1978
MN-00289	Archaeological Survey Report for a Drainage Easement at Lost Cannon Creek, 09-MNO-395, P.M. 109.3	Proctor, Martha	1979
MN-00487	Archaeological Survey Report and Historic Resource Evaluation Report for the Coleville Passing Lanes Project.	Tordoff, Judy D.	1990
MN-00753	Negative Archaeological Survey Report: 09-MNO-395, P.M. 109.3, Intersection of Highway 395 and Mill Canyon County Road in Mono County, California.	Mills, Tom and Andy Gillem	2000
MN-00833	Cultural Resources Inventory: Antelope Valley Fuels Reduction Project, Mono County, California.	Whiteman et al.*	2005

*Whiteman et al. 2005: Whiteman, Erik, Robert Jackson, Jennifer Burns, Doug Edwards, Michael Taggart and Steven Hilton.

Table 2. Previously Recorded Cultural Resources within a ½-Mile Radius of Project Area

Report No.	Trinomial	Primary No.	P/H	Site Type	NRHP	Date
N/A	N/A	26-5284	P	Isolate – Obsidian Biface Midsection	N/A	8/7/1979
N/A	N/A	26-5446	P	Isolate – Obsidian Biface or Projectile Point Fragment	N/A	8/7/1979

Note: P – Prehistoric; H – Historic.

ASM reviewed historic USGS topographic maps, General Land Office (GLO) plat maps, and historic aerial photographs of the project area. The 1941 GLO plat map for Township 8 North (T8N) Range 32 E (R32E) shows a ditch running between Highway 395 and the West Walker River in the vicinity of the APE. The 1956 USGS 7.5-minute Desert Creek Peak Topographic Quadrangle shows three structures on the western side of Highway 395 directly across from the spot where SEHOA property is located today; however, there is no indication that land use for these structures spanned the highway. Maps and aerial photographs indicate that the project area remained relatively undeveloped until the 1980s with the exception of early iterations of Highway 395 and the historic irrigation ditch.

Tribal Consultation

ASM contacted the Native American Heritage Commission on May 4, 2015 in order to determine if there were any registered cultural resources, sacred lands, traditional cultural properties, or areas of heritage sensitivity within the project area. In addition, ASM requested a list of Native American Tribes that would be interested in commenting on the conduct and results of the project (Appendix A). The NAHC responded on May 27, 2015 that they had no records pertaining to the presence of Native American cultural resources in the project area. As part of the consultation process, the NAHC provided information for six Native American contacts for four nearby groups including the Bridgeport Paiute Indian Colony, the Mono Lake Indian Community, the Washoe Tribe of Nevada and California, and the Walker River Paiute Tribe. ASM sent a letter via email and/or fax to the chairperson and/or Tribal Historic Preservation Officer (THPO) of each tribe in order to request information they might have concerning the project area (Appendix A). After waiting for two weeks, ASM did not receive any replies to the letters and followed up with phone calls to each of the contact organizations on June 12, 2015 (see Appendix A:Table 1). In each case, a voicemail or message was left for the appropriate contact. Misty Bennett from the Walker River Paiute Tribe called ASM on June 25, 2015. She was not aware of any areas of cultural concern in the area and recommended that ASM speak with Grace Dick of the Bridgeport Paiute Indian Colony, who is more familiar with the area surrounding Coleville. An email was sent to the secretary of the Bridgeport Indian Colony on June 28, 2015 requesting Ms. Dick's information.

FIELD PROCEDURES

ASM archaeologist Shannon S. Mahoney conducted a pedestrian survey of the designated APE on June 16, 2015. The proposed location for the new Cold Well is on a terrace above the West Walker River and is less than 100 ft. from the water course. The proposed location for the Hot Well cooling loop and the new pump and mechanical room is on the southern end of the property surrounding an existing community center. Given the small amount of acreage, the ground surface was visually inspected in 5 m intervals. Digital photographs were taken of the survey parcels and ground conditions for recordation purposes. Landmark locations (e.g., flagging for the new Cold Well location) were mapped using a Trimble GeoXH GPS (rated to sub-meter accuracy) and recorded using the North American Datum 1983 (NAD 83).

Following standard procedures used by the Bureau of Land Management (BLM) for surveys in Mono County, a prehistoric archaeological site was defined by at least one of the following criteria: (a) ten or more pieces of debitage within a 10 m area; (b) three or more prehistoric formed artifacts (e.g., projectile points, bifaces, ground stone tools) within a 10 m area; (c) one formed artifact in combination with debitage within a 10 m area; (d) one or more features (e.g., bedrock milling stations, circular depressions, rock circles); and/or (e) the presence of rock art. Historic sites were defined by the presence of five or more different artifacts (e.g., not five shards from the same bottle). Isolated finds consist of up to nine pieces of debitage or less than three formed artifacts.

7. SURVEY RESULTS

Prior to the construction of the rural residential housing complex, the West Walker River flowed through the eastern portion of the project area with the remainder of the property serving as a floodplain. Natural sediment is a dark brown sandy silt with gravel inclusions. Since the 1980s, the APE and surrounding residential area have been significantly impacted by development and landscaping. Field conditions and modern impacts are discussed in the context of each survey parcel.

Figure 4. Decomposed granite covering the surface of the terrace.

COLD WELL LOCATION (NORTHERN PARCEL)

The northern parcel, slated to be the location for the new Cold Well, is located in a landscaped area covered with decomposed granite approximately 90 ft. from the current course of the West Walker River. This location was inventoried, but the natural ground surface could not be inspected due to the presence of landscaping ground cover (Figure 4, above). A review of aerial photography and topographic maps of the area indicates that the terrace where the Cold Well will be installed was constructed between 1994 and 1998 (Figure 5). The 1994 USGS Risue Canyon, CA, 7.5-minute Topographic Quadrangle and USGS aerial photography from 1993 confirm that the current Cold Well location is positioned right above where the West Walker River was located twenty years ago (see Figure 2). The upper layers of the terrace were undoubtedly constructed using fill material or secondary alluvial material before being covered with decomposed granite. The 0.2-mile long segment of the terrace that faces the West Walker River has been covered with rip rap that did not allow for examination of soils used to construct the terrace (Figure 6). Although the natural ground surface could not be inspected, it would have been located in the West Walker River bed and, accordingly, is unlikely to retain any cultural resources even if the course of the West Walker River has changed over time. A patch of native sediment is visible approximately 50 ft. to the west along the bank of the river and appears to be a medium to dark brown sandy silt consistent with an alluvial floodplain. No cultural resources were identified on the surface or adjacent to the new Cold Well location. Fragments of brown bottle glass on the ground surface in proximity to the new Cold Well location are undoubtedly modern.

1993

2013

Figure 5. USGS aerial photographs of the project area dating to 1993 (above) and 2013 (below) showing construction of the terrace.

Figure 6. Rip rap covering the eastern edge of the terrace.

HOT WELL COOLING LOOP, PUMP AND MECHANICAL ROOM (SOUTHERN PARCEL)

The 0.194-acre area that will serve as both the project and staging area is in the southern corner of the SEHOA property surrounding an existing community center in a common-use area. The southern parcel is the designated area for a Hot Well cooling loop as well as a pump and mechanical room, both of which require ground-disturbing activities. The APE is located approximately 250 ft. (76 m) west of the current course of the West Walker River. In addition, a historic irrigation ditch, which dates prior to 1941, runs along the western edge of the APE (Figure 7). The irrigation ditch is recorded on USGS aerial photographs and a 1941 survey plat for T8N R32E (Figure 8).

Although the sandy silt at this location appears to represent the natural ground surface of the West Walker River floodplain, the ground within the APE has already been significantly impacted by both landscaping efforts and installation of utilities. The majority of the parcel appears to have been graded or leveled to create a functional surface for the existing community center in the middle of the APE (Figure 9). A low rockery wall and four associated yard hydrants were used to create a low terrace adjacent to the historic irrigation ditch (Figure 10). Various utilities have also been installed including a light pole, Hot Well, and water lines that supply the existing community center. A small spoils pile located next to a cluster of metal and PVC pipes in the southeast corner of the APE may be the result of various impacts to the area and was inspected by ASM but did not appear to have any associated cultural material.

No cultural resources were identified on the surface of the location for the Hot Well cooling loop and the pump and mechanical room. Although the historic irrigation ditch is located just outside of the APE along the western edge of the southern parcel, it will not be disturbed or impacted by ground-disturbing activities (Personal communication, Coleen Shade and Melanie Greene [June 18, 2015]).

Figure 7. Historic irrigation ditch outside of the APE western boundary.

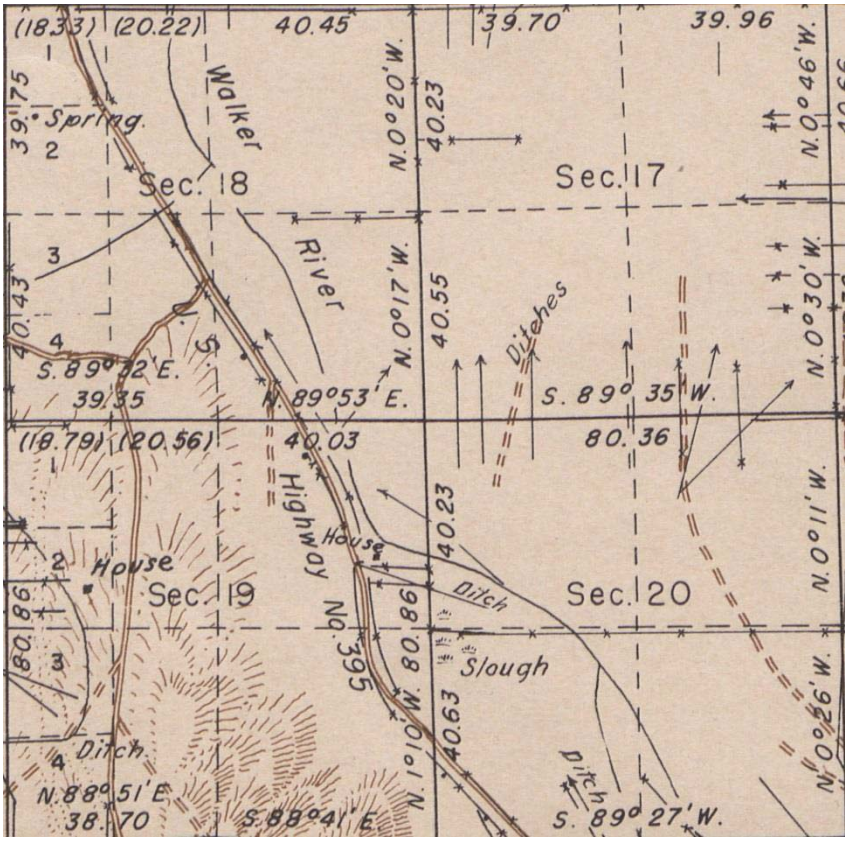

Figure 8. 1941 General Land Office Survey Plat for T8N R32E Sections 17, 18, 19, and 20.

Figure 9. Community center constructed in the center of the southern parcel.

Figure 10. Low rockery wall on the western edge of the southern parcel.

8. MANAGEMENT RECOMMENDATIONS

No cultural resources were identified on the ground surface of either parcel during the survey, and no historic properties will be affected by the project as it is currently planned. Even though the proximity of the APE to the West Walker River increases the probability of encountering both prehistoric and historic cultural resources, modern modifications to the property, including construction, landscaping, and utility work, decrease the likelihood that an intact resource will be located. Excavation for the cooling loop may extend up to 7 ft. below ground surface (Personal communication, Melanie Greene [June 23, 2015]); however, buried deposits are unlikely based on ASM's observations.

If the client or contractor suspects that they have encountered unanticipated buried cultural deposits or human remains during any phase of project implementation, all construction work within 50 feet of the deposit shall cease and a qualified archaeologist shall be contacted immediately and retained to evaluate the significance of the discovery. If potential human remains are discovered during any project activities, all ground-disturbing activity within 50 feet of the discovery shall be halted and R.O. Anderson should be contacted immediately to coordinate evaluation of the remains by a professional archaeologist. If the remains are human, the County coroner shall be notified immediately according to Section 5097.98 of the State Public Resources Code and Section 7050.5 of California's Health and Safety Code. If the remains are determined by the County coroner to be Native American, the NAHC shall be notified within 24 hours. The NAHC shall identify a Most Likely Descendant, who will be designated to cooperate with R.O. Anderson, the lead agency, and the landowner to arrange for the proper disposition of the remains, according to the NAHC guidelines for the treatment and disposition of human remains.

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State Water Resources Control Board
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APPENDICES

APPENDIX A

Correspondence with NAHC and Tribes

ASM affiliates
archaeology
history
ethnography
architectural history

May 4, 2015

Judge Cynthia Gomez
California Native American Heritage Commission
1550 Harbor Blvd. Suite 100
West Sacramento, CA 95691
Via Fax: 916-373-5471

Re: Sierra East Homeowners Association (SEHOA) Water System Improvements Project – Cultural Resources Survey of 0.25 Acres

Dear Judge Gomez,

ASM Affiliates, Inc. (ASM), under contract to RO Anderson, is providing cultural resources support for a water system improvements project for the SEHOA, located in Mono County, California.

This letter serves as an inquiry as to whether you have records of any registered cultural resources, sacred lands or traditional cultural properties, or areas of heritage sensitivity within the project area. In addition, ASM seeks a list of appropriate Native American Tribes who may be interested commenting on the conduct and results of the project. Of course, any consultation with local tribal entities will be conducted in a manner that ensures complete confidentiality.

This project is being conducted to comply with the federal and state drinking water standard and to begin removing naturally occurring arsenic from the potable water supply. The SEHOA proposes to relocate and redrill their existing cold well, rehabilitate the existing hot well, install a hot well cooling loop, water meter, and an emergency propane generator, and to construct an arsenic removal system. The proposed adsorption system will be housed in a new 24-x-30-ft. mechanical building.

ASM will conduct a records search with the Eastern Information Center (EIC) to gather information on archaeological surveys conducted and archaeological resources encountered within the APE and in a ½-mile buffer surrounding it. Within the project APE, ASM intends to carefully examine the ground surface using survey transects spaced no more than 30 meters apart. If cultural resources were encountered, ASM would fully document them. No excavations would be conducted and no artifacts would be collected.

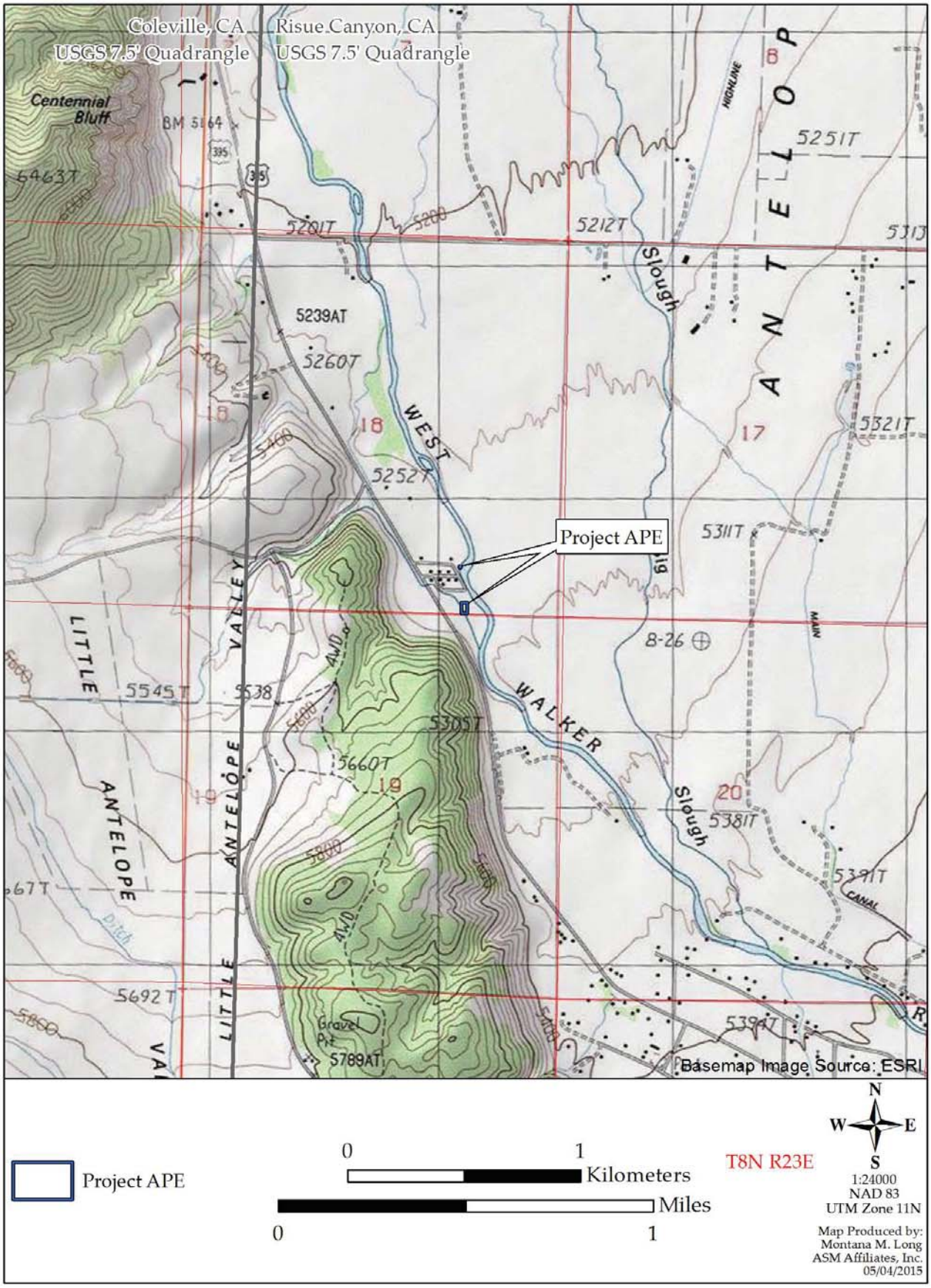
Feel free to contact me at 775-324-6789 or by email at ksprengeler@asmaffiliates.com if you have questions regarding this letter or need additional maps or other materials.

Sincerely,

Kari Sprengeler
Associate Archaeologist

2034 Corte Del Nogal, Carlsbad, California 92011 • (760) 804-5757 • Fax: (760) 804-5755
10 State Street, Reno, Nevada 89501 • (775) 324-6789
www.asmaffiliates.com

Attachments: Map 1 – SEHOA Project APE
Sacred Lands File & Native American Contacts List Request


Coleville, CA
USGS 7.5' Quadrangle
Risue Canyon, CA
USGS 7.5' Quadrangle
Centennial Bluff
BM 5164
6463T
5201T
5212T
5251T
5239AT
5260T
5252T
5321T
5311T
Project APE
5545T
5538
5305T
5660T
5381T
5391T
5692T
5789AT
5394T
8-26
WEST
ANTELOPE VALLEY
LITTLE ANTELOPE
WALKER
Slough
ANTELOPE HIGHLINE CANAL
Basemap Image Source: ESRI
Project APE
0
1
Kilometers
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1
T8N R23E
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E
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1:24000
NAD 83
UTM Zone 11N
Map Produced by:
Montana M. Long
ASM Affiliates, Inc.
05/04/2015

Sacred Lands File & Native American Contacts List Request

NATIVE AMERICAN HERITAGE COMMISSION
1550 Harbor Blvd, Suite 100
West Sacramento, CA 95501
(916) 373-3710
(916) 373-5471 – Fax
nahc@nahc.ca.gov

Information Below is Required for a Sacred Lands File Search

Project: Sierra East Homeowners Association Water Systems Improvement Project

County: Mono County, CA

USGS Quadrangle

Name: Risue Canyon, CA 7.5-Minute Series Topographic Quadrangle

Township: 8N Range: 23E Section(s): 18

Company/Firm/Agency:

ASM Affiliates, Inc.

Contact Person: Kari Sprengeler

Street Address: 10 State Street

City: Reno, NV Zip: 89501

Phone: (775) 324-6789 Extension:

Fax: (775) 324-9666

Email: ksprengeler@asmaffiliates.com

Project Description:

Refer to Attachment 1 for a map of the APE. This project is being conducted to comply with the federal and state drinking water standard and to begin removing naturally occurring arsenic from the potable water supply. The SEHOA proposes to relocate and redrill their existing cold well, rehabilitate the existing hot well, install a hot well cooling loop, water meter, and an emergency propane generator, and to construct an arsenic removal system. The proposed adsorption system will be housed in a new 24-x-30-ft. mechanical building.

☑ Project Location Map is attached

STATE OF CALIFORNIA Edmund G. Brown, Jr., Governor

NATIVE AMERICAN HERITAGE COMMISSION
1550 Harbor Blvd., ROOM 100
West SACRAMENTO, CA 95691
(916) 373-3710
Fax (916) 373-5471

May 27, 2015

Kari Sprengeler
ASM Affiliates, Inc.
10 State Street
Reno, NV 89501

Sent by Fax: (775) 324-9666
Number of Pages: 2

Re: Sierra East Homeowners Association Water Systems Improvement Project, Mono County.

Dear Ms. Sprengeler,

A record search of the sacred land file has failed to indicate the presence of Native American cultural resources in the immediate project area. The absence of specific site information in the sacred lands file does not indicate the absence of cultural resources in any project area. Other sources of cultural resources should also be contacted for information regarding known and recorded sites.

Enclosed is a list of Native Americans individuals/organizations who may have knowledge of cultural resources in the project area. The Commission makes no recommendation or preference of a single individual, or group over another. This list should provide a starting place in locating areas of potential adverse impact within the proposed project area. I suggest you contact all of those indicated, if they cannot supply information, they might recommend others with specific knowledge. By contacting all those listed, your organization will be better able to respond to claims of failure to consult with the appropriate tribe or group. If a response has not been received within two weeks of notification, the Commission requests that you follow-up with a telephone call to ensure that the project information has been received.

If you receive notification of change of addresses and phone numbers from any of these individuals or groups, please notify me. With your assistance we are able to assure that our lists contain current information. If you have any questions or need additional information, please contact me at (916) 373-3712.

Sincerely,

Katy Sanchez

Katy Sanchez
Associate Government Program Analyst

Native American Contacts
Mono County
May 20, 2015

Bridgeport Paiute Indian Colony
John L. Glazier, Chairperson
P.O. Box 37 Paiute
Bridgeport , CA 93517
chair@bridgeportindiancolony.
(760) 932-7083

(760) 932-7846 Fax

Bridgeport Indian Colony
Cultural Resources Coordinator
P.O. Box 37 Paiute
Bridgeport , CA 93517
culture@bridgeportindiancolony.com
(760) 932-7083
(760) 932-7846

Mono Lake Indian Community
Charlotte Lange, Chairperson
P.O. Box 117 Mono
Big Pine , CA 93513 Northern Paiute
clange2008@hotmail.com
(760) 938-1190

Washoe Tribe of Nevada and California
Darrell Kizer, Chairperson
919 Highway 395 South Washoe
Gardnerville , NV 89410
ktrovato@washoetribe.us
(775) 265-4191 Office

(775) 265-6240 Fax

Washoe Tribe of Nevada and California THPO
Darrel Cruz, Cultural Resources Department
919 Highway 395 South Washoe
Gardnerville , NV 89410
darrel.cruz@washoetribe.us
(775) 782-0014
(775) 546-3421 Cell

Walker River Reservation
Melanie McFalls, Chairperson
P.O. Box 220 Northern Paiute
Schurz , NV 89427
(775) 773-2306

(775) 773-2585 Fax

This list is current only as of the date of this document.

Distribution of this list does not relieve any person of statutory responsibility as defined in Section 7050.5 of the Health and Safety Code, Section 5097.94 of the Public Resource Section 5097.98 of the Public Resources Code

This list is only applicable for contacting local Native Americans with regard to cultural resources for the proposed Sierra East Homeowners Association Water Systems Improvement Project, Mono County.

ASM affiliates
archaeology
history
ethnography
architectural history

May 29, 2015

Re: Sierra East Homeowners Association (SEHOA) Water System Improvements Project – Cultural Resources Survey of 0.25 Acres

Dear _____,

ASM Affiliates, Inc. (ASM) has been contracted by R.O. Anderson to conduct a cultural resources survey for a water system improvements project proposed by the Sierra East Homeowners Association (SEHOA) on property located in Mono County, California. The proposed work would be financially supported by the Drinking Water State Revolving Fund (DWSRF) which utilizes both federal and state money and requires the project to comply with NEPA and CEQA regulations. The SEHOA proposes to relocate and redrill their existing cold well, rehabilitate the existing hot well, install a hot well cooling loop, water meter, and an emergency propane generator, and to construct an arsenic removal system. The survey is focused on the proposed location for an adsorption system that will be housed in a new 24-x-30-ft. building as well as the new location for the cold well.

A record search of the California Native American Heritage Commission (NAHC) Sacred Land Inventory indictated that there are no known traditional cultural places in the project site area. We are contacting you to find out if you are aware of any issues of cultural concern regarding the area shown on the enclosed map. In particular, we would like to know if you have knowledge of any Traditional Cultural Properties, Sacred Sites, resource collecting areas, or any other areas of cultural significance. We understand the need for confidentiality in such matters and are looking for guidance from you regarding the nature and general locations of any such cultural resources.

We appreciate any input you may have on this project. Any information you provide will remain strictly confidential. If you have any questions or concerns regarding the proposed project, please contact us at (775) 324-6789, or by email at smahoney@asmaffiliates.com

Sincerely,

Shannon S. Mahoney

Shannon S. Mahoney
Senior Archaeologist
ASM Affiliates – Reno Office
10 State St.
Reno, NV 89501
Fax: 775-324-9666

Legal Description:
County- Mono County, California
USGS 7.5' Series Quad – Risue Canyon (1988)
Section 18 of Township 8 North, Range 23 East

Attachment: Map 1 – SEHOA Project APE

Table 1. Timeline of Consultation with Native American Tribes

Native American Contacts	Method and Date of Communication	Follow-up Method and Date of Communication	Response from Contacts
Bridgeport Paiute Indian Colony, John L. Glazier, Chairperson	Email and Fax sent on 5/29/2015	Phone call and message left on 6/12/2015	No response
Bridgeport Indian Colony Cultural Resources Coordinator	Email and Fax sent on 5/29/2015	Same phone number as above. Email sent to the secretary of the Bridgeport Indian Colony on 6/28/2015.	No Response
Mono Lake Indian Community, Charlotte Lange, Chairperson	Email sent on 5/29/15	Phone call and message left on 6/12/2015	No response
Washoe Tribe of Nevada and California, Darrell Kizer, Chairperson	Email and Fax sent on 3/29/2015	Contacted Cultural Resources Department below	No response
Washoe Tribe of Nevada and California, Darrel Cruz, Cultural Resources Department	Email sent on 5/29/2015	Phone call and message left on 6/12/2015	No response
Walker River Reservation, Melanie McFalls, Chairperson	Fax sent on 5/29/2015	Phone call and message left on 6/12/2015	Received phone call from Misty Bennett on 6/25/2015; She recommended we call Grace Dick with the Bridgeport Paiute Indian Colony – phone number was disconnected

Class III Cultural Resources Inventory for the Sierra East Homeowner's Association Water Systems Improvement Project, Coleville, Mono County, California

DRAFT VERSION | July 2015

Prepared for:

R.O. Anderson Engineering, Inc.
595 Tahoe Keys Blvd., Suite A-2
South Lake Tahoe, California 96150

Prepared by:

Shannon S. Mahoney, Ph.D., RPA

ASM affiliates

10 State Street
Reno, Nevada 89501
775-324-6789

ASM Project Number 24380

Appendix F

Federal Cross-Cutting Guidance

CLEAN WATER STATE REVOLVING FUND PROGRAM
INSTRUCTIONS AND GUIDANCE FOR
"ENVIRONMENTAL COMPLIANCE INFORMATION"

Introduction:

The State Water Resources Control Board (State Water Board) uses the California Environmental Quality Act (CEQA) review process and compliance with federal environmental laws and regulations to satisfy the environmental requirements of the Clean Water State Revolving Fund (CWSRF) Program Operating Agreement between the United States Environmental Protection Agency (USEPA) and the State Water Board. The CWSRF Program is partially funded by a capitalization grant from the USEPA. The issuance of funds from the CWSRF Program is equivalent to a federal action, and thus, compliance with federal environmental laws and regulations is required for projects being funded under the CWSRF Program.

All CWSRF Program applicants must submit adequate and complete environmental documentation to the State Water Board. Following submittal of an applicant's environmental documents, the State Water Board will review the documents to determine if the information is sufficient to document compliance with the CWSRF Program environmental requirements, including making a determination if consultation with federal authorities is required, and may request additional environmental information, when needed. The State Water Board encourages all applicants to initiate early consultation, so that the State Water Board can better streamline the environmental review process.

CEQA Information:

All projects coming to the State Water Board for funding are considered "projects" under CEQA because of the State Water Board's discretionary decision to approve funding.

Detailed information, including CEQA statutes and guidelines can be found online at the California Natural Resources Agency website at http://ceres.ca.gov/ceqa. A CEQA Process Flowchart that shows interaction points between lead and responsible agencies can be found at http://ceres.ca.gov/topic/env_law/ceqa/flowchart/index.html. In addition, State Water Board environmental staff is available to answer questions about the CEQA process, as well as the CWSRF Program environmental requirements. Please contact your assigned Project Manager at the State Water Board, regarding contact information for the appropriate environmental staff.

CEQA requires full disclosure of all aspects of the project, including impacts and mitigation measures that are not only regulated by state agencies, but also by federal agencies. Early consultation with state and federal agencies in the CEQA process will assist in minimizing changes to the project when funding is being requested from the State Water Board.

The types of CEQA documents that may apply to an applicant's project include one or a combination of the following: 1) Notice of Exemption (NOE); 2) Initial Study and Negative Declaration (ND); 3) Initial Study and Mitigated Negative Declaration (MND) with a Mitigation Monitoring and Reporting Program (MMRP); 4) Environmental Impact Report (EIR) with an MMRP; and/or 5) Addendum, Supplemental and Subsequent ND, MND or EIR. The applicant must determine the appropriate document for its project and submit the supporting information listed under the applicable section of the Environmental Package Checklist for Applicant (Attachment 1), along with a completed copy of the Evaluation Form for Environmental Review and Federal Coordination (Attachment 2). Please submit two copies of all CEQA documents.

The applicant must ensure the CEQA document is specific to the project for which funding is being requested. Program or Master Plan EIRs may not be suitable for satisfying the State Water Board environmental requirements if these documents are not project-specific. When an applicant uses an Addendum, Supplemental or Subsequent CEQA document for a project, the associated Program or Master Plan EIR must also be submitted, especially if the Addendum, Supplemental or Subsequent CEQA document includes references to pertinent environmental and mitigation information contained in the Program or Master Plan EIR.

If the applicant is using a CEQA document that is older than five years, the applicant must re-evaluate environmental and project conditions, and develop and submit an updated environmental document (such as an Addendum, Supplemental or Subsequent CEQA document) based on the results of that re-evaluation. The updated environmental document must be circulated through the State Clearinghouse for public review. The applicant must adopt the final updated environmental document, including any new identified measures, make CEQA findings, and file a Notice of Determination (NOD) with the local county clerk(s) and the Governor's Office of Planning and Research, State Clearinghouse (State Clearinghouse).

Each applicant, if it is a public agency, is responsible for approving the CEQA documents it uses regardless of whether or not it is a lead agency under CEQA. Non-profit organizations shall only be responsible for approving and ensuring implementation of the applicable project mitigation measures identified in the MMRP. All public agencies applying for CWSRF Program funding shall file either an NOE or an NOD with the State Clearinghouse and the local county clerk(s). Date stamped copies of those notices must be submitted with all the applicable environmental documents.

If the CEQA document was jointly prepared by a federal public governmental agency to satisfy the National Environmental Policy Act (NEPA) requirements, then the applicant must submit the corresponding NEPA documents, including a Finding of No Significant Impact, or a Record of Decision completed by the federal NEPA lead agency.

Federal Information:

In addition to CEQA compliance, the State Water Board is required to document environmental compliance with federal environmental laws and regulations, including:

1. Federal Endangered Species Act (ESA), Section 7:

The United States Department of the Interior, Fish and Wildlife Service (USFWS) and the United States Department of Commerce National Oceanic and Atmospheric Administration, National Marine Fisheries Service (NMFS) must be consulted for any project that will have the potential to adversely impact a federal special-status species. The USEPA delegated the State Water Board to act as the non-federal lead for initiating informal Section 7 ESA consultation with the USFWS. The State Water Board will coordinate with the USEPA for projects requiring formal Section 7 ESA consultation with the USFWS and projects that will impact federal special-status fish species under the NMFS jurisdiction. The USFWS and NMFS must provide written concurrence prior to a CWSRF financing agreement. USFWS and NMFS comments may include conservation measures, for which the applicant's CWSRF financing agreement will be conditioned to ensure compliance.

For further information on the federal ESA law, regulation, policy, and notices, go to http://www.fws.gov/endangered/laws-policies/index.html and http://www.nmfs.noaa.gov/pr/laws/esa/. Note that compliance with both the state and federal ESAs is required of projects having the potential to impact state and federal special-status species. Although overlap exists between the state and federal ESAs, there might be additional or more restrictive state requirements. For further information on the state ESA, refer to the California Department of Fish and Game website at http://www.dfg.ca.gov/habcon/cesa/.

2. Magnuson-Stevens Fishery Conservation and Management Act, Essential Fish Habitat (EFH):

The Magnuson-Stevens Fishery Conservation and Management Act, as amended, is designed to manage and conserve national fishery resources. EFH consultations are only required for actions that may adversely effect EFH. The applicant needs to determine whether the proposed project may adversely affect EFH. NMFS is responsible for publishing maps and other information on the locations of designated EFH, and can provide information on ways to promote conservation of EFHs to facilitate this assessment. If a project may adversely affect a designated EFH, the applicant must complete an EFH consultation.

The State Water Board will coordinate with the USEPA to request an EFH consultation from the NMFS. NMFS is required to respond informally or in writing. NMFS comments may include conservation measures, for which the applicant's CWSRF financing agreement will be conditioned to ensure compliance. For more information, see the brochure at http://www.nmfs.noaa.gov/sfa/reg_svcs/Council%20stuff/council%20orientation/2007/2007TrainingCD/TabT-EFH/EFH_CH_Handout_Final_3107.pdf.

3. National Historic Preservation Act (NHPA), Section 106:

The NHPA focuses on federal compliance. Section 106 requires Federal agencies to take into account the effects of their undertakings on historic properties. The Section 106 process seeks to accommodate historic preservation concerns with the needs of Federal undertakings through consultation among the agency official and other parties with an interest in the effects of the undertaking on historic properties. The goal of consultation is to identify historic properties potentially affected by the undertaking, assess its effects and seek ways to avoid, minimize or mitigate any adverse effects on historic properties. The Section 106 compliance efforts and reports must be prepared by a qualified researcher that meets the Secretary of the Interior's Professional Qualifications Standards (www.cr.nps.gov/local-law/arch_stnds_9.htm).

In addition, CEQA requires that impacts to cultural and historic resources be analyzed. The "CEQA and Archeological Resources" section from the Governor's Office of Planning and Research CEQA Technical Advice Series states that the lead agency obtains a current records search from the appropriate California Historical Resources Information System Center. Also, to contact the Native American tribes that are culturally affiliated with a project area from the list obtained from the Native American Heritage Commission (NAHC).

The NAHC can be contacted at:

915 Capitol Mall, Room 364
Sacramento, CA 95814
Tele: (916) 653-4082

4. Clean Air Act:

For CWSRF financed projects, we recommend including a general conformity section in the CEQA documents so that another public review process will not be needed, should a conformity determination be required. The applicant should check with its local air quality management district and review the Air Resources Board California air emissions map for information on the State Implementation Plan. For information on the analysis steps involved in evaluating air quality conformity, please contact the State Water Board environmental staff through the assigned Project Manager.

5. Coastal Zone Management Act:

Projects proposing construction in the Coastal Zone will require consultation with either the California Coastal Commission (or the designated local agency with a Local Coastal Program), or the San Francisco Bay Conservation and Development Commission (for projects located in the San Francisco Bay area). The applicant must submit a copy of the approved Coastal Development permit to the State Water Board to satisfy this requirement.

For more information on Coastal Zone Management Act requirements refer to the following agencies websites:

- United States Coastal Zone Boundaries through the NMFS website at http://coastalmanagement.noaa.gov/mystate/docs/StateCZBoundaries.pdf;
- California Coastal Commission website at http://www.coastal.ca.gov/ccatc.html; and/or
- San Francisco Bay Conservation and Development Commission website at http://www.bcdc.ca.gov/.

6. Coastal Barriers Resources Act:

The Coastal Barriers Resources Act is intended to discourage development in the Coastal Barrier Resources System and adjacent wetlands, marshes, estuaries, inlets, and near-shore waters. Since there is no designated Coastal Barrier Resources System in California, no impacts from California projects are expected. However, should the applicant believe there may be impacts to the Coastal Barrier Resources System due to special circumstances, please use the following information as a guide.

During the planning process, the applicant should consult with the appropriate Coastal Zone management agency (e.g., City or County with an approved Local Coastal Program, the California Coastal Commission, or the San Francisco Bay Conservation and Development Commission) to determine if the project will have an effect on the Coastal Barrier Resources System. If the project will have an effect on the Coastal Barrier Resources System, the State Water Board must consult with the appropriate Coastal Zone management agency and the USFWS. Any recommendations from the Coastal Zone management agency and USFWS will be incorporated into the project's design prior to approval of CWSRF financing.

For more information and to ensure that no modifications to Coastal Barrier Resources System have occurred, please visit: http://www.fws.gov/CBRA/.

7. Farmland Protection Policy Act:

Projects involving impacts to farmland designated as prime and unique, local and statewide importance, or under a Williamson Act Contract, will require consultation with the United States Department of Agriculture, Natural Resources Conservation Service and/or California Department of Conservation. For more information on the Farmland Protection Policy Act go to http://www.nrcs.usda.gov/programs/fppa, and regarding the Williamson Act Contact go to http://www.consrv.ca.gov/dlrp/lca.

8. Floodplain Management – Executive Order 11988:

Each agency shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health and welfare, and to restore and preserve the natural and beneficial values served by floodplains in carrying out its responsibilities. Before taking an action, each agency shall determine whether the proposed action will occur in a designated floodplain. The generally established standard for risk is the flooding level that is expected to occur every 100 years. If an agency determines or proposes to, conduct, support, or allow an action to be located in a floodplain, the agency shall consider alternatives to avoid adverse effects and incompatible development in the floodplains.

For further information regarding Floodplain Management requirements, please consult the United States Department of Homeland Security, Federal Emergency Management Agency website at http://www.fema.gov, as well as the USEPA floodplain management Executive Order 11988 at http://www.epa.gov/owow/wetlands/regs/eo11988.html.

9. Migratory Bird Treaty Act (MBTA):

The MBTA restricts the killing, taking, collecting and selling or purchasing of native bird species or their parts, nests, or eggs. The MBTA, along with subsequent amendments to this act, provides legal protection for almost all breeding bird species occurring in the United States and must be addressed under CEQA. In the CEQA document, each agency must make a finding that a project will comply with the MBTA. For further information, please consult the Migratory Bird Program through the USFWS website at http://www.fws.gov/laws/lawsdigest/migtrea.html.

10. Protection of Wetlands – Executive Order 11990:

Projects, regardless of funding, must get approval for any temporary or permanent disturbance to federal and state waters, wetlands, and vernal pools. The permitting process through the United States Army Corps of Engineers (USACE) can be lengthy, and may ultimately require project alterations to avoid wetlands and waters of the United States. Applicants must consult with the USACE early in the planning process if any portion of the project site contains wetlands, or other federal waters. The USACE Wetland Delineation Manual is available at http://www.wetlands.com/regs/tlpge02e.htm. Also note that the California State Water Boards are involved in providing approvals through the Clean Water Act Section 401 Water Quality Certification Program and/or Waste Discharge Requirements. For more information, please go to http://www.waterboards.ca.gov/water_issues/programs/cwa401/index.shtml.

11. Wild and Scenic Rivers Act:

There are construction restrictions or prohibitions for projects near or in a designated “wild and scenic river.” A listing of designated “wild and scenic rivers” can be obtained at http://www.rivers.gov/rivers/california.php. Watershed information can be obtained through the “Watershed Browser” at http://cwp.resources.ca.gov/map_tools.php.

12. Safe Drinking Water Act, Source Water Protection:

Projects must comply with the Safe Drinking Water Act and document whether or not a project has the potential to contaminate a sole source aquifer. For projects impacting a listed sole source aquifer, the applicant must identify an alternative project location, or develop adequate mitigating measures in consultation with the USEPA. For more information, please go to the Sole Source Aquifer Program website at http://epa.gov/region09/water/groundwater/ssa.html.

13. Environmental Justice – Executive Order No. 12898:
Identify and address any disproportionately high and adverse human health or environmental effects of the project's activities on minority and low-income populations. USEPA has defined environmental justice as "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and policies."

Fair Treatment means that no group of people should bear a disproportionate burden of environmental harms and risks, including those resulting from the negative consequences of industrial, governmental, and commercial operations or programs and policies.

Meaningful Involvement means that: 1) potentially affected community members have an appropriate opportunity to participate in decisions about a proposed activity that will affect their environment and/or health; 2) the public's contribution can influence the agency's decision; 3) the concerns of all participants involved will be considered in the decision-making process; and 4) the decision-makers seek out and facilitate the involvement of those potentially affected.

The term "environmental justice concern" is used to indicate the actual or potential lack of fair treatment or meaningful involvement of minority, low-income, or indigenous populations, or tribes in the development, implementation, and enforcement of environmental laws, regulations, and policies.

Your project may involve an "environmental justice concern" if the project could:

a) Create new disproportionate impacts on minority, low-income, or indigenous populations;
b) Exacerbate existing disproportionate impacts on minority, low-income, or indigenous populations; or
c) Present opportunities to address existing disproportionate impacts on minority, low-income, or indigenous populations that are addressable through the project.

Attachment 1

ENVIRONMENTAL[1] PACKAGE CHECKLIST FOR APPLICANT (What to Submit to Project Manager)

Required for all CWSRF Projects:

- ❑ **Evaluation Form for Environmental Review and Federal Coordination with the substantiating information** (i.e. USFWS species list/biological assessment, cultural resources documentation, air quality data, flood map etc.)
- ❑ **Project Report, Scope of Work and Map(s)**

Based on the type of CEQA documents prepared for the project, provide additional information as identified in the following boxes.

If project is covered under a **CEQA Categorical or Statutory Exemption**, submit a copy of the following:

- ❑ **Notice of Exemption** (filed and date stamped by the county clerk and the Governor's Office of Planning and Research)

If project is covered under a **Negative Declaration**, submit a copy of the following:

- ❑ **Draft and Final Initial Study/Negative Declaration (IS/ND)**
  - ❑ Comments and Responses to the Draft IS/ND
- ❑ **Resolution approving the CEQA documents**
  - ❑ Adopting the Negative Declaration
  - ❑ Making CEQA Findings
- ❑ **Notice of Determination** (filed and date stamped by the county clerk and the Governor's Office of Planning and Research)

If project is covered under a **Mitigated Negative Declaration**, submit a copy of the following:

- ❑ **Draft and Final Initial Study/Mitigated Negative Declaration (IS/MND)**
  - ❑ Comments and Responses to the Draft IS/MND
  - ❑ Mitigation Monitoring and Reporting Plan/Program (MMRP)
- ❑ **Resolution approving the CEQA documents**
  - ❑ Adopting the Mitigated Negative Declaration and the MMRP
  - ❑ Making CEQA Findings
- ❑ **Notice of Determination** (filed and date stamped by the county clerk and the Governor's Office of Planning and Research)

If project is covered under an **Environmental Impact Report (EIR)**, submit a copy of the following:

- ❑ **Draft and Final EIR**
  - ❑ Comments and Responses to the Draft EIR
  - ❑ Mitigation Monitoring and Reporting Plan/Program (MMRP)
- ❑ **Resolution approving the CEQA documents**
  - ❑ Certifying the EIR and adopting the MMRP
  - ❑ Making CEQA Findings
  - ❑ Adopting a Statement of Overriding Considerations for any adverse environmental impact(s), if applicable
- ❑ **Notice of Determination** (filed and date stamped by the county clerk and the Governor's Office of Planning and Research)

If EIR is a joint CEQA/National Environmental Policy Act document (EIR/Environmental Impact Statement or EIR/Environmental Assessment), submit the applicable Record of Decision and/or the Finding of No Significant Impact.

[1] If the CEQA document is more than five years old applicant shall provide an updated CEQA document (eg. subsequent, supplemental, or addendum CEQA documents) or a letter that describes the current status of the environmental condition for the project's location.

State Water Resources Control Board (State Water Board)
Clean Water State Revolving Fund Program

Evaluation Form for Environmental Review and Federal Coordination

CWSRF No.: _____

Applicant Name: _____

Date: _____

Project Title: _____

1. <u>Federal Endangered Species Act (ESA), Section 7</u>:
Does the project involve any direct effects from construction activities, or indirect effects such as growth inducement that may affect federally listed threatened or endangered species or their critical habitat that are known, or have a potential, to occur on-site, in the surrounding area, or in the service area?

a. **Required documents: Attach project-level biological surveys, evaluations analyzing the project's direct and indirect effects on special-status species, and an up-to-date species list (from the United States Fish and Wildlife Service and the California Natural Diversity Database) for the project area.**

☐ No. Discuss why the project will not impact any federally listed special status species:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

☐ Yes. Provide information on federally listed species that could potentially be affected by this project and any proposed avoidance and compensation measures so that the State Water Board can initiate informal/formal consultation with the applicable federally designated agency. Document any previous ESA consultations that may have occurred for the project. Include any comments below:

_____

_____

_____

_____

_____

_____

_____

_____

_____

2. **<u>Magnuson-Stevens Fishery Conservation and Management Act, Essential Fish Habitat</u>: Does the project involve any direct effects from construction activities, or indirect effects such as growth inducement that may adversely affect essential fish habitat?**

☐ No. Discuss why the project will not impact essential fish habitat:

☐ Yes. Provide information on essential fish habitat that could potentially be affected by this project and any proposed avoidance and compensation measures. Document any consultations with the National Marine Fisheries Service that may have occurred for the project. Include any comments below:

3. **<u>National Historic Preservation Act, Section 106</u>: Identify the area of potential effects (APE), including construction, staging areas, and depth of any excavation. (Note: the APE is three dimensional and includes all areas that may be affected by the project, including the surface area and extending below ground to the depth of any project excavations).**

- **Required documents: Cultural Resources Assessment** prepared by a prepared by a qualified researcher that meets the Secretary of the Interior's Professional Qualifications Standards (www.cr.nps.gov/local-law/arch_stnds_9.htm). **Current records search** with maps showing all sites and surveys drawn in relation to the project area, records of **Native American consultation**, and a **consultation letter** for the State Water Board to use to consulate with the State Historic Preservation Officer. Include any comments below:

4. **<u>Federal Clean Air Act</u>:**

Identify Air Basin Name _____
Name of the Local Air District for Project Area: _____

Is the project subject to a State Implementation Plan (SIP) conformity determination?

☐ No. The project is in an attainment or unclassified area for all federal criteria pollutants.

☐ Yes. The project is in a nonattainment area or attainment area subject to maintenance plans for a federal criteria pollutant. Include information to indicate the nonattainment designation (e.g. moderate, serious, severe, or extreme), if applicable. If estimated emissions (below) are above the federal de minimis levels, but the project is sized to meet only the needs of current population projections that are used in the approved SIP for air quality, then quantitatively indicate how the proposed capacity increase was calculated using population projections.

- **The Lead Agency shall provide the estimated project construction and operational air emissions (in tons per year) in the chart below, and attach supporting calculations, regardless of attainment status**

- **Also, attach any air quality studies that may have been done for the project.**

Pollutant	Federal Status (Attainment, Nonattainment, Maintenance, or Unclassified)	Nonattainment Rates (i.e., moderate, serious, severe, or extreme)	Threshold of Significance for Project Air Basin (if applicable)	Construction Emissions (Tons/Year)	Operation Emissions (Tons/Year)
Ozone (O_3)					
Carbon Monoxide (CO)					
Oxides of Nitrogen (NO_x)					
Reactive Organic Gases (ROG)					
Volatile Organic Compounds (VOC)					
Lead (Pb)					
Particulate Matter less than 2.5 microns in diameter ($PM_{2.5}$)					
Particulate Matter less than 10 microns in diameter (PM_{10})					
Sulfur Dioxide (SO_2)					

5. <u>Coastal Zone Management Act</u>:
Is any portion of the project site located within the coastal zone?

☐ No. The project is not within the coastal zone.

☐ Yes. Describe the project location with respect to coastal areas and the status of the coastal zone permit, and provide a copy of the coastal zone permit or coastal exemption:

_____
_____
_____
_____
_____
_____

6. Coastal Barriers Resources Act:

Will the project impact or be located within or near the Coastal Barrier Resources System or its adjacent wetlands, marshes, estuaries, inlets, and near-shore waters? Note that since there is currently no Coastal Barrier Resources System in California, projects located in California are not expected to impact the Coastal Barrier Resources System in other states. If there is a special circumstance in which the project may impact a Coastal Barrier Resource System, indicate your reasoning below.

☐ No. The project will not impact or be located within or near the Coastal Barrier Resources System or its adjacent wetlands, marshes, estuaries, inlets, and near-shore waters.

☐ Yes. Describe the project location with respect to the Coastal Barrier Resources System, and the status of any consultation with the appropriate Coastal Zone management agency and the United States Fish and Wildlife Service:

_____

_____

_____

_____

7. Farmland Protection Policy Act:

Is any portion of the project located on important farmland?

☐ No. The project will not impact farmland.

☐ Yes. Include information on the acreage that would be converted from important farmland to other uses. Indicate if any portion of the project boundaries is under a Williamson Act Contract and specify the amount of acreage affected:

_____

_____

_____

_____

_____

8. Flood Plain Management:

Is any portion of the project located within a 100-year floodplain as depicted on a floodplain map or otherwise designated by the Federal Emergency Management Agency?

- **Required documents: Attach a floodplain map.**

☐ No. Provide a description of the project location with respect to streams and potential floodplains:

_____

☐ Yes. Describe the floodplain, and include a floodplains/wetlands assessment. Describe any measures and/or project design modifications that would be implemented to minimize or avoid project impacts:

_____

_____

_____

_____

9. Migratory Bird Treaty Act:
Will the project affect protected migratory birds that are known, or have a potential, to occur on-site, in the surrounding area, or in the service area?

☐ No. Provide an explanation below.

_____
_____
_____
_____

☐ Yes. Discuss the impacts (such as noise and vibration impacts, modification of habitat) to migratory birds that may be directly or indirectly affected by the project and mitigation measures to reduce or eliminate these impacts. Include a list of all migratory birds that could occur where the project is located:

_____
_____
_____
_____

10. Protection of Wetlands:
Does any portion of the project boundaries contain areas that should be evaluated for wetland delineation or require a permit from the United States Army Corps of Engineers?

☐ No. Provide the basis for such a determination:

_____
_____
_____
_____

☐ Yes. Describe the impacts to wetlands, potential wetland areas, and other surface waters, and the avoidance, minimization, and mitigation measures to reduce such impacts. Provide the status of the permit and information on permit requirements:

_____
_____
_____
_____

11. Wild and Scenic Rivers Act:
Identify watershed where the project is located: _____

Is any portion of the project located within a wild and scenic river?

☐ No. The project is not located near a wild and scenic river.

☐ Yes. Identify the wild and scenic river watershed and project location relative to the affected wild and scenic river:

_____
_____
_____
_____

12. <u>Safe Drinking Water Act, Sole Source Aquifer Protection</u>:
Is the project located in an area designated by the United States Environmental Protection Agency, Region 9, as a Sole Source Aquifer?

☐ No. The project is not within the boundaries of a sole source aquifer.

☐ Yes. Contact USEPA, Region 9 staff to consult, and identify the sole source aquifer (e.g., Santa Margarita Aquifer, Scott's Valley, the Fresno County Aquifer, the Campo/Cottonwood Creek Aquifer or the Ocotillo-Coyote Wells Aquifer) that will be impacted:

_____
_____

13. <u>Environmental Justice</u>:
Does the project involve an activity that is likely to be of particular interest to or have particular impact upon minority, low-income, or indigenous populations, or tribes?

☐No. Selecting "No" means that this action is not likely to be of any particular interest to or have an impact on these populations or tribes. Explain.

_____
_____
_____
_____
_____

☐Yes. If you answer yes, please check at least one of the boxes and provide a brief explanation below:

☐ The project is likely to impact the health of these populations.

☐ The project is likely to impact the environmental conditions of these populations.

☐ The project is likely to present an opportunity to address an existing disproportionate impact of these populations.

☐ The project is likely to result in the collection of information or data that could be used to assess potential impacts on the health or environmental conditions of these populations.

☐ The project is likely to affect the availability of information to these populations.

☐ Other reasons, describe: _____

_____
_____
_____
_____
_____
_____

BASIC CRITERIA FOR BIOLOGICAL EVALUATIONS AND BIOLOGICAL ASSESSMENTS REPORTS

FOR SECTION 7 AND SECTION 10 CONSULTATION WITH THE UNITED STATES FISH & WILDLIFE SERVICE (USFWS) AND NATIONAL MARINE FISHERIES SERVICE (NMFS) UNDER THE FEDERAL ENDANGERED SPECIES ACT (ESA) – 50 CFR PART 402

PROJECT DESCRIPTION AND AREA OF POTENTIAL EFFECTS

- Applicants must provide a detailed project description and identify the area of potential effects (APE). Include multiple views (maps & photos) of the project area and the surrounding environment. NOTE: The APE also includes project staging areas.

- The APE is three-dimensional and includes all areas that may be affected directly or indirectly by the project. The APE includes the surface area and extends below ground to the depth of any project excavations, soil borings, &/or groundwater wells. If trenching is involved, the applicant must outline trenching depths and linear feet involved.

CURRENT SPECIES LIST(S)

- A current Federal species list must be obtained from your local USFWS office. The species list must include all endangered, threatened, &/or special status species in the project area.

- The species list should be made for an area larger than the APE. *The appropriate area varies for different projects but must be drawn large enough to provide information on what types of species may exist in the vicinity. Sometimes a species may occur in the larger regional area near the project, but the habitat necessary to support the species is not in the project area (including areas that may be beyond the immediate project boundaries, but within the APE of the project). If you know that the specific habitat type used by a species does not occur in the APE, documentation (biological field survey) may be required.*

SURVEYS

- Submit any biological surveys have been completed in the project APE.

- Adequate surveys include a clear description of the survey methods and will include the following information:
  - How intensive was the survey? Did the survey cover the entire project area or only part of it? Include maps of areas surveyed if appropriate.

  - Who did the survey and when? Was the survey done during the time of year/day when the plan is growing or during the species active period? Did the survey follow accepted protocols?

  -

REPORT TERMINOLOGY

- The "not known to occur here" approach to BA/BEs are not acceptable. The operative word is "known". Unless adequate surveys have been conducted or adequate information sources have been referenced, this statement is not appropriate. Always reference your information sources.

Environmental Impact Reports, Environmental Impact Statements, and other environmental documents (CEQA) cannot be used in lieu of a biological evaluation or biological assessment. Environmental documents are not acceptable for the purposes of Section 7 or Section 10 consultation.

NOTE: If "Decision's" are made, they must be one of the three "Decision's" listed below.

These include:

"No effect" (Means there are absolutely no biological effects of the project, positive or negative).

"May affect – is not likely to adversely affect" (Means all biological effects are beneficial, insignificant, or discountable).

"May affect – is likely to adversely affect" (Means that all adverse effects can not be avoided).

BASIC CRITERIA FOR CULTURAL RESOURCES REPORTS

FOR SECTION 106 CONSULTATION WITH THE STATE HISTORIC PRESERVATION OFFICER (SHPO) UNDER THE NATIONAL HISTORIC PRESERVATION ACT (NHPA) – 36 CFR PART 800

PROJECT DESCRIPTION AND AREA OF POTENTIAL EFFECTS

- Applicants must provide a detailed project description and identify the area of potential effects (APE). Include multiple views (maps & photos) of the project area and the surrounding environment. NOTE: The APE also includes project staging area(s). Identify the project and staging area(s) on the maps.

- The APE is three-dimensional and includes all areas that may be directly or indirectly affected by the project. The APE includes the surface area and extends below ground to the depth of any project excavations, soil borings, &/or groundwater wells. If trenching is involved, the applicant must outline trenching depths and linear feet involved.

CURRENT RECORDS SEARCH INFORMATION

- A current (less than five years old) records search from the appropriate California Historical Resources Information System (CHRIS) is necessary. The records search must include maps that show all recorded sites and surveys in relation to the APE for the project.

- The records search request should be made for an area larger than the APE. The appropriate area varies for different projects but must be drawn large enough to provide information on what types of sites may exist in the vicinity.

NATIVE AMERICAN AND INTERESTED PARTY CONSULTATION

- Native American and interested party consultation should be initiated at the beginning of any cultural resource investigations. The purpose is to gather information from people with local knowledge that may be used to guide research.

- A project description and map should be sent to the Native American Heritage Commission (NAHC) requesting a check of their Sacred Lands Files. The Sacred Lands Files include religious and cultural places that are not recorded at the information centers.

- The NAHC will include a list of Native American groups and individuals with their response. A project description and maps must be sent to everyone on the list asking for information on the project area.

- Similar letters should be sent to local historical organizations and other interested parties.

- Follow-up contact should be made by phone, if possible, and a contact log or correspondence summary must be included in the report.

REPORT TERMINOLOGY

- A cultural resources report used for Section 106 shall use terminology and content consistent with the NHPA 36 CFR Part 800.11.

- Being consistent with the NHPA does not mean that the report needs to be “filled” with passages and interpretations of the regulations; the SHPO reviewer already knows the law.

Environmental Impact Reports, Environmental Impact Statements, and other environmental documents (CEQA) cannot be used in lieu of a cultural resources report. Environmental documents are not acceptable for the purposes of Section 106 consultation.

NOTE: If “findings” are made, they must be one of the four “findings” listed in Section 106.

These include:

“No historic properties affected” (no properties are within the APE, including the below ground APE).

“No effect to historic properties” (properties may be near the APE but the project will not impact them).

“No adverse effect to historic properties” (the project may affect historic properties but the impacts will not be adverse).

“Adverse effect to historic properties” NOTE: the SHPO must be consulted at this point. If your consultant proceeds on his/her own, his/her efforts may be wasted.