Environmental Initial Study

Lake Shastina CSD
Drinking Water System Improvements

Draft Initial Study Checklist
Proposed Mitigated Negative Declaration
References and Documentation

Lead Agency:

Lake Shastina
Community Services District
16309 Everhart Drive
Weed, CA 96094

Technical Assistance By:

SHN Consulting Engineers & Geologists
350 Hartnell Avenue, Suite B
Redding, CA 96002

July 2024

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Lake Shastina CSD
Environmental Checklist Form

1. **Project Title:** Lake Shastina Community Services District Drinking Water System Improvements

2. **Lead Agency:**

   Lake Shastina
   Community Services District
   16309 Everhart Drive
   Weed, CA 96094

3. **Contact Person:**

   Rick Thompson
   General Manager
   Lake Shastina Community Services District
   16309 Everhart Drive
   Weed, CA 96094
   (530) 938-3281
   RickT@lakeshastina.com

4. **Project Location:** The Lake Shastina Community Services District (District) and its residential community is situated 7 miles north of Weed, California. The District lies between two major transportation routes; County Roads A29 (Big Springs Road) and Jackson Ranch Road. The project area is in Township 43 North, Range 5 West, Sections 1, 2, 11, 12, 25, 26, 31, 35, and 36, Mount Diablo Base Meridian (MDBM).

5. **Applicant's Name and Address:**

   Lake Shastina
   Community Services District
   16309 Everhart Drive
   Weed, CA 96094

6. **General Plan Designation:** The Siskiyou County General Plan does not have specific land use designations (such as commercial, residential, agriculture, etc.). Rather, it is based on land classifications, such as hazards and other resource area specific topics which are overlays. Evaluation for the project Site and immediately surrounding lands shows that the designated overlays for the project include Erosion Hazard, Building Foundation Limitations, Flood Hazard, Surface Hydrology, Deer Wintering Area and Wildfire Hazard.

7. **Zoning:** The existing Siskiyou County zoning is RES-1 (Single-Family Residential).

8. **Description of Project:** The District has identified several deficiencies in the overall water treatment system including aging tanks, inadequate water storage, inadequate pressure in the southeast zone, lack of backup power, and aging fire hydrants. To remedy these deficiencies, the District proposes a combination of replacement components and new construction (well house buildings and one above ground water tank).

   The District is planning to make upgrades to all water meters and fire hydrants throughout the project site. The water meters will be replaced with automatic sensor meters and no ground disturbance will be required at these locations. The fire hydrants will need to be replaced at the elbow joint in the ground. Soil disturbance within 10 feet of each fire hydrant and approximately 48 inches of depth is expected with the use of a backhoe and hand tools, within negligible vegetation or bare ground.

9. **Surrounding Land Uses and Setting:** The project area is surrounded by vacant undeveloped land, portions of Lake Shastina and active agricultural lands.

10. **Other public agencies whose approval is required (e.g., permits, financing approval, or participation agreement):**

    California Department of Fish and Wildlife
    North Coast Regional Water Quality Control Board
    Siskiyou County – Water well permit, building permit, electrical permit.
    Siskiyou County Air Pollution Control District
    State Water Resources Control Board

11. **Have California Native American tribes traditionally and culturally affiliated with the project area requested consultation pursuant to Public Resources Code section 21080.3.1? If so, is there a plan for consultation that includes, for example, the determination of significance of impacts to tribal cultural resources, procedures regarding confidentiality, etc.?**

    Consultation and correspondence with various culturally affiliated Tribal groups and agencies were conducted in accordance with Public Resources Code (PRC) Section 21080.3.1 (AB 52). On January 8, 2024, the District initiated environmental review under the California Environmental Quality Act (CEQA) for the proposed Lake Shastina Drinking Water System Improvements project. The District sent a certified project notification letter to the Quartz Valley Indian Community and Shasta Nation, each a California Native American Tribe that is traditionally and culturally affiliated with the geographic area of the proposed project, on January 8, 2024, pursuant to PRC Section 21080.3.1, notifying that the project was under review and to provide the Tribes 30 days from the receipt of the letter to request consultation on the project in writing. No responses were received requesting initiation of consultation under the provisions of AB 52.

    Note: *Conducting consultation early in the CEQA process allows tribal governments, lead agencies, and project proponents to discuss the level of environmental review, identify and address potential adverse impacts to tribal cultural resources, and reduce the potential for delay and conflict in the environmental review process (see PRC Section 21080.3.2.). Information may also be available from the California Native American Heritage*

    Commission's Sacred Lands File per PRC Section 5097.96 and the California Historical Resources Information System administered by the California Office of Historic Preservation. Please also note that PRC Section 21082.3(c) contains provisions specific to confidentiality.

    Information contained in the Cultural Resources Inventory for the Lake Shastina Drinking Water System Improvements Project (DZC, 2023) related to the specific location of prehistoric and historic sites is confidential and exempt from the Freedom of Information Act (FOIA) and the California Public Records Act (CPRA); therefore, site specific cultural resource investigations are not attached to this Initial Study. Professionally qualified individuals, as determined by the California Office of Historic Preservation, may contact the Lake Shastina Community Services District directly in order to inquire about its availability.

12. **Purpose of this Document:** This document analyzes the environmental effects of the proposed Lake Shastina Drinking Water System Improvements project and makes appropriate findings in accordance with Section 15070 of the State CEQA Guidelines. In addition, this document has been prepared to the degree of specificity appropriate to the current proposed action, as required by Section 15146 of the State CEQA Guidelines. The analysis considers the actions associated with the proposed project to determine the short-term and long-term effects associated with their implementation.

13. **List of Attachments:**

Attachment A	Preliminary Engineering Report
Attachment B	Air Quality & GHG Modeling Outputs
Attachment C	Biological Resources Report
Attachment D	Cultural Resources Inventory Report

Section 1 – Introduction and Purpose

1.1 Introduction

The Lake Shastina Community Services District (District), as the Lead Agency, has prepared this Initial Study to provide the general public and interested public agencies with information about the potential environmental impacts of the proposed Lake Shastina Drinking Water System Improvements project (proposed project). Funding for this project has been provided in full through a small community drinking water planning grant from the California State Water Resources Control Board (SWRCB), under SWRCB Agreement Number D1902019 and SWRCB Project Number 4710013-001P.

Details about the proposed project are included in Section 2.0, PROJECT DESCRIPTION, of this Initial Study. This Initial Study has been prepared in accordance with the California Environmental Quality Act (CEQA) of 1970 (as amended), codified in California Public Resources Code Section 21000 *et seq*., and the State CEQA Guidelines (California Code of Regulations, Title 14, Division 6, Chapter 3). Pursuant to these regulations, this Initial Study identifies potentially significant impacts and, where applicable, includes mitigation measures that would reduce all identified environmental impacts to less than significant levels. Mitigation measures have been proposed to avoid or minimize any significant impacts that were identified. This Initial Study supports a Mitigated Negative Declaration pursuant to CEQA Guidelines Section 15070.

1.2 Lead Agency

The Lead Agency is "*the public agency which has the principal responsibility for carrying out or approving a project,*" which may be subject to CEQA (PRC Section 21067). Accordingly, the Lake Shastina Community Services District is the CEQA Lead Agency.

1.3 Purpose of the Initial Study

CEQA requires that public agencies document and consider the potential environmental effects of the agency's actions that meet CEQA's definition of a "project." Briefly summarized, a "project" is an action that has the potential to result in direct or indirect physical changes in the environment. A project includes the agency's direct activities as well as activities that involve public agency approvals or funding. Guidelines for an agency's implementation of CEQA are found in the "CEQA Guidelines" (Title 14, Chapter 3 of the California Code of Regulations).

Provided that a project is not exempt from CEQA, the first step in the agency's consideration of its potential environmental effects is the preparation of an Initial Study. The purpose of an Initial Study is to determine whether the project would involve "significant" environmental effects, as defined by CEQA, and to describe feasible mitigation measures that would avoid significant effects or reduce them to a level that is less than significant. If the Initial Study does not identify significant effects, then the agency prepares a Negative Declaration. If the Initial Study notes significant effects but also identifies mitigation measures that would reduce these significant effects to a level that is less than significant, then the agency prepares a Mitigated Negative Declaration. If a project would involve significant effects that cannot be readily mitigated, then the agency must prepare an Environmental Impact Report. The agency may also decide to proceed directly with the preparation of an Environmental Impact Report without an Initial Study.

The proposed project is a "project" as defined by CEQA and is not exempt from CEQA consideration. The District has determined that the project may potentially have significant environmental effects and therefore would require preparation of an Initial Study. This Initial Study describes the proposed project and its environmental setting, discusses the potential environmental effects of the project, and identifies feasible mitigation measures that would eliminate any potentially significant environmental effects of the project or reduce them to a level that would be less than significant.

This Initial Study is a public information document that describes the proposed project, existing environmental setting at the project site, and potential environmental impacts of construction and operation of the proposed project. It is intended to inform the public and decision-makers of the proposed project's potential environmental impacts and to document the lead agency's compliance with CEQA and the State CEQA Guidelines.

This Initial Study concludes that the project would have potentially significant environmental effects, all of which would be avoided or reduced to a level that would be less than significant with recommended mitigation measures. As a result, the District has prepared a Mitigated Negative Declaration and has issued a Notice of Intent to Adopt the Mitigated Negative Declaration for the project. The time available for public comment on the Initial Study and Mitigated Negative Declaration is shown on the Notice of Intent.

1.4 Incorporation by Reference

In accordance with Section 15150 of the State CEQA Guidelines to reduce the size of the report, the following documents are hereby incorporated by reference into this Initial Study and are available for public review at the Lake Shastina Community Services District. A brief synopsis of the scope and content of each of these documents is provided below.

Community Wildfire Protection Plan

The Community Wildfire Protection Plan (CWPP) (2018) reflects common goals to better enable the Lake Shastina community to protect itself. This CWPP is a living document which will change over time, as projects are implemented and new priorities arise. The Greater Lake Shastina Fire Safe Council (GLSFSC) will utilize the CWPP as a means for the community to participate in wildfire protection planning for the future.

Siskiyou County General Plan

The Siskiyou County General Plan is a blueprint for future development and describes the County's development goals and policies, It also is the foundation for land use decisions made by the Planning Commission and Board of Supervisors Although the General Plan established standards for the location and density of land uses, it does not directly regulate the land use as does zoning. The County's General Plan was utilized throughout this Initial Study as the fundamental planning document governing the project site.

Siskiyou County Code

The Zoning Ordinance (Title 10) of the Siskiyou County Code of Ordinances promotes the protection of public health, safety, peace, morals, comfort, convenience and general well fare of the County. Specially, the zoning ordinance assists in providing a definite plan of development of the County and to guide, control and regulate future growth of the County through the regulation of land uses, buildings and structures.

Siskiyou County Hazard Mitigation Plan

The purpose of the Siskiyou County Hazard Mitigation Plan is to implement and sustain actions that reduce vulnerability and risk from hazards or reduce the severity of the effects of hazards on people and property. Mitigation actions are both short-term and long-term activities, which reduce the cause or occurrence of hazards; reduce exposure to hazards or reduce effects of hazards through various means to include preparedness, response, and recovery measures.

1.5 Project Environmental Studies

As part of the preparation of this Initial Study, the following studies were prepared or utilized to develop baseline information and project-related impact discussions. Hard copies of these studies are available for inspection at the Lake Shastina Community Services District, 16309 Everhart Drive, Weed, California 96094, during normal business hours (8:00 a.m. to 5:00 p.m. Monday through Friday):

- *Biological Report*, prepared by SHN, February 2023.
- *Phase I Cultural Resource Inventory Report for the Lake Shastina Community Services District Drinking Water Improvement Project*, prepared by DZC Archaeology and Cultural Resource Management, December 2023.
- *Preliminary Engineering Report for Drinking Water System Improvements*, prepared by SHN, December 2023.

Information contained in the cultural resources inventory report identified above related to the specific location of prehistoric and historic sites is confidential and exempt from the Freedom of Information Act (FOIA) and the California Public Records Act (CPRA); therefore, this information is not included in as an attachment to this Initial Study. Professionally qualified individuals, as determined by the California Office of Historic Preservation, may contact the Lake Shastina Community Services District directly to inquire about its availability.

1.6 Environmental Review Process

This Initial Study is being circulated for public and agency review as required by CEQA. Because State agencies will act as responsible or trustee agencies, the District will circulate the Initial Study to the State Clearinghouse of the Governor's Office of Planning and Research for distribution and a 30-day review period. During the review period, written comments may be submitted to:

Lake Shastina
Community Services District
16309 Everhart Drive
Weed, CA 96094

Rick Thompson, General Manager
Phone: (530) 938-3281
rthompson@lakeshastina.com

Upon completion of the 30-day public review period, written responses to all substantive environmental issues raised will be prepared and available for review prior to the public hearing before the Lake Shastina Community Services District Board of Directors at which the approval of the proposed project will be considered.

Section 2 – Project Description

2.1 Project Location and Setting

Regional Setting

Located in inland northern California, adjacent to the Oregon state line, Siskiyou County is bordered on the west by Del Norte and Humboldt counties, on the south by Trinity and Shasta counties, and on the east by Modoc County. Siskiyou County is the fifth largest county by area and 45th in population in the State. At 6,347 square miles, the County has a population density of only 7.1 people per square mile. More than 60 percent of the land in the County is currently managed by federal and State agencies. The majority of this land is in the Klamath, Shasta-Trinity, and Modoc National Forests (see Figure 2-1).

Local Setting

The Lake Shastina Community Services District (District) is a special purpose district created to provide sewer, water, police, and fire services to the area around Lake Shastina in unincorporated Siskiyou County. The District and its residential community is situated approximately 7 miles north of Weed, California (see Figure 2-2). The District lies between two major transportation routes; County Roads A29 (Big Springs Road) and Jackson Ranch Road.

Project Location

The project area is located entirely within the District's boundaries and is generally situated within Township 43 North, Range 5 West, Sections 1, 2, 11, 12, 25, 26, 31, 35, and 36, Mount Diablo Meridian. The proposed water infrastructure improvements are located within the following Assessor's Parcel Numbers (APNs) (see Figure 2-3):

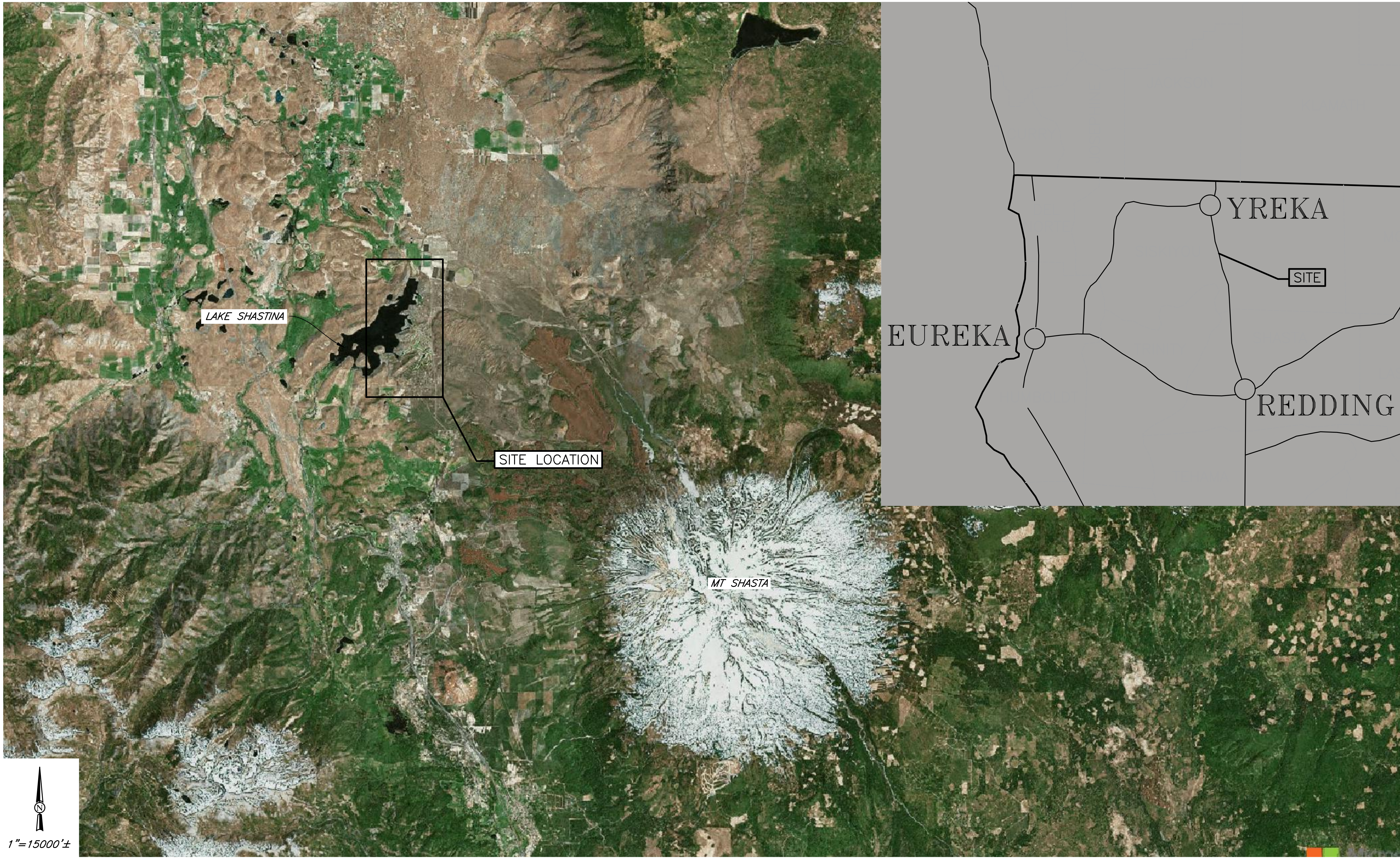
- Water tank 4 location APN: 020-071-270-000.
- Water tank 3 location APN: 108-200-120-000.
- Water tank 2 location APN: 106-380-450-000.
- Water tank 1 location APN: 106-190-150-000.
- Place a temporary water tank outside of pump station 53 on APN: 107-080-270-000.
- New pump station location APN: 107-450-550-000.
- 319 fire hydrant replacements throughout the project area within Township 43 North, Range 5 West, sections 35, 26, 25, 31, 36, 1, 12, 11, 2, Mount Diablo Meridian.

Individual infrastructure improvements are accessed by a network of private roads maintained by the Lake Shastina Property Owners Association (LSPOA), as well as private roads and driveways to individual residences.

Existing Conditions

The Lake Shastina community is located around Lake Shastina which is a reservoir that is approximately 2.85 square miles and holds approximately 50,000 acre-feet of water. Lake Shastina supplies irrigation water to agricultural lands to the north and potable water for the City of Montague and is used for recreation. The District's service area (see Figure 2-3) currently has 1,266 active residential connections and 26 active commercial connections.

The project area is situated between approximately 2,680 and 3,230 feet above the mean sea level, with the highest elevations represented at the most southeastern corner of the study area where Jackson Ranch Road and A29/Big Springs Road meet. The residential areas that surround half of Lake Shastina was created because of the construction of the Dwinnell Dam with Shasta River flowing north from the north tip of the lake. The residential area within the study area has been under development for the past 54 years with road, underground power, water, and sewage improvements brought to the area to house around 2,400 residents. The project area consists of rural residential development with managed landscapes. The topography is hilly with significant tree cover throughout the service area. Wildlife presents include various birds, deer, and other animals commonly found in the area.



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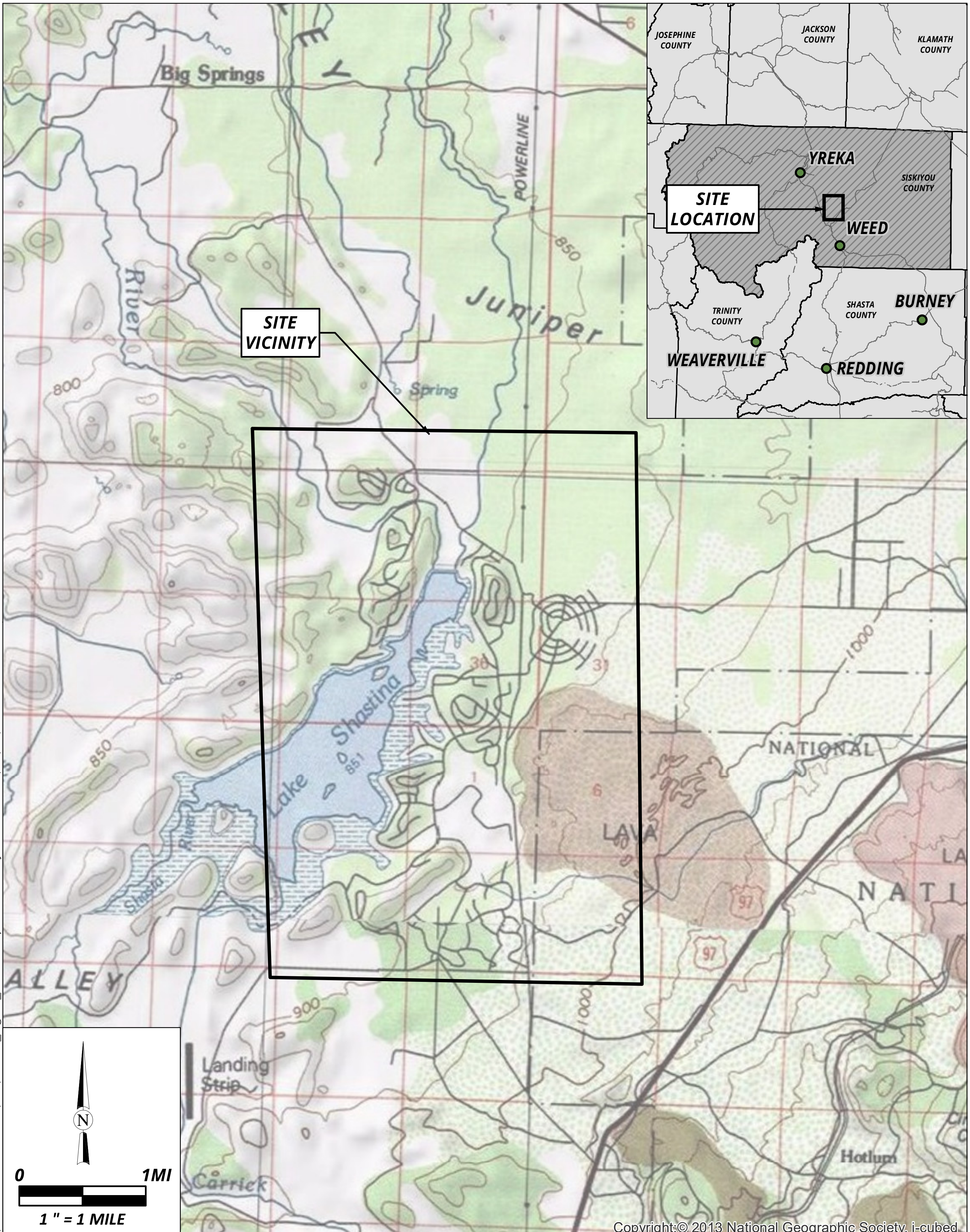
SHN	Lake Shastina CSD Drinking Water System Improvements	Project Vicinity
	July 2024	Figure 2-1



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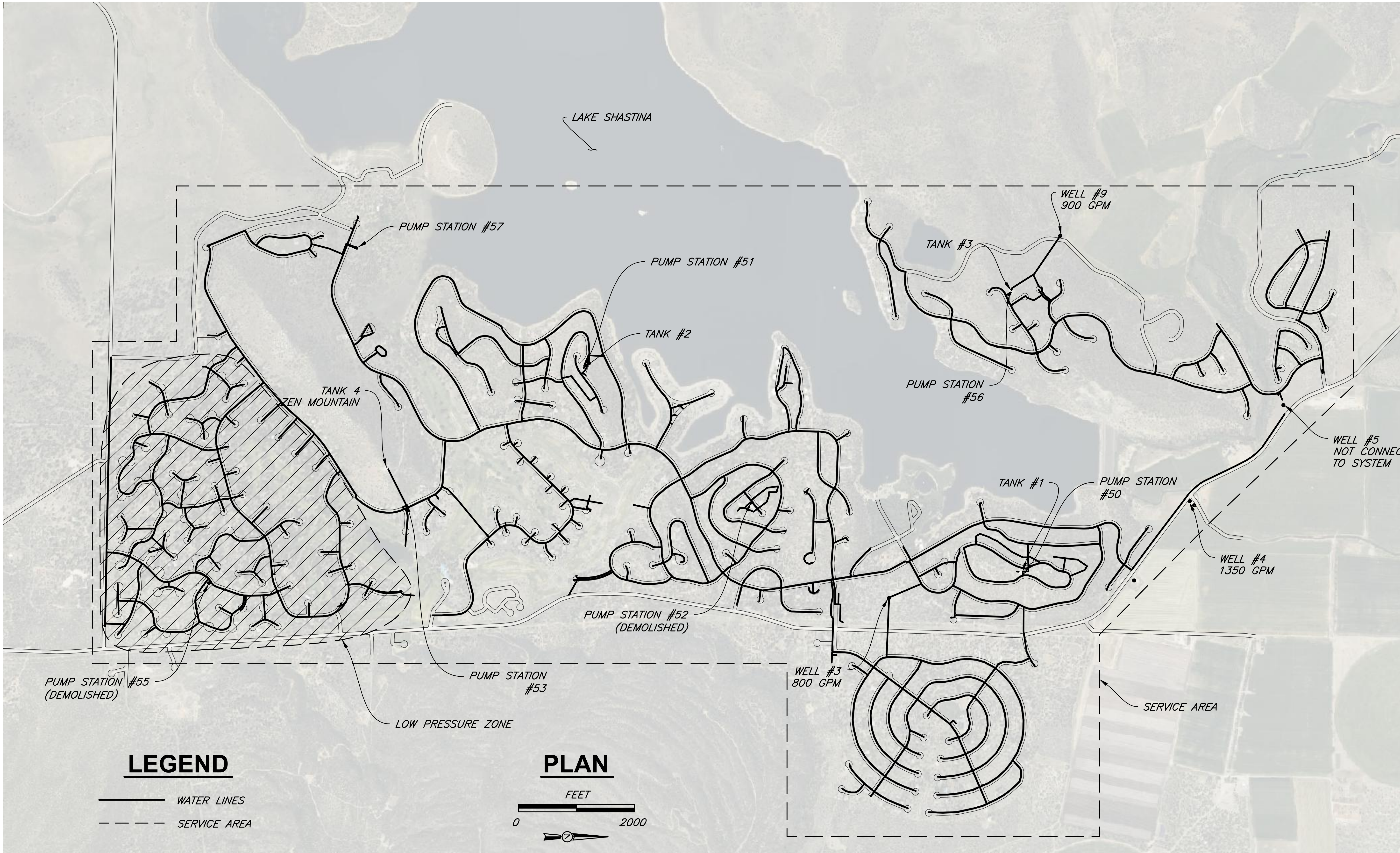
SHN	Lake Shastina Community Services District Drinking Water System Improvements Lake Shastina, California	**Site Vicinity** July 2024 - 524009	**Figure** **2-2**



Lake Shastina CSD
Drinking Water System Improvements

Existing Conditions

July 2024

Figure 2-3

General Plan and Zoning

The Siskiyou County General Plan does not have specific zoning based on designations (such as commercial, residential, agriculture, etc.). Rather, it is based on land classifications, such as hazards and other resource area specific topics which are overlays. Evaluation for the project site and immediately surrounding lands shows that the designated overlays for the project include Erosion Hazard, Building Foundation Limitations, Flood Hazard, Surface Hydrology, Deer Wintering Area and Wildfire Hazard. The existing Siskiyou County zoning is RES-1 (Single-Family Residential).

2.2 Water System Deficiencies

The District's water system deficiencies to be addressed by the proposed project are summarized in this section. Additional details can be found in Attachment A, PRELIMINARY ENGINEERING REPORT, that summarizes the deficiencies and lists the associated proposed solutions and the State Water Resources Control Board (SWRCB) funding priority category.

- Well 4 is the main production well and the other wells in the system do not produce as much water as Well 4. Without full redundancy, if Well 4 is offline, significantly less water would be produced, which could result in curtailment of water use within the service district.
- The four water tanks are more than 50 years old and, based on inspections performed in 2017, need cleaning and recoating due to corrosion. The cathodic protection systems are well beyond their useful lives and need to be replaced. The tanks still have their original interior and exterior coatings.
- During high use periods, Tank 2 has been nearly depleted. Due to the system configuration, Tank 2 cycles through more water than the other tanks. If the water level in Tank 2 were to fall below a minimum level, reduced or even negative pressures would be possible within portions of the distribution system. The system does not have adequate storage in this part of the service area.
- The southeast portion of the District's service area does not have adequate system pressure. There have been two consequences of this. First, some customers have complained about the inadequate water pressure. Second, the District allows local wildfire crews to fill fire trucks from fire hydrants in this zone; with inadequate pressure, the fire trucks have often gone within the residential area to fill from other higher-pressure fire hydrants, causing traffic concerns.
- The water system lacks adequate backup power except at Well 3. In the event of an extended power outage, water supply and pressures may be inadequate thereby causing a disruption in water service.
- Most of the system's fire hydrants are the ones that were originally installed and are beyond their useful lives. This is exhibited by stuck valves, which can lead to inadequate fire-fighting ability.
- While the District has recently installed a SCADA system for system monitoring and control, pump station B-57 was not included. Pump station B-57 requires manual operation, and Tank 4 has overflowed as a result of inadequate monitoring the system.
- Most of the water meters are original and are well past their useful life. These meters are manually read, causing a significant strain on personnel due to the high level of effort needed. In addition, handwritten records of water use can be subject to error, leading to incorrect billing.

2.3 Project Characteristics

As described above, the District has identified several deficiencies in the overall water treatment system including aging tanks, inadequate water storage, inadequate pressure in the southeast zone, lack of backup power, and aging fire hydrants. To remedy these deficiencies, the District proposes a combination of replacement components and new construction as follows (see Figure 2-4):

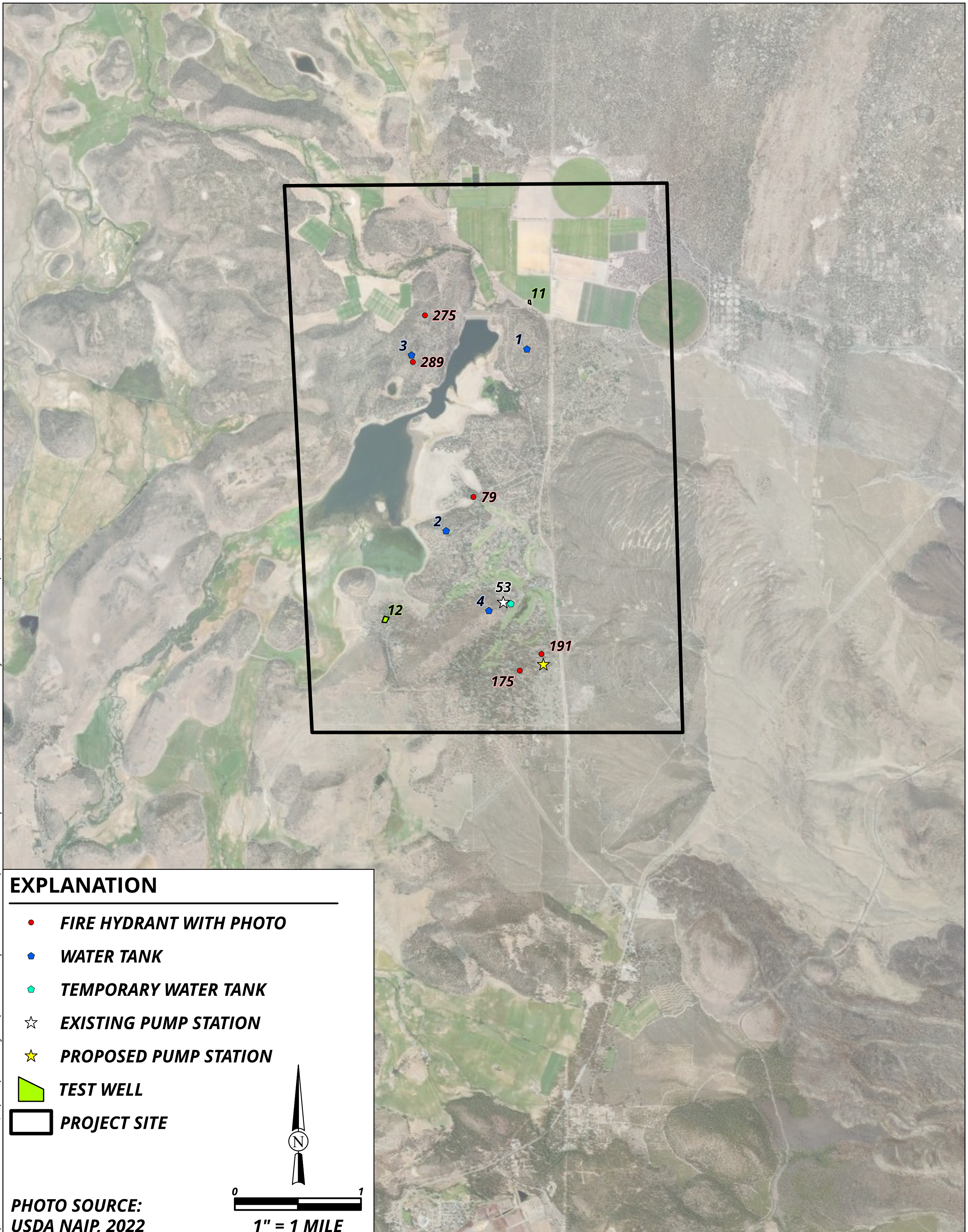
- LSCSD proposes to make upgrades to water tanks 1, 2, 3, and 4. Water tanks 1, 2, and 3 will be re-painted and a new 250,000 gallon cylindrical water tank will be constructed adjacent to Tank 4 in an effort to maintain water demands of the area.
- A new test well 12 will be drilled (on APN 020-280-280-000).
- A new test well 11 will be drilled next to existing test wells (on APN 020-280-280-000).
- A new pump house station will be constructed (on APN 107-450-550-000) to allow enhanced residential water pressure. Soil disturbance and minor vegetation removal by using a backhoe and hand tools within 20 feet of the area will occur.

The District is also planning to make upgrades to all water meters and fire hydrants throughout the project site. The water meters will be replaced with automatic sensor meters and no ground disturbance will be required at these locations. The fire hydrants will need to be replaced at the elbow joint in the ground. Soil disturbance within 10 feet of each fire hydrant and approximately 48 inches of depth is expected with the use of a backhoe and hand tools, within negligible vegetation or bare ground (see Figure 2-5). The range of potential activities, proposed component candidates, and actions are detailed in Table 2-1.

Table 2-1
PROJECT COMPONENTS, RELATED ACTIVITIES, AND ESTIMATED DEPTH OF GROUND DISTURBANCE

Deficiency	Solution	Solution Candidates	Replace (R) or New (N)	Potential Solution Actions	Depth of Disturbance
Aging Tanks	Refurbish Tanks	Tank No. 1 Tank No. 2 Tank No. 3 Tank No. 4	R	• Replace interior lining. • Replace tension bands. • Replace roofing. • Re-paint tank exteriors.	None
Inadequate Water Storage	Install new 250,000-gallon tank	New Tank Adjacent to Tank No. 4	N	• Lay cement foundation pad. • Install new piping. • Install new tank.	48”
Lack of Well Redundancy	Install additional wells	Well House and Well	N	• Install new production well. • Construct new well house. • Tie in new piping to system.	48”
Inadequate Pressure in the Southeast Zone	Install new booster pump station	Pump House and Pump	N	• Tie in new power/control box to existing power system. • Install a new pump. • Lay cement pump foundation. • Tie in new piping to existing system.	48”
Lack of Backup Power	Install stationary backup power at existing sites without backup power	Pump No. 50 Pump No. 51 Pump No. 53 Pump No. 55 Pump No. 56 Pump No. 57 Test Well No. 4 Test Well No. 5 Test Well No. 10 Test Well No. 12 Test Well No. 53	R/N	Tie in new power/control box back-up to existing facility.	48”
Aging Fire Hydrants		320 Fire Hydrants	R	Replace fire hydrants and valves up to the main stem in the roadway.	48”

Implementation of the proposed project would not involve vegetation or soil disturbance within 50 feet of a stream or drainage and will not have hydrological impacts to any adjacent jurisdictional (Regional Water Quality Control Board [RWQCB] or California Department of Fish and Wildlife [CDFW]) features. Minor soil disturbance would be required at several locations that vary from 170 feet to 5,000 feet away from the riparian habitat to replace existing fire hydrants, water Tank 4, and the new pump house station.



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Lake Shastina Community Services District
Drinking Water System Improvements
Lake Shastina, California

Water System Improvements

July 2024 - 524009

Figure 2-4

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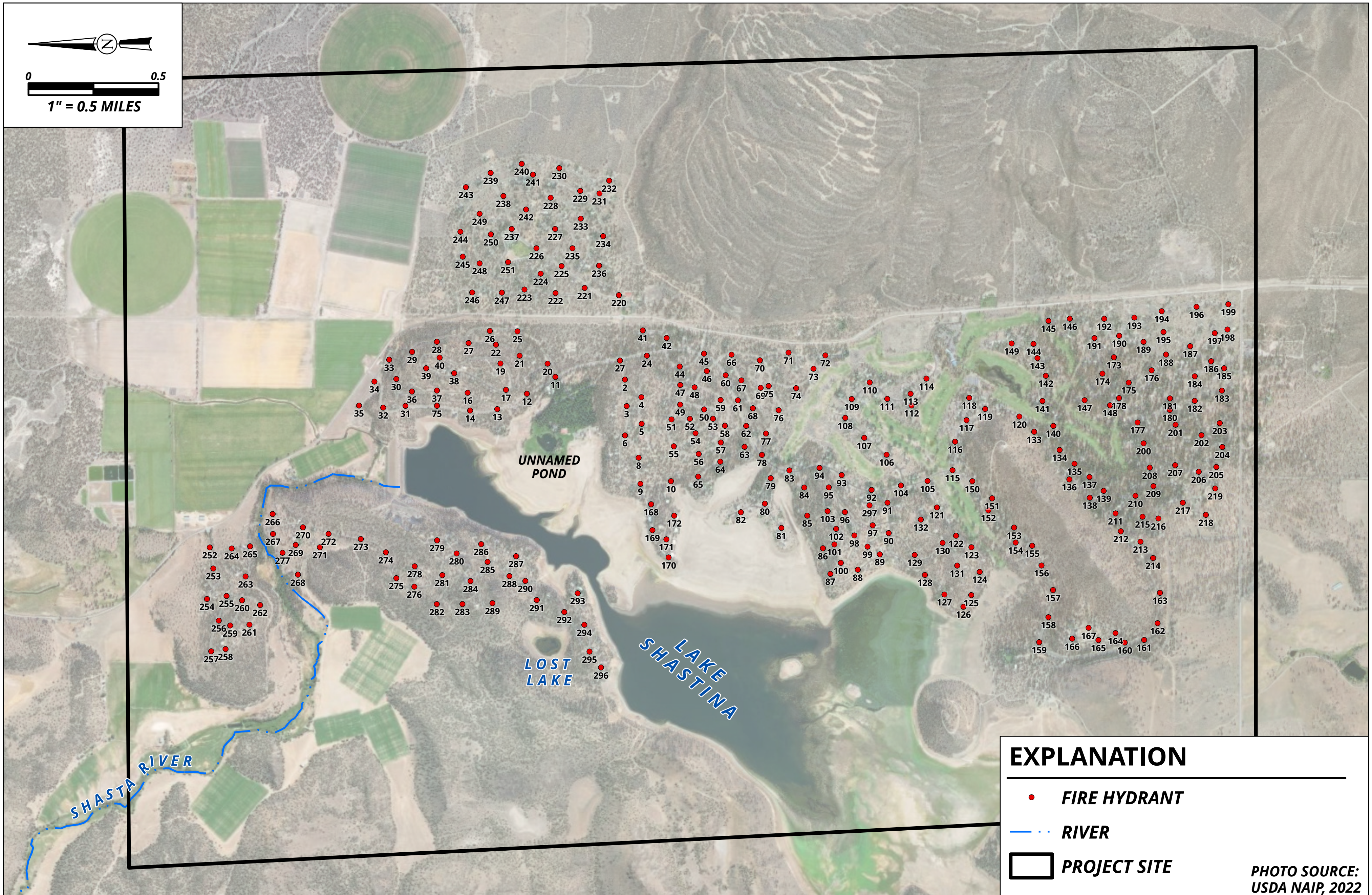


Lake Shastina Community Services District
Drinking Water System Improvements
Lake Shastina, California

Fire Hydrant Upgrades

July 2024 - 524009

Figure 2-5

Documentation and References

DZC (DZC Archaeology and Cultural Resource Management). 2023. *Phase I Cultural Resource Inventory Report for the Lake Shastina Community Services District Drinking Water Improvement Project*. December 2023.

SCOES (Siskiyou County Office of Emergency Services). 2018a. *Hazard Mitigation Plan Volume 1: Planning Area Wide Elements*. August 2018.

SCOES. 2018b. *Hazard Mitigation Plan Volume 2: Planning Partner Annexes*. August 2018.

SHN (SHN Consulting Engineers and Geologists). 2023a. *Biological Report for Lake Shastina Community Services Infrastructure Improvement Project*. February 2023.

SHN. 2023b. *Preliminary Engineering Report for Drinking Water System Improvements*. December 2023.

Siskiyou (Siskiyou County). 1972. *Siskiyou County General Plan*. 1972, as amended.

Siskiyou. 2023a. *Siskiyou County Code of Ordinances – Title 10*. [Online]: https://library.municode.com/ca/siskiyou_county/codes/code_of_ordinances?nodeId=TIT10PLZO. Accessed December 8, 2023.

Siskiyou. 2023b. *Siskiyou County Geographic Information System*. [Online]: https://www.co.siskiyou.ca.us/gis. Accessed December 8, 2023.

Section 3 - Environmental Factors Potentially Affected

The environmental factors checked below would be potentially affected by this project, involving at least one impact that is a “Potentially Significant Impact or Potentially Significant Unless Mitigation Incorporated” as indicated by the checklist on the following pages.

	Aesthetics		Agricultural Resources	X	Air Quality
X	Biological Resources	X	Cultural Resources		Energy
	Geology and Soils		Greenhouse Gas Emissions	X	Hazards and Hazardous Materials
	Hydrology and Water Quality		Land Use and Planning		Mineral Resources
X	Noise		Population and Housing		Public Services
	Recreation		Transportation	X	Tribal Cultural Resources
	Utilities and Service Systems		Wildfire	X	Mandatory Findings of Significance

DETERMINATION: (To be completed by the Lead Agency)

On the basis of the initial evaluation:

☐ I find that the proposed project COULD NOT have a significant effect on the environment, and a NEGATIVE DECLARATION will be prepared.

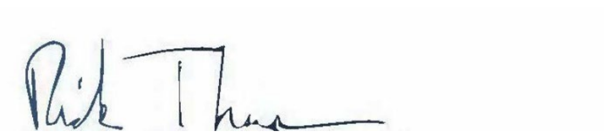
X I find that although the proposed project could have a significant effect on the environment, there will not be a significant effect in this case because revisions in the project have been made by or agreed to by the project proponent. A MITIGATED NEGATIVE DECLARATION will be prepared.

☐ I find that the proposed project MAY have a significant effect on the environment, and an ENVIRONMENTAL IMPACT REPORT is required.

☐ I find that the proposed project MAY have a “potentially significant impact” or “potentially significant unless mitigated” impact on the environment, but at least one effect 1) has been adequately analyzed in an earlier document pursuant to applicable legal standards, and 2) has been addressed by mitigation measures based on the earlier analysis as described on attached sheets. An ENVIRONMENTAL IMPACT REPORT is required, but it must analyze only the effects that remain to be addressed.

☐ I find that although the proposed project could have a significant effect on the environment because all potentially significant effects (a) have been analyzed adequately in an earlier EIR or NEGATIVE DECLARATION pursuant to applicable standards, and (b) have been avoided or mitigated pursuant to that earlier EIR of NEGATIVE DECLARATION, including revisions or mitigation measures that are imposed upon the proposed project, nothing further is required.

Copies of the Initial Study and related materials and documentation may be obtained at the Lake Shastina Community Services District, 16309 Everhart Drive, Weed, CA 96094. Contact Rick Thompson, General Manager, at (530) 938-3281.



Rick Thompson, General Manager
Lake Shastina Community Services District

July 30, 2024
Date

Section 4 – Evaluation of Environmental Impacts

This section provides an evaluation of the potential environmental impacts of the proposed Lake Shastina Drinking Water System Improvements project (proposed project) as well as the CEQA Mandatory Findings of Significance. A discussion of cumulative impacts is also included at the end of this chapter. The issue areas evaluated in this Initial Study include:

- Aesthetics
- Agricultural Resources
- Air Quality
- Biological Resources
- Cultural Resources
- Energy
- Geology & Soils
- Greenhouse Gas Emissions
- Hazards & Hazardous Materials
- Hydrology & Water Quality
- Land Use & Planning
- Mineral Resources
- Noise
- Population & Housing
- Public Services
- Recreation
- Transportation
- Tribal Cultural Resources
- Utilities & Service Systems
- Wildfire

The environmental analysis in this section is patterned after the Initial Study Checklist recommended by the State CEQA Guidelines and used by the Lake Shastina Community Services District in its environmental review process. For the preliminary environmental assessment undertaken as part of this Initial Study's preparation, a determination that there is a potential for significant effects indicates the need to more fully analyze the proposed project's impacts and identify mitigation.

For the evaluation of potential impacts, the questions in the Initial Study Checklist are stated and an answer is provided according to the analysis undertaken as part of the Initial Study. The analysis considers the long-term, direct, indirect, and cumulative impacts of the development. To each question, there are four possible responses:

- *No Impact.* The project will not have any measurable impact on the environment.
- *Less Than Significant Impact.* The project will have the potential for impacting the environment, although this impact will be below established thresholds that are considered to be significant.
- *Potentially Significant Impact Unless Mitigation Incorporated.* The project will have the potential to generate impacts which may be considered as a significant effect on the environment, although mitigation measures or changes to the development's physical or operational characteristics can reduce these impacts to levels that are less than significant.
- *Potentially Significant Impact.* The project will have impacts which are considered significant, and additional analysis is required to identify mitigation measures that could reduce these impacts to less than significant levels.

All answers must take into account the whole action involved, including potential off and onsite, indirect, direct, construction, and operation, except as provided for under State CEQA Guidelines Section 15183 and State CEQA Statute Section 21083. The setting discussion under each resource section in this chapter is followed by a discussion of impacts and applicable mitigation measures.

This Initial Study identifies several potentially significant environmental effects related to the proposed project. Some effects are mitigated by implementation of existing provisions of law and standards of practice related to environmental protection. Such provisions are considered in the environmental impact analysis, and the degree to which they would reduce potential environmental effects is discussed. Additional mitigation measures are specifically identified, when necessary, to avoid potential environmental effects or to reduce them to a level that is less than significant.

Format of the Environmental Analysis

Each topical section of this Initial Study is organized into the following subsections:

- *Environmental Setting.* The environmental settings present the existing environmental conditions, in accordance with CEQA Guidelines Section 15125. The subsection describes the baseline conditions against which the environmental impacts associated with the proposed project are assessed.

- *Regulatory Setting.* The regulatory settings describe the laws, regulations, and policies that affect the resource or the assessment of impacts on the specific resource. Where appropriate, the regulatory setting subsection establishes the regulatory framework for the analysis of each resource.

- *Impact Analysis.* The impact analysis presents thresholds of significance used and discusses potential effects of the proposed project on the existing environmental conditions (in accordance with CEQA Guidelines sections 15126.2(a) and 15143).

- *Mitigation Measures.* Mitigation measures provide measures to reduce potentially significant effects associated with the proposed project to the extent feasible (in accordance with CEQA Guidelines sections 15002(a)(3), 15021(a)(2), and 15091(a)(l)).

- *Findings.* This subsection is presented in accordance with CEQA Guidelines Section 15091(a)(1), 15092(b)(2)A), and 15126.2(b), which require identification of impacts capable of avoidance or mitigation, as well as those that cannot be avoided.

Section I - Aesthetics

This section of the Initial Study describes the existing visual environment in and around the project area. The analysis assesses the potential for aesthetics impacts using accepted methods of evaluating visual quality, as well as identifying the type and degree of change the proposed project would likely have on the character of the surrounding area.

Environmental Setting

The project area is located in the Shasta Valley, an area dominated by background views of Mount Shasta, the peaks and ridgelines of the southern Cascade Mountain Range and the Trinity Mountains to the southwest. Views within the Shasta Valley include undeveloped forest and range lands, developed agricultural lands and residential developments.

Within the vicinity of the project the area has been highly developed for residential uses with the multitude of developments within the Lake Shastina Community Services District (District). Existing development consists of residential uses (typically single-family residences); recreational (two golf courses, Lake Shastina, boating and water sports facilities); public facilities (water and sewer developments, fire/police facilities, medical, community, etc.); and all related infrastructure normally associated with residential developments (paved roads, parks, overhead power and communications lines, etc.).

The Lake Shastina community has been under development for the past 54 years with road, underground power, water, and sewage improvements. The habitat within the project area consists of rural residential development with managed landscapes. The areas not landscaped with fescue grasses and maples are sparse shrubs consisting of rabbitbrush (*Chrysothamnus* sp.) and manzanita (*Arctostaphylos* sp.), mixed with Western juniper (*Juniperus occidentalis*) and ponderosa pine (*Pinus ponderosa*).

Scenic Resources

Scenic vistas are defined as expansive views of highly-valued landscapes from publicly accessible viewpoints. Scenic vistas include views of natural features such as topography, water courses, outcrops, and natural vegetation, as well as man-made scenic structures. County has not designated specific scenic vistas in the immediate project area as a part of the Siskiyou County General Plan (Siskiyou, 1972). Additionally, according to Caltrans' California Scenic Highway Program and the National Scenic Byways Program, the proposed project is not located near a highway which has been listed as a State or federal Scenic Highway (Caltrans, 2023; FHWA, 2018).

Regulatory Setting

This section summarizes current federal, State, and local regulations relevant to the review of *Aesthetics* for this project. Ordinances, regulations, or standards that are applicable to the environmental review of agricultural resource impacts include the following:

Siskiyou County General Plan, Scenic Highways Element

The Siskiyou County Scenic Highways Element was established to provide guidance for the development of county programs to protect and enhance the scenic values along designated scenic routes and in scenic areas visible from these routes. The following Objectives apply to the proposed project:

- Objective 2: To conserve, enhance and protect scenic views observable from scenic routes without unduly restricting the primary uses of the lands involved.

- Objective 4: To preserve for all travelers the outstanding characteristics of Siskiyou County, primarily clean air and magnificent scenery, so that it may so remain, providing incentives for tourism, and to stabilize and increase property values and the economy of Siskiyou County.

National Scenic Byways Program

The National Scenic Byways Program is part of the U.S. Department of Transportation, Federal Highway Administration (FHWA). Established in Title 23, Section 162 of the United Sates Code, the program is a grass-roots collaborative effort established to help recognize, preserve, and enhance selected roads throughout the United States. FHWA's May 18, 1995 interim policy sets forth the procedures for the designation by the U.S. Secretary of Transportation of certain roads as National Scenic Byways or All-American Roads based on their archaeological, cultural, historic, natural, recreational, and scenic qualities. There are 150 such designated byways in 46 states.

California Scenic Highway Program

California's Scenic Highway Program was created by the legislature in 1963. Its purpose is to protect and enhance the natural scenic beauty of California highways and adjacent corridors, through special conservation treatment. The State laws governing the Scenic Highway Program are found in the Streets and Highways Code, Sections 260 through 263. Caltrans has compiled a list of State highways that are designated as scenic and county highways that are eligible for designation as scenic.

Impact Analysis

The following includes an analysis of environmental parameters related to *Aesthetics* based on Appendix G of the State CEQA Guidelines. The discussion not only includes the areas for which there is potential for environmental impacts but also provides justification for the conclusions that either no impacts, less than significant impacts, or less than significant impacts with mitigation could occur.

Would the Project:		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a)	Have a substantial adverse effect on a scenic vista?			X	
b)	Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State scenic highway?				X
c)	In nonurbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? *(Public views are those that area experienced from publicly accessible vantage point).* If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?			X	
d)	Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?			X	

a) *Have a substantial adverse effect on a scenic vista?*

As noted above, the County has not designated specific scenic vistas in the immediate project area as a part of the Siskiyou County General Plan and there is no designated State or federal scenic highways or scenic highway corridors in the vicinity of the proposed project.

Implementation of the proposed project would include the construction of a new 250,000-gallon above ground water tank immediately adjacent to Tank 4 – Zen Mountain Tank. Tank 4 is a 250,000-gallon cylindrical welded-steel tank that has external dimensions of 30 feet tall by 38 feet in diameter located at the top of Zen Mountain. The closest street is Tennis Court, which also is the beginning of the access road to this tank. The base elevation of the tank is approximately 3,160 feet. The proposed new tank would be approximately the same height as the existing tank. Because the new tank would be constructed at a similar height and scale to the adjacent tank within an area already developed with municipal water infrastructure, the addition of this tank would not be visually intrusive and impacts would be less than significant. There would be temporary visual impacts due to the use of construction equipment and grading/earthwork; however, this would cease when the project is complete.

The project would not introduce new structures that would be dissimilar to nor located adjacent to nearby receptors such that development at either end of the proposed project would preclude long-distance views. Due to these factors, the project would result in a less than significant impact and would not substantially have a substantial adverse effect on a scenic vista.

b) *Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a State scenic highway?*

As described above under *the Environmental Setting*, there are no designated State or federal scenic highways or scenic highway corridors in the vicinity of the proposed project. Therefore, the implementation of the proposed project would not substantially damage any scenic resource within a State scenic highway. No impact would occur in this regard.

c) *In nonurbanized areas, substantially degrade the existing visual character or quality of public views of the site and its surroundings? (Public views are those that area experienced from publicly accessible vantage point). If the project is in an urbanized area, would the project conflict with applicable zoning and other regulations governing scenic quality?*

The proposed water system improvements would occur within an urbanized area within Lake Shastina. The project site is zoned RES-1 (Single-Family Residential) (Siskiyou, 2023). There are no specific provisions relating to scenic quality applicable to the residential zone designation. As noted above, the project site is not located within a scenic vista or State scenic highway. The proposed project involves improvements to the District’s drinking water system, including replacement components and new construction (well house buildings and one above ground water tank) to better serve community residents. In addition, the project includes upgrades to all existing water meters and fire hydrants throughout the District. Therefore, implementation of the proposed would not conflict with applicable zoning or other regulations governing scenic quality. Impacts would be less than significant in this regard.

d) *Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?*

Light pollution occurs when nighttime views of the stars and sky are diminished by an over-abundance of light coming from the ground. Light pollution is a potential impact from the operation of any light source at night. Proper light shields, lighting design, and landscaping are commonly used to reduce light pollution generated from lighting by blocking the conveyance of light upwards.

The proposed project does not include the installation of any new permanent exterior lighting with the exception of the new pump house on APN 107-450-550-000. Exterior lighting will comply with the County’s lighting standards to prevent unreasonable glare to adjoining properties and to prevent sky-reflected glare. In addition, temporary lighting, if needed during construction activities would be required to comply with County standards to prevent impacts on motor vehicles and nearby residences. Impacts would be less than significant.

Mitigation Measures

No mitigation measures are required.

Findings

Based upon the review of the information above, implementation of the proposed project will have a less than significant with respect to *Aesthetics*.

Documentation and References

Caltrans (California Department of Transportation). 2023. *California State Scenic Highway System Map*. [Online]: https://caltrans.maps.arcgis.com/apps/webappviewer/index.html?id=465dfd3d807c46cc8e8057116f1aacaa Accessed December 8, 2023.

FHWA (Federal Highways Administration). 2018. *National Scenic Byways Program*. 2018. [Online]: https://www.fhwa.dot.gov/byways/states/CA. Accessed December 8, 2023.

National Wild and Scenic Rivers System. 2018. [Online]: https://www.rivers.gov/california.php. Accessed December 8, 2023.

SHN (SHN Consulting Engineers and Geologists). 2023. *Preliminary Engineering Report for Drinking Water System Improvements*. December 2023.

Siskiyou (Siskiyou County). 1972. *Siskiyou County General Plan*. 1972, as amended.

Siskiyou. 2023. *Siskiyou County Geographic Information System*. [Online]: https://www.co.siskiyou.ca.us/gis. Accessed December 8, 2023.

Section II – Agricultural Resources

The purpose of this section of the Initial Study is to determine the extent to which the project contributes to the physical deterioration of agricultural resources. This section describes the agricultural resources within the project study area, and the applicable regulations that govern those resources.

Environmental Setting

The Department of Conservation (DOC) Farmland Mapping and Monitoring Program (FMMP) maps and classifies farmland. Classifications are based on a combination of physical and chemical characteristics of the soil and climate that determine the degree of suitability of the land for crop production. The project site does not contain designated farmland. The site is not located within an area of Prime Farmland as identified by the California Department of Conservation's Important Farmland Series Mapping and Monitoring Program (DOC, 2023).

The top three soils within the project area consist of Delaney sand, Delaney gravelly sand, and Mary-Rock outcrop complex. Delaney sand, which occurs on 0 to 9 percent slopes and is somewhat excessively drained, Delaney gravelly sand occurs on 0 to 9 percent slopes and is somewhat excessively drained, and Mary-Rock outcrop complex which occurs on 2 to 50 percent slopes are well drained. The 18 different soil types within the study area range from very poorly drained (Gazelle silt loam) to excessively drained (rock outcrop and Lithic Haploxerolls-Rock outcrop complex). (NRCS, 2023).

The California Land Conservation Act of 1965, commonly known as the Williamson Act, allows local governments to form contracts with private landowners to restrict specific parcels of land to agricultural or open space use. The area involving the proposed project is not under an active Williamson Act contract. Additionally, no timberlands or forest land are present within the project site.

Regulatory Setting

This section summarizes current federal, State, and local regulations relevant to the review of *Agricultural Resources* for this project. Ordinances, regulations, or standards that are applicable to the environmental review of agricultural resource impacts include the following:

California Farmland Mapping and Monitoring Program

The California Farmland Mapping and Monitoring Program (FMMP), which monitors the conversion of the State's farmland to and from agricultural use, relies on information from the NRCS soils surveys, NRCS land inventory and monitoring criteria, and land use and water availability. Topography, climate, soil quality, and available irrigation water all factor into the FMMP farmland classifications. The FMMP was established by the California DOC, under the Division of Land Resource Protection. Important Farmland Maps are compiled by the FMMP pursuant to Section 65570 of the California Government Code. The FMMP is an informational service only and does not constitute State regulation of local land use decisions. Under the FMMP, "Important Farmland Categories" were established based on soils characteristics that have significant agricultural production values.

California Land Conservation Act

The California Land Conservation Act of 1965, commonly referred to as the Williamson Act, is promulgated in California Government Code Section 51200-51297.4. The Williamson Act enables local governments to enter into contracts with private landowners for the purpose of restricting specific parcels of land to agricultural or related open space uses in return for reduced property tax assessments. Private land within locally designated agricultural preserve areas is eligible for enrollment under Williamson Act contracts.

Farmland Security Zone Contract

The DOC passed the Farmland Security Zone legislation (Govt. Code Section 51296) in 1998. The Farmland Security Zone allows counties to establish an additional program for farmlands to enter into contracts with the State. This legislation allows landowners whose land is under a Williamson Act contract to petition to the county board of supervisors to annul the Williamson Act contract for a Farmland Security Zone Contract. A Farmland Security Zone Contract is a 20-year contract that allows the property owner to receive 35 percent more in tax savings than a Williamson Act contract. Both of these contracts require that lands be within an established Agricultural Preserve. Agricultural lands that are not in a preserve face the greatest threat of conversion, as they are assessed higher property taxes due to their proximity to urbanization.

Forest Land and Timberland

Public Resources Code Section 12220(g) defines Forest Land as *"land that can support 10% native tree cover of any species, including hardwoods, under natural conditions, and that allows for management of one or more forest resources, including timber, aesthetics, fish and wildlife, biodiversity, water quality, recreation, and other public benefits."* Public Resources Code Section 4526 defines timberland as *"land, other than land owned by the federal government, which is available for, and capable of, growing a crop of trees of any commercial species used to produce lumber and other forest products, including Christmas trees."* Government Code Section 51104(g) defines Timberland Production Zone (TPZ) as *"an area which has been zoned pursuant to [Government Code] Section 51112 or 51113 and is devoted to and used for growing and harvesting timber, or for growing and harvesting timber and compatible uses, as defined in subdivision (h)."*

Impact Analysis

The following includes an analysis of environmental parameters related to *Agricultural Resources* based on Appendix G of the State CEQA Guidelines. The discussion not only includes the areas for which there is potential for environmental impacts but also provides justification for the conclusions that either no impacts, less than significant impacts, or less than significant impacts with mitigation could occur.

Would the Project:		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a)	Convert Prime Farmland, Unique Farmland, or 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?				X
b)	Conflict with existing zoning for agricultural use, or a Williamson Act Contract?				X
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 5110(g))?				X
d)	Result in the loss of forest land or conversion of forest land to non-forest use?				X
e)	Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest land?				X

a) *Convert Prime Farmland, Unique Farmland, or 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?*

The project site has not been historically used for agricultural purposes, nor does it possess soils that are prime for agricultural production. The site is not located within an area of Prime Farmland as identified by the California Department of Conservation's Important Farmland Series Mapping and Monitoring Program (DOC, 2023). Therefore, construction activities would not convert prime farmland, unique farmland, or farmland of statewide importance to nonagricultural use. No impact would occur in this regard.

b) *Conflict with existing zoning for agricultural use, or a Williamson Act Contract?*

The proposed project nor its surrounding lands are currently under a Williamson Act contract. In addition, the proposed project site is not under a Farmland Security Zone contract or within an agricultural preserve. Therefore, construction activities would not result in conflicts with existing agricultural zoning. No impact would occur in this regard.

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 5110(g))?*

The proposed project would not 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)). The project site is not forest land, timberland, or zone Timberland Production. Therefore, construction activities would not conflict with existing zoning or cause rezoning and would have no impact on timberlands zoned as Timber Production. No impact would occur in this regard.

d) *Result in the loss of forest land or conversion of forest land to non-forest use?*

The proposed project is not located within existing forest land. Therefore, construction activities would not result in the loss of forest land or conversion of forest land to non-forest use. No impact would occur in this regard.

e) *Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland to non-agricultural use or conversion of forest land to non-forest land?*

The proposed project would not result in the loss of forest land or conversion of forest land to non-forest use, as the project site is not located on forest land. In addition, construction activities would not occur in an area of significant agricultural soils. No impact would occur in this regard.

Mitigation Measures

No mitigation measures are required.

Findings

In the course of the above evaluation, impacts associated with *Agricultural Resources* were found to not be significant because of the inability of a project of this scope to create such impacts or the absence of project characteristics producing effects of this type.

Documentation and References

DOC (California Department of Conservation). 2023. *Farmland Mapping and Monitoring Program*. [Online]: https://maps.conservation.ca.gov/DLRP/CIFF/. Accessed December 8, 2023.

DOC. 2018. *Farmland of Local Importance*. [Online]: https://www.conservation.ca.gov/dlrp/fmmp/Documents/Farmland_of_Local_Importance_2018.pdf. Accessed December 8, 2023.

NRCS (Natural Resources Conservation Service). 2023. *Web Soil Survey-Soil Map*. [Online]: https://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx Accessed December 8, 2023.

III. Air Quality

This section examines the air quality in the project area, includes a summary of applicable air quality regulations, and analyzes potential air quality impacts associated with the proposed project. Air quality impacts were assessed in accordance with methodologies recommended by the US Environmental Protection Agency (EPA), California Air Resources Board (CARB), and the Siskiyou County Air Pollution Control District (SCAPCD). Where quantification was required, emissions were modeled using the California Emissions Estimator Model (CalEEMod).

Environmental Setting

The proposed project is located within the County of Siskiyou within the Northeast Plateau Air Basin (NEPAB). The NEPAB consists of a total of three counties: Siskiyou, Modoc and Lassen. This air basin is generally situated in the northeastern portion of California bordering Oregon to the north and Nevada to the east. The southern border is bound by the North Coast, Lake Tahoe, and the Sacramento Valley Air Basins. Air flows into the NEPAB from the north. The surrounding mountains act as a barrier to airflow, which traps air pollutants when meteorological conditions are unfavorable for transport and dilution. Poor air movement most frequently occurs in the fall and winter due to the presence of high-pressure cells over the NEPAB. During these periods, surface winds are typically lacking, and reduced vertical flow, caused by decreased surface heating, restricts air influx and concentrates pollutants under stable meteorological conditions. The highest surface concentrations of air pollutants coincide with agricultural burning activities, wildfire, or temperature inversions, which create a ceiling effect, trapping pollutants near the ground and hindering dispersion.

The local air quality agency affecting the project site is the Siskiyou County Air Pollution Control District (SCAPCD). Within the SCAPCD, the primary sources of air pollution are burning stoves, wildfires, farming operations, unpaved road dust, managed burning and disposal, and motor vehicles. The U.S. Environmental Protection Agency (EPA) has designated Siskiyou County as an unclassified/attainment area for the 8-hour ozone, carbon monoxide (CO), particulate matter (PM10), and fine particulate matter (PM2.5) under both state and federal air quality standards (CARB, 2022). Additionally, Siskiyou County meets the attainment area criteria for the state 1-hour ozone standard, as well as for PM2.5, PM10, nitrogen dioxide, sulfur dioxide, sulfates, and lead. However, the county remains unclassified for carbon monoxide, hydrogen sulfide, and visibility-reducing particles under CARB standards (CARB, 2022).

Sensitive receptors (for example, children, senior citizens, and acutely or chronically ill people) are more susceptible to the effect of air pollution than the general population. Land uses that are considered sensitive receptors typically include residences, schools, parks, childcare centers, hospitals, and retirement homes. Sensitive receptors near the project site include existing residents that would be within approximately 100 feet of construction activities.

Regulatory Setting

This section summarizes current federal, State, and local regulations relevant to the review of *Air Quality* for this project. Ordinances, regulations, or standards that are applicable to the environmental review of air quality impacts include the following:

Ambient Air Quality Standards

The federal Clean Air Act of 1971 and the Clean Air Act Amendments (1977) established the national ambient air quality standards (NAAQS), which are promulgated by the U.S. Environmental Protection Agency (EPA). The State of California has also adopted its own California ambient air quality standards (CAAQS), which are promulgated by CARB. Implementation of the project would occur in the Siskiyou County portion of the NEPAB, which is under the air quality regulatory jurisdiction of the SCAPCD and is subject to the rules and regulations adopted by the air district to achieve the NAAQS and CAAQS.

Siskiyou County Air Pollution Control District

The SCAPCD, along with other air districts in the NEPAB, has the responsibility of enforcing federal and state air quality regulations in Siskiyou County. It also issues rules and regulations setting specific standards of operation, defining permit requirements, and setting emission limits. For new or modified stationary sources, Siskiyou County has defined 250 pounds (lbs)/day as the threshold of significance for NOx, PM2.5, PM10, and SO2 emissions, and 2,500 lbs/day as the threshold of significance for CO emissions (Rule 6.1) (CARB, 2001).

All projects in Siskiyou County are subject to applicable SCAPCD rules and regulations in effect at the time of construction and operation. Additionally, Siskiyou County is currently designated in attainment or unclassified status for all federal and state criteria pollutants; therefore, the County is not required to have a local air quality attainment plan. Descriptions of specific rules applicable to the proposed project may include, but are not limited to (CARB, 2001):

- SCAPCD Rule 4.1 and Rule 4.2. Visible Emissions and Nuisance: Rule 4.1 requires that airborne particles that are designated as No. 2 on the Ringelmann chart, as published by the United States Bureau of Mines remain on the site, they originate from under normal wind conditions. Proper mitigation techniques approved by SCAPCD must be implemented to ensure that fugitive dust is contained. This does not apply to dust emissions discharged through a stack or other point source. Rule 4.2 states that any air discharge that may cause injury or detriment, nuisance or annoyance, or damage to any public property or considerable number of people shall be regulated. This rule discusses all the health and safety issues that may interfere with public and private areas surrounding the site.

- SCAPCD Rule 4.13. National Standards for Hazardous Air Pollutants. Rule 4.13 requires compliance with provisions of Part 61, Chapter I, Title 40 of the Code of Federal Regulations (40 CFR Part 61) for stationary sources of air pollution, such as National Emission Standards for Asbestos.

- SCAPCD Rule 6.1. Construction Permit Standards for Criteria Pollutants: Rule 6.1 requires a permit for any new stationary source or modification with a net increase of 2,500 or more pounds of CO or 250 pounds or more for all other criteria pollutants and implement best available control technology.

- SCAPCD Rule 6.4. Construction Permit Standards for Hazardous Air Pollutants: Rule 6.4 requires the installation of best available control technology for toxics at any constructed or reconstructed major source of hazardous air pollutants.

- SCAPCD Rule 8.7. Asbestos Airborne Toxic Control Measure. Rule 8.7 provides a Naturally Occurring Asbestos (NOA) Dust Mitigation Plan Application (Title 17, §93105 of the California Code of Regulations) for projects that include construction where ultramafic rock exists.

Impact Analysis

The significance of potential impacts was determined based on State CEQA Guidelines, Appendix G, and the Siskiyou County Air Pollution Control District's (SCAPCD's). The discussion not only includes the areas for which there is potential for environmental impacts but also provides justification for the conclusions that either no impacts, less than significant impacts, or less than significant impacts with mitigation could occur. This section analyzes the short-term air quality impacts associated with construction activities as well as the long-term operational impacts that may result due to development of the proposed project.

The air quality analysis includes a review of criteria pollutant[1] emissions such as carbon monoxide (CO)[2], nitrogen oxides NO_x)[3], volatile organic compounds (VOC) as reactive organic gases (ROG)[4], particulate matter less than 10 micrometers (coarse or PM_{10}), and particulate matter less than 2.5 micrometers (fine or $PM_{2.5}$).[5] For the purposes of assessing air quality impacts in CEQA documents, SCAPCD Rule 6.1 – Construction Permit Standards for Criteria Pollutants, which contains thresholds for operational emissions from new stationary sources, is commonly used as a significance threshold for project-level review for land use projects. Although these stationary source emissions thresholds do not directly apply to land use projects, they provide a reference point for levels of emissions that would trigger SCAPCD requirements for best available control technology and/or mitigation off-sets. Per Rule 6.1, criteria air pollutants from the operation of stationary sources are considered significant if they exceed the following thresholds listed in Table 4-1, SCAPCD SIGNIFICANCE THRESHOLDS (SCAPCD, 2001).

Table 4-1
SCAPCD SIGNIFICANCE THRESHOLDS

Pollutant	Significance Thresholds[1] (pounds per day)
Reactive Organic Compounds	250
Nitrogen Oxides	250
Carbon Monoxide	2500
Sulfur Oxides	250
Particulate Matter (PM10)	250
[1.]SCAPCD, 2001.	

In using SCAPCD Rule 6.1 as a threshold in this document, the District is exercising its discretion to formulate CEQA significance criteria based in part on the SCAPCD rules, as they reflect the best available expert judgment regarding what constitutes significant levels of air pollution within the NEPAB and Siskiyou County.

The CEQA Checklist question, discussion, and environmental significance conclusions are provided below under each individual environmental parameter related to *Air Quality*.

Would the Project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Conflict with or obstruct implementation of the applicable air quality plan?			X	
b) 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.			X	
c) Expose sensitive receptors to substantial pollutant concentrations?		X		

[1] Criteria air pollutants refer to those air pollutants for which the USEPA and CARB has established National Ambient Air Quality Standards (NAAQS) and California Ambient Air Quality Standards (CAAQS) under the Federal Clean Air Act (CAA).

[2] CO is a non–reactive pollutant that is a product of incomplete combustion of organic material, and is mostly associated with motor vehicle traffic, and in wintertime, with wood–burning stoves and fireplaces.

[3] When combustion temperatures are extremely high, as in aircraft, truck and automobile engines, atmospheric nitrogen combines with oxygen to form various oxides of nitrogen (NOx). Nitric oxide (NO) and NO_2 are the most significant air pollutants generally referred to as NOx. Nitric oxide is a colorless and odorless gas that is relatively harmless to humans, quickly converts to NO_2 and can be measured. Nitrogen dioxide has been found to be a lung irritant capable of producing pulmonary edema.

[4] VOC means any compound of carbon, excluding carbon monoxide, carbon dioxide, carbonic acid, metallic carbides or carbonates, and ammonium carbonate, which participates in atmospheric photochemical reactions and thus, a precursor of ozone formation. ROG are any reactive compounds of carbon, excluding methane, CO, CO_2 carbonic acid, metallic carbides or carbonates, ammonium carbonate, and other exempt compounds. The terms VOC and ROG are often used interchangeably.

[5] PM10 and PM2.5 consists of airborne particles that measure 10 microns or less in diameter and 2.5 microns or less in diameter, respectively. PM10 and PM2.5 represent fractions of particulate matter that can be inhaled into the air passages and the lungs, causing adverse health effects.

Would the Project:	Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
d) Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?			X	

a) *Conflict with or obstruct implementation of the applicable air quality plan?*

The proposed project would not conflict with or obstruct implementation of an air quality plan. Siskiyou County is currently designated in attainment or unclassified status for all federal and state criteria pollutants; therefore, the County is not required to have a local air quality attainment plan.

As described throughout this document, implementation of the proposed project would occur over a period of approximately 4 years (SHN, 2023) and would include improvements, including but not limited to, the construction of a new water tank, booster pump station improvements, and the replacement of up to 320 fire hydrants. The project must comply with various regulatory measures including SCAPCD Rule 4.1 and Rule 4.2., which requires the implementation of best management practices during construction activity to control pollutants including fugitive dust (SCAPCD, 2001). Once construction activities are complete there is limited potential for the project to generate operational air quality impacts. Operational emissions are anticipated to result from maintenance activities by District personnel. Due to the duration of project construction activities, project design elements, limited operational activities, and required regulatory measures, the project would not exceed SCAPCD significant thresholds (see Section III.b) or conflict with or obstruct implementation of an applicable air quality plan. Impacts are considered less than significant in this regard.

b) *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.*

As discussed in the *Environmental Setting*, the project is located in Siskiyou County, which is located in the NEPAB and is subject to the jurisdiction of the SCAPCD. The SCAPCD's primary responsibility is to achieve and maintain federal and State air quality standards, subject to the powers and duties of the CARB. Siskiyou County is currently designated in attainment or unclassified status for all federal and state criteria pollutants.

The proposed project has the potential to generate the emissions of criteria air pollutants and ozone precursors (Reactive Organic Gases [ROG] and Oxides of Nitrogen [NO_x]) during the proposed construction activities. During construction activities, emissions would primarily be generated from fugitive dust from ground-disturbing activities and vehicle/equipment exhaust. Once construction activities are complete there is limited potential for the project to generate operational air quality impacts. Operational emissions are anticipated to result from maintenance activities by District personnel.

Construction and operation emissions for the proposed project were estimated using the California Emissions Estimator Model (CalEEMod), which is a statewide land use emissions computer model designed to provide a uniform platform for government agencies to quantify potential criteria pollutant emissions associated with both construction and operation of a variety of land use projects (CAPCOA, 2022). The model applies inherent default values for various land uses, including trip generation rates based on the Institute of Transportation Engineers (ITE) Manual, vehicle mix, trip length, average speed, etc. However, where project-specific data is available, such data should be input into the model. Project-specific information from Section 2.0, PROJECT DESCRIPTION, where available, was input into the model. Otherwise, where project-specific information was not available, the model default values were used for estimating emissions from the proposed project.

Table 4-2 and Table 4-3 below provide the maximum daily construction and operations emissions estimates (unmitigated) as compared to the significance thresholds for criteria pollutants and ozone precursors in SCAPCD Rule 6.1.

Table 4-2
MAXIMUM DAILY CONSTRUCTION EMISSIONS (UNMITIGATED)

Criteria Pollutants	Emissions (pounds per day)					
	ROG	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
Maximum Daily Emissions[1]	65.5	68	24.7	0.3	19.5	7.6
Significance Threshold[2]	250	250	2500	250	250	250
Exceeds Significance Threshold?	No	No	No	No	No	No

1. CAPCOA, 2022.
2. SCACPD, 2001.

Table 4-3
MAXIMUM DAILY OPERATIONAL EMISSIONS (UNMITIGATED)

Criteria Pollutants	Emissions (pounds per day)					
	ROG	NO_x	CO	SO_x	PM_{10}	$PM_{2.5}$
Maximum Daily Emissions[1]	0.40	0.26	1.5	<0.005	0.2	0.0.06
Significance Threshold[2]	250	250	2500	250	250	250
Exceeds Significance Threshold?	No	No	No	No	No	No

3. CAPCOA, 2022.
4. SCACPD, 2001.

As indicated in Table 4-2 and Table 4-3, the maximum daily construction and operation emissions (unmitigated) from the proposed project would be below the SCAPCD Rule 6.1 significance thresholds. Additionally, as noted above, Siskiyou County is currently designated in attainment or unclassified status for all federal and state criteria pollutants. As such, the proposed project is not anticipated to result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment. Impacts are considered less than significant in this regard.

c) *Expose sensitive receptors to substantial pollutant concentrations?*

High concentrations of criteria air pollutants and toxic air contaminants can result in adverse health effects to humans. Sensitive receptors (for example, children, senior citizens, and acutely or chronically ill people) are more susceptible to the effect of air pollution than the general population. Land uses that are considered sensitive receptors typically include residences, schools, parks, childcare centers, hospitals, and retirement homes. Sensitive receptors near the project site include existing residents that would be within approximately 100 feet of construction activities.

Construction Activities

This discussion addresses whether the proposed construction activities would expose sensitive receptors to substantial concentrations of asbestos and lead, fugitive dust (PM_{10} and $PM_{2.5}$), and diesel particulate matter (diesel PM).

Asbestos and Lead

Asbestos particles and fibers are naturally occurring in some rock and soil formations, but because of its strength and heat resistance, asbestos has been used in a variety of building materials. If asbestos-containing materials (ACM) are disturbed, for example during demolition of a structure, asbestos particles and fibers may be released into the air. The USGS has published mapping identifying areas that are known to contain naturally occurring asbestos (NOA) (USGS, 2011). The mapping shows several locations within Siskiyou County known to contain NOA. The project site is located at Lake Shastina, situated north of the City of Weed, and is not identified as being in close proximity to NOA-containing areas. As such, the project site is not known to contain NOA that could be released during the proposed construction activities.

Asbestos and lead paint may be present in the existing well houses or existing piping that may need to be removed or modified. Prior to initiation of construction activities that would affect existing structures and associated piping, a comprehensive survey shall be completed in locations where asbestos and lead-based paint are suspected. Removal or disturbance of material with any detectable amount of asbestos or lead-based paint must be handled in accordance with USEPA AHERA, USEPA NESHAP, and Cal/OSHA regulations. All hazardous materials shall be removed by trained and authorized personnel and disposed of at a licensed facility in compliance with local, State, and federal regulations and guidelines.

For the removal or disturbance of asbestos containing materials, these regulations require the following procedures:

- Survey by a California State Certified Asbestos Consultant (CAC) of the areas proposed for disturbance for asbestos-containing material.
- Documentation of the asbestos survey results in a signed report from the CAC.
- Notification to the SCAPCD at least 10 working days prior to any demolition.
- Employing the use of proper work practices outlined in the NESHAP asbestos regulations.
- Complying with Cal/OSHA worker safety requirements.

All asbestos-containing materials to be removed by demolition activities must be done by a registered asbestos abatement contractor, as an asbestos abatement project. The construction contractor must maintain all records of compliance with the NESHAP asbestos regulations and SCAPCD rules including, but not limited to, the following: 1) evidence of notification to the SCAPCD; 2) contact information for the asbestos abatement contractor and asbestos consultant; and 3) receipts (or other evidence) of offsite disposal of all asbestos-containing materials. These records shall be made available to the District and SCAPCD upon request.

Lead-based paint abatement or removal would include removal of any lead hazard, which, according to Title 17 of the California Code of Regulations, includes deteriorated lead-based paint and lead-contaminated soil (soil contaminated with lead paint chips). The California Occupational Safety and Health Administration (OSHA) lead standard for construction activities is implemented under Title 8 of the California Code of Regulations. The standard applies to any construction or demolition activity that may release lead dust or fumes, including manual scraping, manual sanding, heat gun applications, power tool cleaning, rivet busting, abrasive blasting, welding, cutting, or torch burning of lead-based coatings.

Mitigation Measure HAZ-1 requires the completion of lead and asbestos surveys prior to the initiation of construction activities and the removal and disposal of asbestos and lead containing materials in compliance with applicable regulations. Mitigation Measure HAZ-2 requires construction activities to cease and additional surveys to be completed in the event that previously undetected asbestos or lead-containing materials are discovered during construction. Any identified hazardous materials shall be disposed of in accordance with applicable hazardous waste regulations. The implementation of Mitigation Measures HAZ-1 and HAZ-2 would reduce potential impacts of the project to less than significant levels.

Fugitive Dust

Fugitive dust has the potential to be generated during the proposed construction activities. As discussed in the analysis under impact discussion III.b above, the proposed project would not exceed the SCAPCD significance thresholds for particulate matter (for example, PM_{10}). However, fugitive dust from construction activity can still result in nuisances and localized health impacts. Fugitive dust emissions would vary from day to day, depending on the nature and magnitude of construction activity and local weather conditions. Fugitive dust emissions would also depend on soil moisture, silt content of soil, wind speed, and the amount of equipment operating.

To minimize impacts from fugitive dust generation during the proposed construction activities, the contractor will be required to comply with SCAPCD Rule 4.2. Rule 4.2 states that any air discharge that may cause injury or detriment, nuisance or annoyance, or damage to any public property or considerable number of people shall be regulated. To reduce fugitive dust generation during the proposed construction activity, compliance with Rule 4.2 along with Fugitive Dust Control Measures has been included as Mitigation Measure AQ-1 for the proposed project. Due to the temporary nature of the proposed construction activities and the incorporation of Mitigation Measure AQ-1, implementation of the proposed project would not expose sensitive receptors to substantial fugitive dust concentrations. Impacts are considered less than significant in this regard.

Diesel Particulate Matter (diesel PM)

The use of diesel-powered equipment during the proposed construction activities would generate diesel particulate matter (diesel PM), which is a known carcinogen. Due to the limited scale and duration of construction activities, and the rapid dissipation of diesel PM with distance, it is not anticipated that nearby sensitive receptors would be exposed to substantial diesel PM concentrations. Based on the emissions modeling conducted for the project, maximum daily emissions of diesel PM (modeled by $PM_{2.5}$, which is conservatively considered a surrogate for diesel PM), would not exceed 8 pounds per day (CAPCOA, 2022). This is well below the SCAPCD significance threshold of 250 pounds per day for particulate matter (SCAPCD, 2001).

The proposed construction activities would occur in multiple phases and nearby sensitive receptors (residents) located within the vicinity of the project site would be exposed to construction contaminants only for the duration of construction activity. This brief exposure period would substantially limit exposure to hazardous emissions. Therefore, it is not anticipated that the proposed project's construction activity would expose sensitive receptors to substantial diesel PM concentrations.

Operational Activities

Operational air quality impacts may include emissions from project-generated traffic and project operations, including, but not limited to, maintenance trips. The predicted maximum daily emissions associated with the project operations compared to SCAPCD thresholds are summarized in Table 4-3. The proposed operational emissions would not exceed the SCAPCD thresholds, and therefore operational impacts would be less than significant.

Conclusion

The construction and operational activities proposed by the project, as mitigated and in compliance with regulatory requirements, would not expose sensitive receptors to substantial pollutant concentrations. Therefore, implementation of the proposed project would result in a less than significant impact with mitigation incorporated.

d) *Result in other emissions (such as those leading to odors) adversely affecting a substantial number of people?*

The potential for the project to generate emissions of criteria air pollutants and TACs is addressed under impact discussions III.a – lll.c above. Some of the emissions that would be generated during the proposed construction activity also have the potential to generate odors. The discussion below analyzes whether the potential odors from the proposed project would adversely affect a substantial number of people.

Construction Activities

Due to the subjective nature of odor impacts, the number of variables that can influence the potential for an odor impact, and the variety of odor sources, there are no quantitative or formulaic methodologies to determine the presence of a significant odor impact. Rather, air districts often recommend that odor analyses strive to fully disclose all pertinent information. The intensity of an odor source's operations and its proximity to sensitive receptors influences the potential significance of odor emissions.

During the proposed construction activity, there is the potential for the generation of objectionable odors in the form of equipment/vehicle exhaust and hot asphalt in the immediate vicinity of the proposed activity. Based on the duration of the proposed construction activity and the rapid dispersal of these emissions with distance, it is not anticipated the potential odors would adversely affect a substantial number of people. Impacts would be less than significant in this regard.

Mitigation Measures

The following mitigation measures have been developed to reduce potential impacts related to *Air Quality* to less than significant levels:

Mitigation Measure AQ-1

The construction and demolition contractor shall be responsible for implementing Rule 4.2 and Fugitive Dust Control Measures to reduce the potential generation of fugitive dust during the proposed construction activities. Compliance with these requirements shall be required to minimize dust generation during construction activity.

- All active construction areas (for example, parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered a minimum of two times per day during the dry season;
- Hydroseed or apply non-toxic soil stabilizers to inactive construction areas;
- Dust-generating activities shall be limited during periods of high winds (over 15 mph);
- Suspend excavation and grading activity when winds exceed 25 mph;
- All haul trucks transporting soil, sand, or other loose material, likely to give rise to airborne dust, shall be covered;
- All vehicle speeds shall be limited to 15 miles per hour within the construction area;
- Promptly remove earth or other tracked out material from paved streets onto which earth, or other material has been transported by trucking or earth-moving equipment; and
- Conduct digging, backfilling, and paving of utility trenches in such a manner as to minimize the creation of airborne dust.

Findings

Based upon the review of the information above, with implementation of mitigation measures the proposed project will have a less than significant impact with respect to *Air Quality*.

Documentation and References

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Siskiyou (Siskiyou County). 1972. *Siskiyou County General Plan*. 1972, as amended.

USGS (U.S. Geological Survey). 2011. *Reported Historic Asbestos Mines, Historic Asbestos Prospects, and Other Natural Occurrences of Asbestos in California*. [Online]: https://pubs.er.usgs.gov/publication/ofr20111188. Accessed July 05, 2023.

IV. Biological Resources

The purpose of this section of the Initial Study is to determine the extent to which the project contributes to the physical deterioration of biological resources. This section describes the biological resources within the project study area, and the applicable regulations that govern those resources.

Environmental Setting

The study area is situated between approximately 2,680 and 3,230 feet above the mean sea level, with the highest elevations represented at the most southeastern corner of the study area where Jackson Ranch Road and A29/Big Springs Road meet. The residential areas that surround half of Lake Shastina was created because of the construction of the Dwinnell Dam with Shasta River flowing north from the north tip of the lake. The residential area within the study area has been under development for the past 54 years with road, underground power, water, and sewage improvements brought to the area to house around 2,400 residents. The habitat within the project area consists of rural residential development with managed landscapes. The areas not landscaped with fescue grasses and maples are sparse shrubs consisting of rabbitbrush (*Chrysothamnus* sp.) and manzanita (*Arctostaphylos* sp.), mixed with Western juniper (*Juniperus occidentalis*) and ponderosa pine (*Pinus ponderosa*).

Regulatory Setting

This section summarizes current federal, State, and local regulations relevant to the review of *Biological Resources* for this project. Regulations that are applicable to the environmental review of biological resource impacts include the following:

Wetlands and Waters

The United States Army Corps of Engineers (USACE) has primary federal responsibility for administering regulations that concern waters of the U.S. (including wetlands). Section 404 of the Clean Water Act (CWA), regulates the discharge of dredged or fill material into waters of the U.S. The USACE requires that a permit be obtained prior to the placement of structures within, over, or under navigable waters and/or discharges dredged or fill material into waters below the ordinary high-water mark (OHWM). The USACE has established a series of nationwide permits (NWP) that authorize certain activities in waters of the U.S. Under CWA Section 401, a project requiring a USACE Section 404 permit is also required to obtain a State Water Quality Certification (or waiver) to ensure that the project will not violate established State water quality standards. The RWQCB regulates waters of the State and has a policy of no-net-loss of wetlands. The Regional Water Quality Control Board (RWQCB) typically requires mitigation for all impacts to wetlands before it will issue a water quality certification.

Federal Endangered Species Act

The U.S. Fish and Wildlife Service (USFWS) and the National Marine Fisheries Service (NMFS) implement the federal Endangered Species Act (FESA) of 1973. Under FESA, threatened and endangered species on the federal list and their habitats are protected from “take” unless a Section 10 Permit is granted to an individual or a Section 7 consultation and a Biological Opinion with incidental take provisions are rendered from the lead federal agency. Under FESA, habitat loss is considered to be an impact to the species. Under Section 7 of the FESA, all federal agencies (including the USFWS and NMFS) are required to ensure that any action they authorize, fund, or carry out will not likely jeopardize the continued existence of federally listed species or result in the destruction or adverse modification of critical habitat.

Federal Migratory Bird Treaty Act

Most bird species, (especially those that are breeding, migrating, or of limited distribution) are protected under federal and/or State regulations. Under the Migratory Bird Treaty Act (MBTA) of 1918, migratory bird species, their nests, and their eggs are protected from injury or death, and any project-related disturbances during the nesting period.

Federal Magnuson-Stevens Fishery Conservation and Management Act

The Magnuson-Stevens Fishery Conservation and Management Act, also known as the Sustainable Fisheries Act (Public Law 104-297), requires that all federal agencies consult with NMFS on projects authorized, funded, or undertaken by that agency that may adversely affect Essential Fish Habitat of commercially managed marine and anadromous fish species.

Federal Bald and Golden Eagle Protection Act

This Act provides for the protection of the bald eagle and the golden eagle by prohibiting, except under certain specified conditions, the taking, possession, and commerce of such birds and their occupied and unoccupied nests.

California Fish and Game Code §1600-1616 (Streambed Alteration)

California Fish and Game Code §1600 *et seq.*, requires that a project proponent notify the California Department of Fish and Wildlife (CDFW) prior to any work that would divert or obstruct the natural flow of any river, stream, or lake; change the bed, channel, or bank of any river, stream, or lake; use material from any river, stream, or lake; and/or deposit or dispose of material into any river, stream, or lake. The project proponent and the CDFW must enter into a Streambed Alteration Agreement (SAA) prior to an action that would result in such an impact. The SAA will include conditions that minimize/avoid potentially significant adverse impacts to riparian habitat and waters of the state.

California Fish and Game Code §3503 and 3503.5 (Nesting Bird Protections)

These sections of the Code provide regulatory protection to resident and migratory birds and all birds of prey within the State and make it unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by the Code.

California Endangered Species Act

The California Endangered Species Act (CESA) prohibits the take of State-listed threatened and endangered species. Under CESA, state agencies are required to consult with the CDFW when preparing CEQA documents. The CDFW can authorize take if an incidental take permit is issued by the Secretary of the Interior in compliance with the FESA, or if the director of the CDFW issues a permit under §2080 in those cases where it is demonstrated that the impacts are minimized and mitigated.

California Native Plant Protection Act

The California Native Plant Protection Act (NPPA) (California Fish and Game Code §1900 – 1913) includes measures to preserve, protect, and enhance rare and endangered native plants. The list of native plants afforded protection pursuant to the Native Plant Protection Act includes those listed as rare and endangered under the CESA. The NPPA states that no person will take, possess, sell, or import into the State any rare or endangered native plant, except in compliance with provisions of the act.

Impact Analysis

The following includes an analysis of environmental parameters related to *Biological Resources* based on Appendix G of the State CEQA Guidelines. The discussion not only includes the areas for which there is potential for environmental impacts but also provides justification for the conclusions that either no impacts, less than significant impacts, or less than significant impacts with mitigation could occur.

Would the Project:		Potentially Significant Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a)	Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special-status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?		X		
b)	Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local of regional plans, policies, regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?		X		
c)	Have a substantial adverse effect on State or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?				X
d)	Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?		X		
e)	Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?				X
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?				X

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*?

An evaluation was conducted for the presence or absence of potential habitat for special-status plant and animal species. CNDDB RareFind, BIOS, and CNPS searches were completed for the 7.5-minute USGS Lake Shastina quadrangle and all adjacent quadrangles. The databases were queried for historical and existing occurrences of listed species or species proposed for listing. In addition, a list of all federally-listed species that are known to occur or may occur in the vicinity was obtained from the USFWS' IPaC. The critical habitat mapper was reviewed, however no critical habitat was mapped within or adjacent to the study area.

Special-Status Plant Species

Based on review for the special-status botanical species, 42 special-status botanical species have been reported from the region consisting of the Lake Shastina quadrangle and the surrounding quadrangles. Of the special-status botanical species reported for the region, 30 botanical species are considered to have low or no potential to occur within the study area. Twelve (12) species have a moderate to high potential of occurring within the study area. Species with a moderate or high potential of occurrence within the study area are described below.

- Woolly balsamroot (*Balsamorhiza lanata*) is a perennial herb in the Asteraceae family. It is neither state nor federally listed but has a CRPR of 1B.2 and a heritage rank of G3/S3. Its elevation range is reported from 2,624 to 3,444 feet above sea level. Within its range in northern California, its blooming period is reported as April to June. This species is reported in cismontane woodland and is typically found in rocky and volcanic areas. There are 34 occurrences that have been observed and reported within the nine-quad search, with the most recent occurrence within the Weed quad in 2003. This recorded occurrence was less than a mile from the study area situated southwest of Jackson Ranch Road.

- Greene's mariposa-lily (*Calochortus greenei*) is a perennial herb in the Liliaceae family. It is neither state nor federally listed but has a CRPR of 1B.2 and a heritage rank of G3/S2S3. Its elevation is reported from 3,395 to 6,200 feet above sea level. Within its range in northern California, its blooming period is reported as June to August. This species is reported in cismontane woodland and is typically found in rocky and volcanic areas. Within the nine-quad search, numerous Rarefind occurrences are reported, the nearest is approximately 8 miles northeast of the study area with an observation date in 2011.

- Shasta chaenactis (*Chaenactis suffrutescens*) is a perennial herb in the Asteraceae family. It is neither state nor federally listed but has a CRPR of 1B.3 and a heritage rank of G2G3/S2S3. Its elevation is reported from 2,460to 9,185 feet. Within its range in California, its blooming period is May to September. This species is reported in lower montane coniferous forest and is typically found in sandy or serpentinite areas. There are 10 Rarefind occurrences within the nine-quad search. The most recent observation was reported in 2007, approximately 4.4 miles east of the study area.

- Modoc green-gentian (*Frasera albicaulis var. modocensis*) is a perennial herb in the Gentianaceae family. It is neither state nor federally listed but has a CRPR of 2B.3 and a heritage rank of G5T3T4/S2S3. Its elevation is reported from 2,995 to 5,740 feet. Within its range in California, its blooming period is May to July. The species is reported in great basin grassland within openings. There are 2 Rarefind occurrences within the nine-quad search, with the most recent finding reported in 1940.

- Alkali hymenoxys (*Hymenoxys lemmonii*) is a perennial herb in the Asteraceae family. It is neither state nor federally listed but has a CRPR of 2B.2 and a heritage rank of G4/S2S3. Its elevation is reported from 785 to 11,125 feet. Within its range in California, its blooming period is May to September. This species is reported in Great Basin scrub and lower montane coniferous forest. There are 8 Rarefind occurrences within the nine-quad search with the closest being approximately 7.3 miles southwest of the study area reported in 1997.

- Baker's globe mallow (*Iliamna bakeri*) is a perennial herb in the Malvaceae family. It is neither state nor federally listed but has a CRPR of 4.2 and a heritage rank of G4/S3. Its elevation is reported from 3,280 to 8,205 feet. Within its range in California, its blooming period is June to September. This species is reported in chaparral, great basin scrub, lower montane coniferous forest, and pinyon and juniper woodland areas that are volcanic. Within the nine-quad search, 1 occurrence from 1969 was reported 3.7 miles east of the study area.

- Peck's lomatium (*Lomatium peckianum*) is a perennial herb in the Apiaceae family. It is neither state nor federally listed but has CRPR of 2B.2 and a heritage rank of G4/S1. Its elevation is reported from 2,295 to 5,905 feet above sea level. Within its range in California, its blooming period is April to June. This species is reported in chaparral, cismontane woodland, lower montane coniferous forest, and pinyon and juniper woodland with volcanic soil. There are 3 Rarefind occurrences within the nine-quad search, the most recent finding reported in 2012, 3.72 miles southwest of the study area.

- Brittle prickly-pear (*Opuntia fragilis*) is a perennial stem in the Cactaceae family. It is neither state nor federally listed but has a CRPR of 2B.1 and a heritage rank of G5/S1. Its elevation is reported from 2,690 to 2,885 feet above sea level. Within its range in California, its blooming period is April to July. This species is reported in pinyon and juniper woodland within volcanic areas. There are 2 Rarefind occurrences within the nine-quad search, the closest being approximately 5 miles northwest of the study area in 2005.

- Shasta orthocarpus (*Orthocarpus pachystachyus*) is an annual herb in the Orobanchaceae family. It is neither state nor federally listed but has a CRPR of 1B.1 and a heritage rank of G1/S1. Its elevation is reported from 2,755 to 2,790 feet above sea level. Within its range, the blooming period is in May. This species is reported in great basin scrub, meadows, seeps, valley and foothill grasslands. There are 2 Rarefind occurrences within the nine-quad search, with the most recent and closest reported 6 miles southwest of the study area in 1998.

- Cooke's phacelia (*Phacelia cookei*) is an annual herb in the Hydrophyllaceae family. It is neither state nor federally listed but has a CRPR of 1B.1 and a heritage rank of G1/S1. Its elevation is reported from 3,595 to 5,580 feet above sea level. Within its range, its blooming period is June to July. This species is reported in Great Basin scrub and lower montane coniferous forest with sandy and volcanic soils. There are 2 Rarefind occurrences nine-quad search, with the closest being 2 miles east of the study area in 1985.

- Hairy Marsh hedge-nettle (*Stachys Pilosa*) is a perennial rhizomatous herb in the Lamiaceae family. It is neither state nor federally listed but has a CRPR of 2B.3 and a heritage rank of G5/S3. Its elevation is reported from 3,935 to 5,805 feet above sea level. Within its range, its blooming period is June to August. This species is reported in great basin scrub, meadows, and seeps. There is 1 Rarefind occurrence within the nine-quad search that is approximately 3.70 miles northwest of the study area in 2010.

- Henderson's triteleia (*Triteleia hendersonii*) is a perennial herb in the Themidaceae family. It is neither state nor federally listed but has a CRPR of 2B.2 and a heritage rank of G4/S1. Its elevation is reported from 2,495 to 3,935 feet above sea level. Within its range, its blooming period is May to July. This species is reported in cismontane woodland. There is 1 Rarefind occurrence within the nine-quad search, 4.70 miles southwest of the study area in 1956.

These species would not have been identifiable at the time of the field survey but could potentially be present at the water tank and pump station sites. Mitigation Measure BIO-1 requires a botanical field survey to be conducted by a qualified biologist in the spring when special-status plants known to occur in the region would be identifiable. The survey shall be conducted pursuant to applicable regulatory agency protocols and guidelines. In the event that special-status plant species are present, a suitable buffer zone(s) shall be determined by a qualified biologist in consultation with the applicable regulatory agency, and exclusionary fencing shall be placed prior to commencement of construction. If avoidance is not feasible, a detailed mitigation plan subject to regulatory agency review and approval would be prepared and implemented by the District. Implementation of Mitigation Measure BIO-1 ensures that impacts to special-status plant species are less than significant.

Special-Status Animal Species

Based on a review of special-status animal species, 43 special-status animal species have been reported with the potential to occur in the project region consisting of the Lake Shastina quadrangle and the surrounding quadrangles. Of the special-status animal species potentially occurring in the region, 30 animal species are considered to have no or a low potential to occur at the project site and 13 species have a moderate to high potential. Species with a moderate or high potential for occurrence within the study area are described below.

Amphibians

No special-status amphibians have a moderate or high potential to occur within the study area.

Birds

The Cooper's Hawk (*Accipiter cooperii*) occupies woodlands, open and interrupted and marginal habitats. Nests are primarily in riparian areas with deciduous trees, in canyons bottoms, and among live pines and spruces. It is not listed under CESA or FESA but is on the CDFW Watch List and has heritage ranking of G5/S4. Suitable habitat exists within the study area for this species, and it was detected. The project will not directly impact suitable habitat for this species. Noise disturbance from project activities has the potential to impact this species during the nesting season.

The golden eagle (*Aquila chrysaetos*) occupies cliff-walled canyons for nesting along with large trees in open areas and prefers rolling foothills, sage-juniper flats, and mountain areas. It is not listed under CESA or FESA, but is on the CDFW Watch List, listed as Sensitive and Fully Protected, is a USFWS Bird of Conservation Concern, and has heritage ranking of G5/S3. Although this species was not detected, suitable habitat does exist within the study area. The project will not directly impact suitable habitat for this species.

The great blue heron (*Ardea Herodias*) is found in wetlands, riparian forests, and marshes. They typically nest on north slopes near water in rookeries in large trees that are red fir, lodgepole pine, Jeffrey pine, or aspens. It is not listed under CESA or FESA but is listed as Sensitive by CDFW and has a heritage ranking of G5/S4. Suitable habitat exists within the study area for this species, and it was detected. The project will not directly impact suitable habitat for this species.

The black tern (*Chlidonias niger*) prefers large freshwater wetlands, dense marshes, river edges, and lakes. They nest in areas of shallow and still water sheltered by cattails and bulrushes. It is not listed under either CESA or FESA but has a heritage ranking of G4G5/S2. Although this species was not detected, suitable habitat does exist within the study area. The project will not directly impact suitable habitat for this species.

The prairie falcon (*Falco mexicanus*) occupies grassland and scrub in dry and open terrain. Nesting sites can be found on cliffs and it forages long distances for prey. It is not listed under either federal or California endangered species acts but is on the CDFW Watch List and has a heritage ranking of G5/S4. Although this species was not detected, suitable habitat does exist within the study area. The project will not directly impact suitable habitat for this species.

The bald eagle (*Haliaeetus leucocephalus*) can be found near rivers and lake margins. Most nests will be within a mile of water and will be in tall protruding conifer trees. It is delisted from FESA but is Endangered under CESA with special status by CDFW of Fully Protected and Sensitive and by USFWS as a Bird of Conservation Concern. The bald eagle has a heritage ranking of G5/S3. Although this species was not detected, suitable habitat does exist within the study area. The project will not directly impact suitable habitat for this species.

The California gull (*Larus californicus*) favors shorelines, lakes and marshes. They nest in large groups on islands within strongly alkaline lakes. It is not listed under CESA or FESA but is on the CDFW Watch List and listed as a Bird of Conservation Concern by USFWS. The California gull has a heritage ranking of G5/S4. Suitable habitat exists within the study area for this species and it was detected. The project will not directly impact suitable habitat for this species.

The double-crested cormorant (*Nannopterum auritum*) is found near lakes and ponds with perching areas. It forms breeding colonies in fresh or strongly alkaline lakes. It is not listed under CESA or FESA but is on the CDFW Watch List and has heritage ranking of G5/S4. Suitable habitat exists within the study area for this species, and it was detected. The project will not directly impact suitable habitat for this species.

The osprey (*Pandion haliaetus*) occupies any fish-filed water, including rivers, reservoirs, and lakes. They build nests on top of elevated telephone or power poles and treetops near bodies of water with large amounts of fish. It is not listed under CESA or FESA, but is considered Sensitive, is on the CDFW Watch List, and has heritage ranking of G5/S4. Suitable habitat exists within the study area for this species, and it was detected. The project will not directly impact suitable habitat for this species. Noise disturbance from project activities has the potential to impact this species during the nesting season.

The bank swallow (*Riparia riparia*) can be found in riparian scrub, riparian woodlands, and swamp edges. It requires vertical banks/cliffs with fine-textured/sandy soils near streams, rivers, and lakes to dig nesting holes. It is not listed under FESA, but under CESA is listed as Threatened, listed as Sensitive by CDFW, and has heritage ranking of G5/S2. Although this species was not detected, suitable habitat does exist within the study area. The project will not directly impact suitable habitat for this species.

The yellow warbler (*Setophaga petechia*) favors open woodlands, swamp edges, and streams below 9,000 feet. Nests are built near streamside thickets in willows, hawthorns, dogwoods, and white cedars, 10-40 ft off the ground. It is not listed under CESA or FESA and has heritage ranking of G5/S3S4. Although this species was not detected, suitable habitat does exist within the study area. The project will not directly impact suitable habitat for this species.

Refer to impact discussion IV.d, below. With implementation of Mitigation Measure BIO-3 impacts would be less than significant.

Fishes

No special-status fishes have a moderate or high potential to occur within the study area.

Insects

No special-status insects have a moderate or high potential to occur within the study area.

Mammals

The North American porcupine (*Erethizon dorsatum*) occupies forested habitats in a wide variety of coniferous and mixed woodlands within the Sierra Nevada, Cascade, and Coast ranges. It is not listed under FESA and CESA and has heritage ranking of G5/S3. Although this species was not detected, suitable habitat does exist within the study area. The project will not directly impact suitable habitat for this species.

Reptiles

The western pond turtle (*Emys marmorata*) occupies ponds, marshes, rivers and stream below 6,000 ft elevation. They require upland habitat 0.5 kilometers (km) from water for egg-laying. It is not listed under CESA or FESA, but is listed as SSC, Vulnerable, and Sensitive with a heritage ranking of G5/S3S4. Although this species was not detected, suitable habitat does exist within the study area. The project will not directly impact suitable habitat for this species.

b) *Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local of regional plans, policies, regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?*

Implementation of the proposed project will not involve vegetation or soil disturbance within 50 feet of a stream or drainage and will not have hydrological impacts to any adjacent jurisdictional (Regional Water Quality Control Board [RWQCB] or California Department of Fish and Wildlife [CDFW]) features. Minor soil disturbance would be required at several locations that vary from 170 feet to 5,000 feet away from the riparian habitat to replace fire hydrants, water tank 4, and the new pump house station. Project components as they relate to distance to water features are as follows:

- Lost Lake's (northwest of Lake Shastina) three closest utility upgrades are to fire hydrant #292 at 533 feet to the nearest water feature, fire hydrant #294 at 570 feet to the nearest water feature, and fire hydrant #295 at 590 feet to the nearest water feature.
- Lake Shastina's three closest upgrades are to fire hydrant #293 at 300 feet to the nearest water feature; fire hydrant #286 at 335 feet to the nearest water feature; fire hydrant #294 at 360 feet to the nearest water feature.
- Shasta River's five closest utility upgrades are fire hydrant #277 at 172 feet to the nearest water feature, fire hydrant #266 at 205 feet to the nearest water feature, fire hydrant #265 at 235 feet to the nearest water feature, fire hydrant #267 at 264 feet to the nearest water feature, and fire hydrant #268 at 275 feet to the nearest water feature.

Best Management Practices will be implemented during construction to minimize erosion and sediment impacts to these adjacent habitats.

The introduction and spread of noxious weeds during construction activities has the potential to impact natural communities. Each noxious weed identified by the California Department of Agriculture receives a rating that reflects the importance of the pest, the likelihood that eradication or control efforts would be successful, and the present distribution of the pest within the state. Noxious weeds observed in the Project area are of widespread distribution in the County, and further spread of these weeds is not anticipated. However, other noxious weeds could be introduced into the Project area if unwashed construction vehicles are used from outside of the County. Mitigation Measure BIO-2 reduces potential impacts related to the introduction and spread of noxious weeds to a less than significant level.

c) *Have a substantial adverse effect on State or federally protected wetlands (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?*

The project site is located entirely within an upland area that is predominantly developed and does not contain any potentially regulated waters or wetlands or the United States or State. Additionally, there are no areas on the project site capable of supporting wetlands or riparian vegetation. As noted above, Lake Shastina is located adjacent to the project site that is jurisdictional. However, no construction activities will encroach into Lake Shastina or any other potentially regulated water feature adjacent to the project site. Therefore, implementation of the proposed project would not result in impacts to any State or federally protected waters or wetlands and no mitigation or permitting are required. No impact would occur in this regard.

d) *Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?*

Wildlife Corridors

Wildlife movement corridors, also referred to as dispersal corridors or landscape linkages, are generally defined as linear features along which animals can travel from one habitat or resource area to another. There are no defined wildlife corridors within the Lake Shastina community, though migratory birds fly over and utilize Lake Shastina. The Shasta River is blocked by Dwinell Dam creating Lake Shastina, and the project does not propose any activities that would impact the dam, lake or Shasta River.

The northern half of the project site is within the far western edge of the Siskiyou Mule deer (*Odocoileus hemionus*) winter range migration corridor and migration stopovers. Mule deer migrate for winter from mid-November to mid-January which begins in the Dorris area and ends near the Day area. Spring migration for mule deer occurs between April and May depending on snow levels.

The project site is approximately 5 miles southwest of the documented 2016-2020 elk migration area in East Shasta Valley. Elk will spend their time during the winter months (December-February) on private ranches in the Shasta Valley and then in the spring (March-May) they will move south and east to the Grass Lake area. Their summer range includes Grass Lake, Bull Meadows, and Deer Mountain. The elk herd in this area is called the Shasta Valley Herd and is a mix of Rocky Mountain (*Cervus canadensis nelsoni*) and Roosevelt Elk (*Cervus canadensis roosevelti*). Water courses and their associated riparian zones, due to complex structure providing cover, are likely the primary movement corridors for smaller mammals within the study area. Additionally, wildlife may use roads and trails that provide openings in areas of dense vegetation.

Since the project is being developed on areas previously developed by other activities and is within an area that has been allocated for residential, recreation and associated uses, this project will not have a direct impact on deer wintering range as the winter range vegetation has either been removed or severely altered by previous projects. During construction, human activity in the project site may temporarily impede the movement of wildlife. However, it is anticipated that these animal species will alter their routes by moving around the construction areas. The only fencing proposed would be around the water tank and pump house sites; therefore, implementation of the proposed project will not divide or otherwise restrict deer or elk from migrating through this area as part of seasonal migrations to winter forage. No long term impacts would occur.

Nesting Migratory Birds

The project area is located within the Pacific Flyway, and it is possible that migratory birds could nest in or adjacent to the project area. Nesting migratory birds, if present, could be directly or indirectly affected by construction activities. Direct effects could include mortality resulting from removal of a tree/shrub containing an active nest with eggs or chicks, or construction equipment operating in an area containing an active nest. Indirect effects could include nest abandonment by adults in response to loud noise levels or human encroachment, or a reduction in the amount of food available to young birds due to changes in feeding behavior by adults.

In the local area, most birds nest between February 1 and August 31. As required by Mitigation Measure BIO-3, the potential for adversely affecting nesting birds can be greatly minimized by removing vegetation and conducting construction activities either before February 1 or after August 31. If this is not possible, a nesting survey would be conducted within one week prior to removal of vegetation and/or the start of construction. If active nests are found in the Project area, work would need to be postponed in the vicinity of the nests until after the young have fledged. Further, to prevent nest abandonment and mortality of chicks and eggs, vegetation removal and construction activities would not occur within 500 feet of an active nest unless a smaller buffer zone is authorized by CDFW and/or USFWS. If required by the agencies, a qualified biologist would monitor active nests during construction for signs of disturbance to the nesting birds.

Therefore, because construction activities that may impede the movement of wildlife are a temporary impact that would cease at completion of the project, and Mitigation Measure BIO-3 would reduce the potential for adversely affecting nesting birds, the proposed project would have a less than significant impact on the movement of any native resident or migratory fish, or wildlife species and would not impact migratory wildlife corridors.

e) *Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?*

Siskiyou County does not have a tree preservation ordinance, nor are there other local policies or ordinances related to the protection of biological resources that would apply to the proposed project. Therefore, the project would have no impact on any local policies or ordinances protecting biological resources such as a Tree Protection Ordinance. No impact would occur in this regard.

f) *Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community, Conservation Plan, or other approved local, regional, or State habitat conservation plan?*

A Habitat Conservation Plan (HCP) is a federal planning document that is prepared pursuant to Section 10 of the Federal Endangered Species Act (FESA). A Natural Community Conservation Plan (NCCP) is a State planning document administered by CDFW. There are no HCPs, NCCPs or other habitat conservation plans that apply to the proposed project. No impact would occur in this regard.

Mitigation Measures

The following mitigation measures have been developed to reduce potential impacts related to *Biological Resources* to less than significant levels:

Mitigation Measure BIO-1

A botanical field survey shall be conducted by a qualified biologist in the spring when special status plants known to occur in the region would be identifiable. The survey shall be conducted pursuant to applicable regulatory agency protocols and guidelines. In the unlikely event that special-status plant species are present, a suitable buffer zone(s) shall be determined by a qualified biologist in consultation with the applicable regulatory agency, and exclusionary fencing shall be placed prior to commencement of construction.

If avoidance is not possible, the District shall consult with the applicable regulatory agency to determine a satisfactory method of mitigation. Typical mitigation includes collecting and propagating seeds, and replanting the seedlings in a protected area, or transplanting the individual plants to a protected area. A detailed mitigation plan shall be submitted to the applicable regulatory agency for review and approval. The plan shall identify the mitigation site, methods to be employed to create offsetting special-status plant habitat, success criteria, monitoring requirements, remedial measures, and/or other pertinent data to ensure successful replacement of the affected plant populations. Mitigation shall be undertaken concurrently with or in advance of the start of project construction.

Mitigation Measure BIO-2

The potential for introduction and spread of noxious weeds shall be avoided/minimized by the following:

- Using only certified weed-free erosion control materials, mulch, and seed;
- Limiting any import or export of fill material to material that is known to be weed free; and
- Requiring the construction contractor to thoroughly wash all equipment at a commercial wash facility prior to entering the County. If the equipment has most recently been used within the County, cleaning is not required.

Mitigation Measure BIO-3

To avoid impacts to nesting birds, and/or raptors, protected under California Fish and Game Code Section 3503 and Section 3503.5, including their nests and eggs, one of the following shall be implemented:

- Vegetation removal and ground-disturbance activities shall occur between September 1st and January 31st when birds are not nesting; or
- If vegetation removal and ground disturbance activities occur during the nesting season, a pre-construction nesting survey shall be conducted by a qualified biologist to identify active nests in and adjacent to the project area.

Surveys shall begin prior to sunrise and continue until vegetation and nests have been thoroughly observed. The survey shall take into account acoustic impacts and line-of-sight project disturbances to determine a sufficient survey radius to maximize observations of nesting birds. A nesting bird survey report should be prepared and, at a minimum, the report should include a description of the area surveyed, date and time of the survey, ambient conditions, bird species observed, a description of any active nests observed, any evidence of breeding behaviors (e.g., courtship, carrying nest materials or food, etc.), and a description of any outstanding conditions that may have impacted the survey results (e.g., weather conditions, excess noise, presence of predators).

If an active nest is located during pre-construction surveys, a non-disturbance buffer should be established around the nest by a qualified biologist in consultation with CDFW and United States Fish and Wildlife Service to comply with Fish and Game Code Sections 3503 and 3503.5 and the Migratory Bird Treaty Act. Compliance measures may include, but are not limited to, exclusion buffers, sound-attenuation measures, seasonal work closures based on the known biology and life history of the species identified during the survey, as well as ongoing monitoring by biologists. Nesting bird surveys should be conducted no more than seven days prior to the initiation of construction. If construction activities are delayed or suspended for more than seven days after the pre-construction nesting bird survey, the site should be resurveyed.

Findings

Based upon the review of the information above, with implementation of mitigation measures the proposed project will have a less than significant impact with respect to *Biological Resources*.

Documentation and References

SHN (SHN Consulting Engineers and Geologists). 2023a. *Biological Report for Lake Shastina Community Services Infrastructure Improvement Project*. February 2023.

SHN. 2023b. *Preliminary Engineering Report for Drinking Water System Improvements*. December 2023.

V. Cultural Resources

The purpose of the section of the Initial Study is to identify any potential cultural resources within or adjacent to the proposed project, and to assist the Lead Agency, in this case the Shasta County, in determining whether such resources meet the office definitions of “historical resources,” as provided in the California Public Resources Code (PRC), in particular under the California Environmental Quality Act (CEQA).

CEQA requires a lead agency to determine whether a project may have a significant effect on historical resources (Section 21084.1). If it can be demonstrated that a project will cause damage to resources Eligible for or Listed in the California Register of Historic Resources (CRHR), Tribal Cultural Resources (TCRs) and other resources on county or local lists, or those determined by the lead agency to be significant, the lead agency may require reasonable efforts be made to permit any or all of the resources to be preserved in place or left in an undisturbed state. To the extent that they cannot be left undisturbed, mitigation measures are required (Section 21083.2[a], [b], and [c]).

The analysis in this section has been prepared in accordance with Section 15064.5 of the State CEQA Guidelines, which considers the potential impacts on prehistoric, historic, and paleontological resources. This section describes the potential cultural resources within the project study area, and the applicable regulations that govern those resources and is based on the following evaluations:

- *Phase I Cultural Resources Inventory for the Lake Shastina Community Services District Drinking Water Improvement Project*, prepared by DZC Archaeology and Cultural Resource Management, December 2023.

The information provided below is an abridged version of the cultural resources report and is provided here to afford a brief context of the potential cultural resources in the project area. Information on the specific location of prehistoric and historic sites is confidential and exempt from the Freedom of Information Act (FOIA) and the California Public Records Act (CPRA); therefore, this information has been redacted for use in this Initial Study and the cultural resource reports are not included as attachments. Professionally qualified individuals, as determined by the California Office of Historic Preservation (OHP), may contact the Lake Shastina Community Services District (District) in order to inquire about its availability.

Environmental Setting

The proposed project is located in Township 42 North, Range 5 West, sections 1, 2, 11, & 12; Township 43 North, Range 5 West, sections 25, 26, 31, 35, & 36 of the USGS 7.5-Minute Series Lake Shastina, Juniper Peak, Weed, and Hotlum Quadrangles of the Mount Diablo Meridian. The project comprises 302 discontiguous work locations each containing at least one of the following components: water pump, well, tank, or a fire hydrants. The aggregate total of the Area of Potential Effects (APE) is 44.5 acres encompassed within a 3,422-acre project study area.

Two built environment complexes were noted during the survey; the Lake Shastina wastewater treatment and delivery system, and the Lake Shastina Golf Course and Resort. The structural constituents within the APE units (tanks, hydrant, pumps, etc.) are joined to the Lake Shastina water system, all of which eventually connect to the Lake Shastina wastewater treatment facility located a quarter mile north of the APE.

Prehistoric Context

California prehistory is divided into three broad temporal periods that reflect similar cultural characteristics throughout the state: Paleoindian Period (c. 9,000–6,000 BCE), Archaic Period (6,000 BCE–CE 500), and Emergent Period (CE 500–Historic Contact). The Archaic is divided further into Lower (6,000–3,000 BCE), Middle (3,000–1,000 BCE), and Upper (1,000BCE–CE 500) Periods, governed by climatic and environmental variables, such as the drying of pluvial lakes at the transition from the Paleoindian to the Lower Archaic.

The project area lies in what is described as the Cascade subregion of the Northeastern California Archaeological Region, which is one of eight arbitrary organizational divisions of the State. The Cascade subregion extends southward from the Oregon border to the Central Valley, between the crest of the Klamath Mountains on the west and the Modoc Plateau on the east. Two important obsidian flows are found within this subregion: Glass Mountain and Medicine Lake Highlands in eastern Siskiyou County. Based on environmental factors, it was possible for human occupation in the Cascade subregion as early as 10,000 years ago during the Paleoindian Period.

The earliest definite evidence of human occupation in north-central California is from the site CA-SHA-475 located north of Redding and south of the present project area on Squaw Creek, where a charcoal-based C-14 date suggests initial Native American presence around 6,500years ago. Continuous use of the region is indicated on the basis of evidence from this and other regional sites. Most of the artifactual material dating to this early time period suggests cultural affiliation with the Borax Lake area, with large wide-stemmed projectile points and manos and metates being the most prominent artifact types represented.

The possibility exists that this early culture represents Hokan-speaking peoples who were related to those who subsequently expanded into the northern Sierra Nevada, the southern Cascades, the northern Coast Ranges, and the southern Klamath Mountains. Sometime around CE 100-200, the first major disruption of this Hokan-speaking population by Penutian immigrants occurred to the south. Eventually, these later arrivals displaced at least some of the Hokan populations who had been occupying the Sacramento Valley floor and the margins of the Sacramento River and may have forced the northward migration of Hokan-speaking groups, which had been occupying sections of the Sacramento River Canyon north of Redding and south of Mt. Shasta and Weed. The Penutian-speaking immigrants were still expanding into areas previously occupied by Hokan speakers at the time of initial contact with Euro-American populations circa CE 1850.

Ethnographic Context

The four ethnographic cultural geographical divisions of the Shastan peoples are the Okwanuchu, along the upper Sacramento; the New River Shasta and the Konomihu in the Salmon River watershed; and the Shasta proper, farthest to the north.

The Shastans spoke four languages which were subdivisions of the Hokan Language family: Konomihu, New River Shasta, Okwanuchu, and Shasta. The tribal name was possibly derived from susti'ka, a Shasta village or social unit in the vicinity of Yreka (Silver 1978). Shastan territory extended from the Rogue River in Oregon, down into the central Klamath River watershed amid the Cascade, Klamath, and Scott Mountains, and south to the Salmon and upper Sacramento Rivers.

Permanent winter villages were located along the major rivers and tributaries; in the spring, the families moved into brush houses and remained in them through the summer; during acorn season, single family bark houses were used; and during the fall hunt, families camped out. The basic social unit for the Shastan was the family, although the village may also be considered a social as well as a political and economic unit. The Shastan family was bilateral with a patrilineal bias, and it was not uncommon for an entire village to be made up of only one family (Silver 1978).

As with most other northern California Indian groups, the Shastan were hunters and gatherers who practiced an annual subsistence round based on a series of seasonal moves designed to ensure their arrival at specific areas during the peak period of productivity for certain resources. Thus, economic life revolved around hunting, fishing, and collecting plant foods, with deer, salmon, and acorns representing primary staples. The collection and processing of these various food resources was accomplished with the use of a wide variety of wooden, bone, and stone tools. These included bows and arrows, spears, traps, nets, slings, and blinds for hunting land mammals and birds; and harpoons, hooks, salmon gigs, nets, and weirs for fish. Woven tools, seed beaters, burden baskets, and carrying nets and sharpened digging sticks were used to collect plant resources. For food processing, a variety of tools were used, including bedrock and portable mortars (predominantly basket and hopper mortars) and pestles, stone knives, stone scrapers, and a variety of bone tools. The Shastan groups also carved acorn mush stirring paddles, and each person had his or her own eating baskets, along with wooden spoons. The Shastan groups produced simple closed work and openwork twined baskets but relied heavily on imported basketry.

The Shastan and other northern California tribes had little to no contact with Europeans until the 1820s, when a few fur trappers passed through their lands on their way from the northwest coast south into the Sacramento River Valley. The 1849 California Gold Rush, however, quickly brought miners and settlers to the territory, and the Shasta were soon crowded out of their primary hunting grounds and fisheries along the rivers. With the start of permanent Euro American logging and farming settlements, there were active campaigns to exterminate the Shastans and the other tribes in the region. Leaders of the Shastan peoples signed the treaty of 1852 that was brought to all the Native American tribes of California, in which they were offered large protected regional reservations for forfeiting their title to the rest of the State. This treaty was never ratified, and the Shastans played a prominent role in the Rogue River Indian wars, which lasted from 1850 to 1857.

By the 1870s, the Shastan population and way of life had been impacted drastically by the influx of Euro- Americans. Calculations based on the number of settlements in 1852 led Kroeber to suggest a total population of 2,000 for all Shastan language speaking groups, while Cook estimated the pre-contact population at 3,000.

In 1925, Kroeber asserted that there were no more living Okwanuchu. After little over a century of contact, it was estimated that there were 36 Shastans living on the Quartz Valley Rancheria. Today, the majority of Shastan people are affiliated with the Quartz Valley, Grande Ronde, and Siletz Indian Reservations while others have been inducted into the neighboring Karuk or Pit River tribes.

Historic Era

In the 1820s and 30s, the first European Americans exploring and utilizing resources in the vicinity were the Hudson Bay Company fur trappers. These historical figures, namely Peter Skene Ogden, Alexander McLeod, Michel LaFramboise, and John Work, were instrumental in opening the area which led to the subsequent development of the Oregon to California Trail and settlement in Siskiyou County.

By Act on March 22, 1852, the County of Siskiyou came into being, created from the northern part of Shasta County and portions of Klamath County. Yreka has continuously been the county seat. The Siskiyou Trail runs through the county, a trail based on Native American trails, which was expanded by Hudson's Bay Company trappers in the early 1800s. The trail connected the Central Valley of California and the Pacific Northwest. The trail was further expanded during the Gold Rush years (ibid) which greatly influenced the history of the region.

The arrival of a significant number of gold miners prompted many individuals to settle onto the land to produce the needed goods and supplies sought by the miners. Many families went into the ranching and dairying industry. Within the Shasta Valley, local ranchers and farmers grew grass hay, potatoes, melons, dry beans, onions, cabbages, corn, squash, garlic, saffron, cumin, alfalfa, and peppers. Flour and grist mills were established as were distilleries, which were supplied by the numerous orchards.

Initially, many of the early ranches produced hay relying on their own water supply. Agricultural irrigation in the region typically relied on surface water diversion ditches and canals built in the nineteenth century as well as ground water. According to the Yreka Journal " by 1878, there were 98 mining ditches of 600 miles in total length; and 20 irrigation ditches supplying 10,000 acres. By 1881, there were 250 miles of ditches 'of some magnitude' for mining and irrigation in the county (SCCLRMP 2023:74)". The industrious Prather brothers bought large amount of acreage in and north of Montague, California, and soon realized the need for additional water to increase land production.

While subsequent pumping stations and ditches extended some of the farmable land, it was the arrival of a young doctor from Chicago in 1891 who became a local icon and benevolent financier in Siskiyou County. Dr. Dwinnell, a Montague resident, soon became an advocate for water. Between 1913 and 1915, Dr. Dwinnell helped establish the Shasta River, Big Springs, and Mt. Shasta Land Company water districts. Seeking potential water diversion systems to areas in Shasta Valley, a topographical map revealed a natural reservoir site 15 miles southeast of Montague.

On April 13, 1925, the Montague Water Conservation District was formed. Enticed with the potential to have a large lake gravity feed water along a canal with lateral ditches to 23,000 acres in Shasta Valley, the District began feasibility studies. As construction began in 1926, it was soon apparent that the underlying lithography of the reservoir was riddled with leakage problems. After numerous financial disasters amongst the farmers and investors, the reservoir gradually retained more water as lake silt and debris naturally worked their way into the crevices.

The Shasta valley continues to be conducive to raising cattle and sheep for market – often by families of the original homesteaders. Raising cattle and the production of hay is still evident although the large ranch holdings are gradually yielding to the development of smaller parcels of land. While the lake water is still used for irrigation purposes, the area of Lake Shastina, since the 1970s, has been an area of interest for increased real-estate development.

During more prosperous times, the new construction of homes and structures appear in areas that were once pasture. More homes, too, are constructed in timbered areas that are prone to wildland fires with limited escape routes. The Lake Shastina Golf Resort was built in 1973 with a 27-hole course designed by the famous design team of Robert Trent Jones Senior and his son, Robert Trent Jones Junior. Featuring two golf courses and a modest resort, it has the added attraction of being practically located at the base of Mt. Shasta.

More homes called for increased fire response, prompting the organization of the Shastina Fire Department in 1928. It was formed after two disastrous fires in 1927 and 1928 where a number of homes and businesses in Shastina were destroyed. The increase in residential and resort-oriented density of structures around the golf course eventually dictated that an additional fire department at Lake Shastina was formed in 1971. As the Mill Fire in 2022 burned over 50 homes in Lake Shatina, the need for a reliable fire suppression system is evident. As such, nearly every home in Lake Shastina has its own hydrant at the junction of the parcel and the main roadway.

Sensitivity

The results of archival research, the Sacred Lands Search, previous surveys adjacent to and within the study area, and the environmental context all contribute to an assessment of the sensitivity level for a given project area. Based on the geomorphological and topographic characteristics of the project area, the results of the records and literature search, the age the soils mapped in the area, and the level of historic disturbance, the APE is considered to have a moderate potential for buried prehistoric resources and a moderate potential for prehistoric and historic resource surface resources in areas of low to no ground disturbance.

Regulatory Setting

This section summarizes current federal, State, and local regulations relevant to the review of *Cultural Resources* for this project. Ordinances, regulations, or standards that are applicable to the environmental review of biological resource impacts include the following:

National Register of Historic Places

To be eligible for listing on the National Register, a resource must be significant in American history, architecture, archaeology, engineering, or culture, and generally must be greater than 50 years in age. Districts, sites, buildings, structures, and objects of potential significance must meet one or more of the following four established criteria (36 CFR Section 60.4):

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

In addition to these criteria, a resource must retain integrity to be considered eligible for listing on the NRHP. Integrity is the authenticity of the physical identity that is evidenced by the survival of characteristics that existed during the resource's period of significance. Resources must retain enough of their character or appearance to be recognizable as resources and to convey the reasons for their significance. Integrity is the ability of a property to convey its significance. To be listed in the NRHP, a property must not only be shown to be significant under the National Register criteria, but it must also possess integrity. The evaluation of a historic property's integrity is sometimes a subjective judgment, but it must always be grounded in an understanding of the property's physical elements and how they relate to its significance. National Register Bulletin 15 describes seven aspects of integrity used in order to determine a historic property's integrity:

1. *Location.* The relationship between the property and its location is often important in understanding why the property was created.
2. *Design.* The design aspect includes the combination of elements that create the form, plan, space, structure, and style of a property.
3. *Setting.* The setting is defined as the physical environment of a historic property.
4. *Materials.* Materials are the physical elements combined during a particular period of time and in a particular configuration to form a historic property.
5. *Workmanship.* Workmanship is the physical evidence of the crafts of a particular culture of people during any given period in history or prehistory.
6. *Feeling.* Feeling is described as a property's expression of the aesthetic or historic sense of a particular period of time.
7. *Association.* Association is the direct link between an important historic event or person and a historic property.

Section 101(d)(6)(A) of the National Historic Preservation Act (NHPA) allows properties of traditional religious and cultural importance to a Native American tribe to be determined eligible for NRHP inclusion. In addition, a broader range of Traditional Cultural Properties (TCPs) is also considered and may be determined eligible for or listed in the NRHP. A TCP is a property associated with the cultural practices or beliefs of a living community; TCPs are rooted in that community's history and are important in maintaining the continuing cultural identity of the community. In the NRHP programs, "culture" is understood to mean the traditions, beliefs, practices, lifeways, arts, crafts, and social institutions of any community, be it an Indian tribe, a local ethnic group, or the nation as a whole.

California Register of Historical Places

As provided in California Public Resources Code (PRC) Section 5020.4, the California Legislature established the CRHR in 1992. The CRHR is used as a guide by state and local agencies, private groups, and citizens to identify the state historical resources and properties to be protected, to the extent prudent and feasible, from substantial adverse change. The CRHR, as instituted by the California Public Resources Code, automatically includes all California properties already listed in the NRHP and those formally determined to be eligible for listing in the NRHP. The CRHR may also include various other types of historical resources that meet the criteria for eligibility, including the following:

- Individual historic resources.
- Resources that contribute to a historic district.
- Resources identified as significant in historic resource surveys.
- Resources with a significance rating of Category 3 through Category 5 in the State Inventory (Categories 3 and 4 refer to potential eligibility for the NRHP; Category 5 indicates a property with local significance).

The CRHR follows the lead of the NRHP in utilizing the 50-year threshold: a resource is usually considered for its historical significance only after it reaches the age of 50 years. This threshold is not absolute but was selected as a reasonable span of time after which a professional evaluation of historical value/importance should be made. The criteria for listing resources in the CRHR were expressly developed to be in accordance with previously established criteria developed for listing on the NRHP. Section 15064.5(a)(3) of the CEQA Guidelines states that "[g]enerally, a resource shall be considered by the lead agency to be 'historically significant' if the resource meets the criteria for listing on the California Register of Historical Resources" (PRC Section 5024.1; 14 CCR 4852), including if the resource:

PRC Section 5024.1 requires an evaluation of historical resources to determine their eligibility for listing in the CRHR. The purpose of the register is to maintain listings of the State's historical resources and to indicate which properties are to be protected from substantial adverse change. The criteria for listing resources on the CRHR were expressly developed to be in accordance with previously established criteria developed for listing in the National Register of Historic Places (NRHP), enumerated below. According to PRC Section 5024.1(c) (1–4), a resource is considered historically significant if it (i) retains "substantial integrity," and (ii) meets at least one of the following criteria:

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

A historical resource is a resource listed in, or determined to be eligible for listing, in the CRHR (Section 21084.1), a resource included in a local register of historical resources (Section 15064.5[a][2]), or any object, building, structure, site, area, place, record, or manuscript that a lead agency determines to be historically significant (Section 15064.5[a][3]).

Impact Analysis

The following includes an analysis of environmental parameters related to *Cultural Resources* based on Appendix G of the State CEQA Guidelines. The discussion not only includes the areas for which there is potential for environmental impacts but also provides justification for the conclusions that either no impacts, less than significant impacts, or less than significant impacts with mitigation could occur.

Would the Project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Cause a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5?			X	
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?		X		
c) Disturb any human remains, including those interred outside of dedicated cemeteries?		X		

a) *Cause a substantial adverse change in the significance of a historical resource pursuant to Section 15064.5?*

Significant cultural resources, as buildings, sites, structures, objects, and districts significant in the architectural, engineering, scientific, economic, agricultural, educational, social, political, military, or cultural annals of California, must meet the criteria described in the *Regulatory Setting*, above. If no eligible resources are identified within the project area, then the project is not considered to have a significant impact on cultural resources. In addition, State regulations require that measures be taken to protect any resources that are uncovered during construction, and compliance with CEQA Guidelines Section 15064.5(f) requires that construction activities halt if potentially significant resources are discovered until the resources can be assessed by a qualified person.

Based on the result of the *Phase I Cultural Resources Inventory for the Lake Shastina Community Services District Drinking Water Improvement Project* (DZC, 2023), there are no historic or prehistoric archaeological sites located during the cultural resources survey of the project site. Two built environment complexes were noted during the survey. The structural constituents within the APE units (tanks, hydrant, pumps, etc.) are joined to the Lake Shastina water system, all of which eventually connect to the Lake Shastina wastewater treatment facility located a quarter mile north of the APE. Additionally, the APE units are interspersed within and around the Lake Shastina Golf Course. Portions of both systems were surveyed by DZC in 2020 and their potential eligibility addressed in a previous report (Zalarvis-Chase, 2020). The following discussion from the 2020 documentation by DZC bears repeating with regard to the lack of significance and the lack of potential impacts to these built environment features in and around the APE.

Lake Shastina Community Services District Wastewater System

Built in 1975, the Lake Shastina wastewater treatment system comprises a gravity collection system, twenty pump stations, four tanks, associated force mains, 300+ fire hydrants, and a wastewater treatment facility with primary solids removal, aerated lagoons, mechanical evaporators, and a temporary sludge drying facility. The entirety of the facility and its outlying appurtenances are all constructed using commonly accepted industry methods for utility installation and maintenance and are built from readily available and recognizable modern industrial materials. The Lake Shastina wastewater treatment plant is currently used for treating wastewater derived from within the District's limits.

<u>Significance Discussion</u>

NEPA and CEQA mandate that resources older than 50 years may qualify for eligibility on the National Register of Historic Places or the California Register of Historic Resources, respectively. In regard to the Lake Shastina wastewater treatment facility eligibility for inclusion in the NRHP and the CRHR the following has been determined:

- A/1: Research does not indicate this facility is associated with significant national or state events that contribute to broad patterns of our history.
- B/2: Additionally, research does not indicate that the Lake Shastina wastewater treatment facility is associated with the lives or persons significant to our past.
- C/3: The Lake Shastina wastewater treatment facility was originally constructed in 1975 to facilitate wastewater disposal for the Community of Lake Shastina. Today, wastewater treatment facilities are ubiquitous elements of most towns and cities. The materials and construction of the Lake Shastina wastewater treatment facility are considered typical. The treatment facility does not embody a distinctive characteristic of a type, period, or method of construction, does not represent the work of a master; does not possess high artistic values, nor engineering distinction.
- D/4: This facility is unlikely to yield information important in prehistory or history.

Additional research indicates the facility retains integrity of location, design, setting, workmanship, feeling and association, but not with regard to materials as it has undergone nearly a 60% replacement though regular maintenance and upkeep (Lake Shastina CSD; Personal Communication 2020). As the Lake Shastina wastewater treatment facility does not meet the 50-year threshold for inclusion on the NRHP or the CRHR, it was not recorded and will not receive any further consideration as part of the proposed project.

Lake Shastina Golf Resort

Built in 1973, the Lake Shastina Golf Resort is located in Weed, California. Adjacent to Lake Shastina, it is situated within the view of the scenic Mount Shasta. The resort comprises a 27-hole course, a practice range, the Golf Pro Shop, various lodging facilities, and a restaurant.

<u>Significance Discussion</u>

The Lake Shastina Golf Resort was built in 1973. Research indicates that the 27-hole course was designed by Robert Trent Jones Senior and his son, Robert Trent Jones Junior. Robert Trent Jones Senior was a prolific golf architect who designed more than 350 courses and remodeled over 150, including 79 which were used for the United States Open or other national championships. In 1987, the Golf Course Superintendents Association of America (GCSAA) presented him with the Old Tom Morris Award, an award considered prestigious and by which who's recipient, through continuing lifetime commitment to the game of golf, has helped to mold the welfare of the game in a manner and style exemplified by Old Tom Morris.

Robert Trent Jones Jr. has designed more than 270 golf courses in more than 40 countries on six continents. His courses have won countless awards and accolades, been ranked among the best layouts throughout the world and hosted tournaments on every major golf tour. The Trent Jones name has become a trademark, as it guarantees a well-crafted golf venue set comfortably in its natural environment.

- A/1: Research does not indicate this facility is associated with significant national or state events that contribute to broad patterns of our history.
- B/2: Additionally, research does not indicate that the Lake Shastina Golf Resort is associated with the lives or persons significant to our past.
- C/3: The Lake Shastina Golf Resort was originally constructed in 1973. While the materials and construction of the golf complex is considered typical for its time, the course itself may embody a distinctive characteristic of a type or period and may represent the work of a master in the field of gold course design.
- D/4: This facility is unlikely to yield information important in prehistory or history.

Additional research indicates the golf course complex (clubhouse, range, and greens) retains integrity of location, design, setting, workmanship, materials feeling and association. However, the residential development has occurred over several decades. Therefore, some residential developments may not qualify as contributing elements to the overall significance of the complex.

Although the golf course component of the Lake Shastina Golf Resort is located adjacent to several of the APE units, there will be no disturbance to any constituents comprising the golf course. Therefore, this adjacent built environment feature will not incur any effects (significant, adverse, or otherwise) from project activities.

Conclusion

As discussed above, the Lake Shastina wastewater system and the Lake Shastina Golf Resort does not meet any of the National or California Historic registry criteria (A-D, 1-4). Given this, these facilities do not qualify for listing on the NRHP or the CRHR. It is neither a “Historic Property” as defined by NEPA nor “Historical Resource” as defined by CEQA. Therefore, the proposed project will not affect any resources on, or eligible for listing on, the National Register of Historic Places or California Register of Historical Resources.

b) *Cause a substantial adverse change in the significance of an archaeological resource pursuant to Section 15064.5?*

The proposed project would result in a significant impact if it caused a substantial adverse change in the significance of an archaeological resource. Based on the results of the investigations described above, there are no resources in the project area with intact visible surface manifestations that qualify as archaeological resources or historical resources as defined by CEQA Guidelines Section 15064.5. However, there is the possibility of encountering buried archaeological resources during project activities, including ground disturbing activities onsite. Inadvertent discovery procedures should be implemented for resources found as a result of project development would reduce potential impacts on undocumented resources to less than significant levels. To minimize potential impacts to prehistoric and historic resources, including Native American cultural resources, Mitigation Measure CR-1 and Mitigation Measure CR-2 are required. With implementation of these measures, impacts to cultural resources would be less than significant.

c) *Disturb any human remains, including those interred outside of dedicated cemeteries?*

There are no known burial sites on or immediately adjacent to the proposed project site. If human remains are unearthed during future development of the site, the provisions of California Health and Safety Code Section 7050.5 shall apply. Under this Section, no further disturbance shall occur until the Siskiyou County Coroner has made the necessary findings as to origin and disposition, pursuant to California PRC Section 5097.98 and Mitigation Measure CR-2. Impacts are considered less than significant with mitigation incorporated.

Mitigation Measures

The following mitigation measures have been developed to reduce potential impacts related to *Cultural Resources* to less than significant levels:

Mitigation Measure CR-1

If cultural resources, such as chipped or ground stone, or bone are inadvertently discovered during ground-disturbance activities, work shall be stopped within 50 feet of the discovery, as required by the California Environmental Quality Act (CEQA; January 1999 Revised Guidelines, Title 14 California Code of Regulations [CCR] 15064.5 (f)). Work near the archaeological finds shall not resume until a professional archaeologist, who meets the Secretary of the Interior's Standards and Guidelines, has evaluated the material, and offered recommendations for further action.

Mitigation Measure CR-2

If in the event that previously unidentified evidence of human burial or human remains are discovered during project construction, work will stop at the discovery location, within 20 meters (66 feet), and any nearby area reasonably suspected to overlie human remains (Public Resources Code, Section 7050.5) the Siskiyou County Coroner must be informed and consulted, per State law. If the coroner determines the remains to be Native American, he or she shall contact the Native American Heritage Commission within 24 hours. The Native American Heritage Commission shall identify the person or persons it believes to be the most likely descendent. The most likely descendent will be given an opportunity to make recommendations for means of treatment of the human remains and any associated grave goods. when the commission is unable to identify a descendant or the descendants identified fail to make a recommendation, or the landowner or his or her authorized representative rejects the recommendation of the descendants and the mediation provided for in subdivision (k) of Section 5097.94, if invoked, fails to provide measures acceptable to the landowner, the landowner or his or her authorized representative shall reinter the human remains and items associated with Native American human remains with appropriate dignity on the property in a location not subject to further and future subsurface disturbance. Work in the area shall not continue until the human remains are dealt with according to the recommendations of the County Coroner, Native American Heritage Commission and/or the most likely descendent have been implemented.

Findings

Based upon the review of the information above, with implementation of mitigation measures the proposed project will have a less than significant impact with respect to *Cultural Resources*.

Documentation and References

DZC (DZC Archaeology and Cultural Resource Management). 2023. *Phase I Cultural Resource Inventory Report for the Lake Shastina Community Services District Drinking Water Improvement Project*. December 2023.

VI. Energy

The purpose of the section of the Initial Study is to analyze the potential direct and indirect environmental impacts associated with the project's projected energy consumption. Such impacts can include the depletion of nonrenewable resources (e.g., oil, natural gas, coal, etc.). Analyses of emissions of air quality and greenhouse gas (GHG) pollutants during both the construction and long-term operational phases of the project are analyzed in Section III, AIR QUALITY, and Section VIII, GREENHOUSE GAS EMISSIONS.

Environmental Setting

PacifiCorp provides electric services in Siskiyou County. Existing electrical infrastructure facilities are in place where the project site is located for the wells or pump stations. Natural gas is currently not available in Siskiyou County. Energy resources required for the proposed project would primarily include the use of diesel and petroleum-based fuels during construction and operational activities. Individual permanent emergency generators would be used in case of power failure for the wells or pump stations.

An energy management study was prepared that review historical usage within the water system (see Appendix A, PRELIMINARY ENGINEERING REPORT). Based on review of recent electrical usage, the District has found no unusual power usage at any of the wells or pump stations.

Regulatory Setting

This section summarizes current State regulations relevant to the review of *Energy* consumption for this project. Ordinances, regulations, or standards that are applicable to the environmental review of potential impacts related to energy consumption include the following:

California Energy Efficiency Standards for Residential and Nonresidential Buildings (Title 24)

Building energy efficiency standards for new residential and nonresidential buildings were adopted by the California Energy Resources Conservation and Development Commission (now the California Energy Commission (CEC)) in June 1977 and are updated every three years (CCR Title 24, Part 6). CCR Title 24, Part 6 requires the design of building shells and building components to conserve energy. The standards are updated periodically to allow for consideration and possible incorporation of new energy efficiency technologies and methods. On August 11, 2021, the CEC adopted the 2022 Energy Code. In December, it was approved by the California Building Standards Commission for inclusion into the California Building Standards Code. The 2022 Energy Code encourages efficient electric heat pumps, establishes electric-ready requirements for new homes, expands solar photovoltaic and battery storage standards, strengthens ventilation standards, and more. Buildings whose permit applications are applied for on or after January 1, 2023, must comply with the 2022 Energy Code.

California Green Building Standards

The California Green Building Standards Code (California Code of Regulations, Title 24, Part 11), commonly referred to as the CALGreen Code, is a statewide mandatory construction code that was developed and adopted by the California Building Standards Commission and the California Department of Housing and Community Development. The CALGreen standards require new residential and commercial buildings to comply with mandatory measures under the topics of planning and design, energy efficiency, water efficiency and conservation, material conservation and resource efficiency, and environmental quality. CALGreen also provides voluntary tiers and measures that local governments may adopt which encourage or require additional measures in the five green building topics. The most recent update to the CALGreen Code was adopted in 2022.

2008 California Energy Action Plan Update

The California Public Utilities Commission and California Energy Commission *2008 Energy Action Plan Update* provides a status update to the *2005 Energy Action Plan II,* which is the State's principal energy planning and policy document. The plan continues the goals of the original *Energy Action Plan*, describes a coordinated implementation plan for State energy policies, and identifies specific action areas to ensure that California's energy is adequate, affordable, technologically advanced, and environmentally sound. First-priority actions to address California's increasing energy demands are energy efficiency, demand response (i.e., reduction of customer energy usage during peak periods in order to address system reliability and support the best use of energy infrastructure), and the use of renewable sources of power. If these actions are unable to satisfy the increasing energy and capacity needs, the plan supports clean and efficient fossil-fired generation.

Renewable Energy Standards/Renewable Portfolio Standard

In 2002, California established its Renewable Portfolio Standard program[6] with the goal of increasing the annual percentage of renewable energy in the state's electricity mix by the equivalent of at least 1 percent of sales, with an aggregate total of 20 percent by 2017. The California Public Utilities Commission subsequently accelerated that goal to 2010 for retail sellers of electricity (Public Utilities Code Section 399.15(b)(1)). Then-Governor Schwarzenegger signed Executive Order S-14-08 in 2008, increasing the target to 33 percent renewable energy by 2020. In September 2009, then-Governor Schwarzenegger continued California's commitment to the Renewable Portfolio Standard by signing Executive Order S-21-09, which directs the CARB under its AB 32 authority to enact regulations to help the State meet its Renewable Portfolio Standard goal of 33 percent renewable energy by 2020. In September 2010, the CARB adopted its Renewable Electricity Standard regulations, which require all the State's load-serving entities to meet this target. In October 2015, then-Governor Brown signed into legislation Senate Bill 350, which requires retail sellers and publicly owned utilities to procure 50 percent of their electricity from eligible renewable energy resources by 2030. Signed in 2018, SB 100 revised the program's goal to achieve the 50 percent renewable resources target by December 31, 2026 and a 60 percent renewable resources target by December 31, 2030. SB 100 also established a further goal to have an electric grid that is entirely powered by clean energy by 2045. Under the bill, the State cannot increase carbon emissions elsewhere in the western grid or allow resource shuffling to achieve the 100 percent carbon-free electricity target.

Impact Analysis

The impact analysis for energy consumption focuses on the three sources of energy that are relevant to the proposed project: electricity, transportation fuel for vehicle and truck trips, and the fuel necessary for off-road construction equipment. The analysis of electricity and fuel use is based on California Emissions Estimator Model (CalEEMod) project specific data.

The following includes an analysis of environmental parameters related to *Energy* based on Appendix G of the State CEQA Guidelines. The discussion not only includes the areas for which there is potential for environmental impacts but also provides justification for the conclusions that either no impacts, less than significant impacts, or less than significant impacts with mitigation could occur.

Would the Project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?			X	

[6] The Renewable Portfolio Standard is a flexible, market-driven policy to ensure that the public benefits of wind, solar, biomass, and geothermal energy continue to be realized as electricity markets become more competitive. The policy ensures that a minimum amount of renewable energy is included in the portfolio of electricity resources serving a state or country.

Would the Project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?			X	

a) *Result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation?*

Construction Impacts

As described throughout this document, implementation of the proposed project would include excavation, grading, and installation of project components. During the proposed construction activities, energy would be consumed in the form of petroleum-based fuels used to power off-road construction vehicles and equipment on the project site, construction worker travel and hauling truck trips to and from the project site, and to operate generators to provide temporary power for lighting and electronic equipment. Once construction activities are complete there is limited potential for the project to generate operational energy use.

Table 4-4, OFF-ROAD CONSTRUCTION EQUIPMENT DIESEL FUEL CONSUMPTION and Table 4-5, CONSTRUCTION PERIOD PETROLEUM FUEL CONSUMPTION provides an estimate of construction fuel consumption for the project based on the information provided by the CalEEMod emissions model (CAPCOA, 2022).

Table 4-4
OFF-ROAD CONSTRUCTION EQUIPMENT DIESEL FUEL CONSUMPTION

Equipment[1]	Quantity[1]	Horsepower[1]	Load Factor[1]	Fuel Consumption Rate[2] (gallons per hour)	Duration[1] (total hours)	Total Fuel Consumption[3,4] (gallons)
Demolition						
Tractors/Loaders/Backhoes	3	84	0.37	1.55	240	1,116
Rubber Tired Dozers	1	367	0.40	7.34	80	587.2
Concrete/Industrial Saws	1	33	0.73	1.20	80	96
					Subtotal[4]	***1,799.20***
Site Preparation						
Tractors/Loaders/Backhoes	1	84	0.37	1.55	8	12.4
Graders	1	148	0.41	3.03	8	24.24
Rubber Tired Dozers	1	367	0.40	7.34	7	51.38
					Subtotal[4]	***88.02***
Grading						
Tactors/Loaders/Backhoes	2	84	0.37	1.55	28	86.8
Graders	1	148	0.41	3.03	16	48.48
Rubber Tired Dozers	1	367	0.40	7.34	16	117.44
					Subtotal[4]	***252.72***
Building Construction						
Cranes	1	367	0.29	5.32	600	3,192
Forklifts	1	82	0.20	0.82	600	492
Generators S	1	14	0.74	0.51	800	416
Welders	3	46	0.45	1.03	2400	7,416
Tactors/Loaders/Backhoes	1	84	0.37	1.55	600	930
					Subtotal[4]	***12,446***
Paving						
Tactors/Loaders/Backhoes	1	84	0.37	1.55	40	62
Pavers	1	81	0.42	1.70	30	51
Rollers	1	36	0.38	0.68	35	23.8
Cement and Motor Mixes	1	10	0.56	0.28	30	8.4
Paving Equipment	1	89	0.36	1.60	40	64
					Subtotal[4]	***209.2***
Architectural Coating						
Air Compressors	1	37	0.48	0.88	30	26.4

Table 4-4
OFF-ROAD CONSTRUCTION EQUIPMENT DIESEL FUEL CONSUMPTION

Equipment[1]	Quantity[1]	Horsepower[1]	Load Factor[1]	Fuel Consumption Rate[2] (gallons per hour)	Duration[1] (total hours)	Total Fuel Consumption[3,4] (gallons)
					Subtotal[4]	***26.4***
Linear, Grubbing & Land Clearing						
Excavators	1	367	0.29	5.32	60	159.6
Tractors/Loaders/Backhoes	1	84	0.37	1.55	60	93
					Subtotal[4]	***252.6***
Linear, Grading & Excavation						
Excavators	1	36	0.38	0.68	270	183.6
Tractors/Loaders/Backhoes	1	16	0.38	0.30	270	81
Dumpers/Tenders	1	16	0.38	0.30	270	81
					Subtotal[4]	***345.6***
Linear, Drainage Utilities, Sub-Grade						
Excavators	1	36	0.38	0.68	180	122.4
Tractors/Loaders/Backhoes	1	84	0.37	1.55	180	279
Rollers	1	36	0.38	0.68	180	122.4
					Subtotal[4]	***523.8***
Linear, Paving						
Pavers	1	89	0.36	1.60	90	144
Rollers	1	36	0.38	0.68	90	61.2
Cement and Mortar Mixers	1	10	0.56	0.28	90	25.2
Tractors/Loaders/Backhoes	1	84	0.37	1.55	90	139.5
					Subtotal[4]	***369.9***
					Total Diesel Usage[4]	***16,313.44***

1. Derived from CalEEMod modeling results (CAPCOA, 2022).
2. Derived using the following equation: *Fuel Consumption Rate = Horsepower x Load Factor x Fuel Consumption Factor.*
   Where: Fuel Consumption Factor for a diesel engine is 0.05 gallons per horsepower per hour (gal/hp/hr).
3. Derived using the following equation: *Total Fuel Consumption = Quantity of Equipment x Duration in Hours x Fuel Consumption Rate.*
4. Values may be slightly off due to rounding.

Table 4-5
CONSTRUCTION PERIOD PETROLEUM FUEL CONSUMPTION

Phase	Number of Daily Trips[1]	Number of Days[1]	Trip Commute Distance (in miles)[1]	Fuel Usage (miles per gallon)[2]	Gasoline/Diesel Usage (in gallons)[3,4]
Worker Trips (Gasoline)					
Demolition	12.5	10	11.9	10	148.8
Site Preparation	7.50	1	11.9	10	8.9
Grading	10	2	11.9	10	23.8
Building Construction	5.67	100	11.9	10	674.7
Paving	12.5	5	11.9	10	74.4
Architectural Coating	1.13	5	11.9	10	6.7
Linear, Grubbing & Land Clearing	5	10	11.9	10	59.5
Linear, Grading & Excavation	0	45	11.9	10	0
Linear, Drainage Utilities, Sub-Grade	7.5	30	11.9	10	267.8
Linear, Paving	10	15	11.9	10	178.5
				Total Gasoline Usage[4]	***1,443.1***
Hauling Trips (Diesel)					
Demolition	5.8	10	20	8	145
Site Preparation	625	1	20	8	1562.5
Grading	0	2	20	8	0
Building Construction	0	2	20	8	0
Paving	0	100	20	8	0
Architectural Coating	0	5	20	8	0
Linear, Grubbing & Land Clearing	0	5	20	8	0

Table 4-5
CONSTRUCTION PERIOD PETROLEUM FUEL CONSUMPTION

Phase	Number of Daily Trips[1]	Number of Days[1]	Trip Commute Distance (in miles)[1]	Fuel Usage (miles per gallon)[2]	Gasoline/Diesel Usage (in gallons)[3,4]
Linear, Grading & Excavation	7.5	10	20	8	150
Linear, Drainage Utilities, Sub-Grade	0	45	20	8	0
Linear, Paving	0	30	20	8	0
				Total Diesel Usage[4]	***1857.5***

1. Derived from CalEEMod modeling results (CAPCOA, 2022).
2. This is a conservative estimate, as it assumes no electric, hybrid, or other alternative fuel vehicles in the fleet mix.
3. Derived using the following equation: *Gasoline/Diesel Usage = # of Daily Trips x # of Days x Avg. Round-Trip Distance / Fuel Usage*
4. Values may be off due to rounding.

As shown in Tables 4-3 and 4-4, off-road construction equipment and hauling trips would consume a total of approximately 16,313 gallons of diesel fuel over the project's construction period. Worker trips would consume a total of approximately 1,443 gallons of gasoline and hauling trips would consume a total of approximately 1,857 gallons of diesel fuel over the project's construction period. These fuels would be consumed over a period of approximately 4 years (SHN, 2023) and would represent a small percentage of the total energy used in the State.

There are no unusual project characteristics that would need construction equipment or practices that would be less energy efficient than at comparable construction sites in the region or State. Construction activity would be temporary and fuel consumption would cease once construction ends. Due to the temporary nature of construction activities, the fuel and energy needed during the project would not be considered a wasteful or inefficient use of energy. Therefore, it is expected that construction energy consumption associated with the project would be comparable to other similar construction projects, and would therefore not be inefficient, wasteful, or unnecessary. Impacts would be less than significant in this regard.

Operational Impacts

Energy use during operation of the water system would relate primarily to water treatment and pumping as well as maintenance activity by District personnel. The project would result in improved energy and water efficiency through new well houses and booster stations. Well houses and booster stations are expected to result in less energy consumption because they would include equipment that is more energy efficient, such as Variable Frequency Drives (VFDs). A VFD will reduce the frequency of the motor, thus reducing the speed and ultimately the discharge of the pump. By reducing the frequency of the motor, significant energy savings are achievable.

Therefore, construction and operation of the proposed project would not result in potentially significant environmental impact due to wasteful, inefficient, or unnecessary consumption of energy resources, during project construction or operation. Impacts would be less than significant in this regard.

b) *Conflict with or obstruct a state or local plan for renewable energy or energy efficiency?*

As described throughout this document, implementation of the proposed project would occur over a period of approximately 4 years (SHN, 2023) and would include the construction on a new water tank, booster pump station improvements, and the replacement of up to 320 fire hydrants. Once construction activities are complete there is limited potential for the project to result in operational energy use. Operational energy use is anticipated to result from maintenance activities by District personnel.

The project will include Variable Frequency Drives (VFDs) at the new well house and booster station. This energy management device improves efficiency, performance, and reliability of the system. The analysis suggest that the well pumps are oversized during the winter months and would benefit from the features of a VFD. A VFD will reduce the frequency of the motor, thus reducing the speed and ultimately the discharge of the pump. By reducing the frequency of the motor, significant energy savings are achievable. Another feature of a VFD is the integrated soft start feature. A VFD employs a soft start feature that conserves energy by gradually increasing the frequency of a pump and reducing the initial current surge when a pump starts. The soft start feature improves efficiency while also reducing stresses to the pump and other system components.

Based on the temporary nature of the proposed construction activity, the limited operational activity, and the proposed energy efficiency improvements, the proposed project would not conflict with or obstruct a State or local plan for renewable energy or energy efficiency. State and local agencies regulate the use and consumption of energy during construction and operational activity through various methods and programs. Impacts would be less than significant in this regard.

Mitigation Measures

No mitigation measures are required.

Findings

Based upon the review of the information above, implementation of the proposed project will have a less than significant with respect to *Energy*.

Documentation and References

CAPCOA (California Air Pollution Control Officer's Association). 2022. *California Emission Estimator Model (CalEEMod). Version 2022.1.1.6*. Model Run on 07/03/2024. [Online]: https://www.caleemod.com/.

Chico Environment. 2023. Initial Study / Mitigated Negative Declaration - *Dhami's Truck Wash & Truck Repair Project*. State Clearinghouse No. 2023070571. Weed CA, [Online]: https://ceqanet.opr.ca.gov/2023070571.

SHN (SHN Consulting Engineers and Geologists). 2023. *Preliminary Engineering Report for Drinking Water System Improvements*. December 2023.

VII. Geology and Soils

The purpose of this section of the Initial Study is to describe the geologic and seismic setting of the project area, identify potential impacts associated with implementation of the proposed project, and, as necessary, recommend mitigation to reduce the significance of impacts. The issues addressed in this section are risks associated with faults, strong seismic ground shaking, seismic-related ground failure such as liquefaction, landslides, and unstable geological units and/or soils.

Environmental Setting

Regional Geology

The project area is located in the Shasta Valley area, about 12 miles northwest of the peak of Mt. Shasta. Geologically, the site occupies the flank of the broad, conical Mt. Shasta volcanic complex, and the area is underlain by a variety of volcanic rocks derived from Cascade arc volcanism. Bedrock in the Lake Shastina area consists of older volcanic rocks associated with a pre-cursor to Mt. Shasta (the "Sand Flat cone"), large blocks of debris associated with a debris avalanche that originated during the collapse of that older cone (300,000 to 400,000 years ago), and a series of younger volcanic rocks associated with the growth of the modern Mt. Shasta volcanic complex. Younger volcanic materials in the area consist of pyroclastic deposits (accumulations of ash and molten debris flows erupted from volcanoes) and andesitic flows. Portions of the project site along the southeastern shore of Lake Shastina are underlain by these materials.

Low lying areas in Shasta Valley in the proximity to Lake Shastina are typically buried by outwash deposits associated with late Pleistocene glaciations on Mt. Shasta. As the highest mountain in northern California, Mt. Shasta has a significant glacial history, similar to the other highlands in the region. Repeated ice advances occurred during the major late Pleistocene glaciations that occurred between 15,000 and 30,000 years ago, leaving a series of moraines and thick accumulations of outwash deposits on the surrounding flanks. Subsurface exploration in the area of the wastewater treatment ponds north of the lake encountered 16 feet of gravelly, bouldery outwash (overlying hard basalt bedrock). These alluvial deposits are expected to underlie the treatment ponds as well as the Tony Lema sewer extension element of the project.

Mt. Shasta is an active volcano that is associated with a variety of volcanic hazards. From a geologic standpoint, the eruptive history of Mt. Shasta has been episodic (that is, clusters of activity through time). Although currently quiescent, Mt. Shasta could enter a renewed period of volcanism that would threaten a wide area.

Soils

The top three soils within the project area consist of Delaney sand, Delaney gravelly sand, and Mary-Rock outcrop complex (NRCS, 2023). Delaney sand (129), which occurs on 0 to 9 percent slopes and is somewhat excessively drained, Delaney gravelly sand (130) occurs on 0 to 9 percent slopes and is somewhat excessively drained, and Mary-Rock (188) outcrop complex which occurs on 2 to 50 percent slopes are well drained. The 18 different soil types within the study area range from very poorly drained (Gazelle silt loam) to excessively drained. The soils support residential homes, agricultural fields, a lake, ponds, rivers, scrub-shrub, mixed-conifer, and rocky outcrop habitats.

Faults

Active faults are defined as faults that have had surface displacement in the Holocene epoch (in the past 11,000 years) based on California Code of Regulations (CCR) Division 2, Title 14, also known as the Alquist-Priolo Earthquake Fault Zoning Act (A-P Act). Potentially active faults are defined by the A-P Act as faults showing surface displacement during mid to late Quaternary time (about 1.6 million years before present) that have a relatively high potential for ground rupture. In general, Quaternary faults that do not record evidence of Holocene surface displacement are not considered as being active by the State. In addition, the California Geologic Survey (CGS) evaluates the activity rating of a fault in fault evaluation reports (FER). FERs compile available geologic and seismologic data and evaluate if a fault should be zoned as active, potentially active, or inactive. If a FER evaluates a fault as active, then it is typically incorporated into a Special Studies Zone in accordance with the Alquist-Priolo Earthquake Hazards Act. The project site is not located within an Alquist-Priolo Earthquake Fault Zone and no active faults are known to pass through the project site (DOC, 2023a; 2023b; 2023c). Based on the most recent available data, no active or potentially active faults are reported to be present within the boundaries of the project site (DOC, 2023a).

Landslides

The site is relatively flat and is situated at between 2,680 and 3,230 feet above the mean sea level. According to DOC's *Fire Perimeters and Deep Landslide Susceptibility Mapping*, the project site is not identified as a very high landslide susceptibility area (DOC, 2023a; 2023c).

Regulatory Setting

This section summarizes current federal, State, and local regulations relevant to the review of *Geology and Soils* for this project. Ordinances, regulations, or standards that are applicable to the environmental review of potential impacts related to geology and soils include the following:

Alquist-Priolo Earthquake Fault Zoning Act

The Alquist-Priolo Earthquake Fault Zoning Act was passed in 1972 (originally enacted as the Alquist-Priolo Special Studies Zones Act and renamed in 1994) and is intended to reduce the risk to life and property from surface fault rupture during earthquakes. The main purpose of the law is to prevent the construction of buildings used for human occupancy on the surface trace of active faults. The law only addresses the hazard of surface fault rupture and is not directed toward other earthquake hazards. The Alquist-Priolo Act requires the State Geologist to establish regulatory zones known as "Earthquake Fault Zones" around the surface traces of active faults and to issue appropriate maps. The maps are distributed to all affected cities, counties, and state agencies for their use in planning efforts. Local agencies must regulate most development projects within the zones. Projects include all land divisions and most structures for human occupancy.

Seismic Hazard Mapping Act

The Seismic Hazard Mapping Act (SHMA) was adopted by the state in 1990 to protect the public from the effects of non-surface fault rupture earthquake hazards, including strong ground shaking, liquefaction, seismically induced landslides, or other ground failure caused by earthquakes. The goal of the act is to minimize loss of life and property by identifying and mitigating seismic hazards. The California Geological Survey prepares seismic hazard zone maps and provides them to local governments; these maps identify areas susceptible to amplified shaking, liquefaction, earthquake-induced landslides, and other ground failures. SHMA requires responsible agencies to only approve projects within seismic hazard zones following a site-specific investigation to determine if the hazard is present, and if so, the inclusion of appropriate mitigation(s). In addition, the SHMA requires real estate sellers and agents at the time of sale to disclose whether a property is within one of the designated seismic hazard zones.

2022 California Building Code

The California Building Code (CBC), which is codified in CCR Title 24, Part 2, was promulgated to safeguard the public health, safety, and general welfare by establishing minimum standards related to structural strength, egress facilities, and general building stability. The purpose of the CBC is to regulate and control the design, construction, quality of materials, use/occupancy, location, and maintenance of all building and structures within its jurisdiction. Title 24 is administered by the California Building Standards Commission, which, by law, is responsible for coordinating all building standards. Under State law, all building standards must be centralized in Title 24 or they are not enforceable.

Siskiyou County General Plan

The Siskiyou County General Plan identifies the project area as an overlay for Geologic Hazard, Erosion Hazard, Building Foundation Limitations for Soils and a potential for Severe Septic Tank Limitations.

Siskiyou County Hazard Mitigation Plan

The purpose of the Siskiyou County Hazard Mitigation Plan (2018) is to implement and sustain actions that reduce vulnerability and risk from hazards or reduce the severity of the effects of hazards on people and property. Mitigation actions are both short-term and long-term activities, which reduce the cause or occurrence of hazards; reduce exposure to hazards or reduce effects of hazards through various means to include preparedness, response, and recovery measures. The Hazard Mitigation Plan identifies all natural hazards within Siskiyou County, including earthquake, flood, wildfire, landslide/other earth movement, drought, severe weather/storm, dam failure, and volcano/lahar/ash fall hazards. The Plan's goal is to identify mitigation projects that will reduce the vulnerability and damage potential of each hazard. The Hazard Mitigation Plan was a collaborative planning effort between Siskiyou County, local jurisdictions and special districts within the County.

Impact Analysis

The following includes an analysis of environmental parameters related to *Geology and Soils* based on Appendix G of the State CEQA Guidelines. The discussion not only includes the areas for which there is potential for environmental impacts but also provides justification for the conclusions that either no impacts, less than significant impacts, or less than significant impacts with mitigation could occur.

Would the Project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Directly or indirectly cause 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 Publications 42.			X	
ii) Strong seismic ground shaking?			X	
iii) Seismic-related ground failure, including liquefaction?			X	
iv) Landslides?			X	
b) Result in substantial soil erosion or the loss of topsoil?			X	
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?			X	
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?				X
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?				X
f) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?				X

a) *Directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving:*

i. Rupture of a known earthquake fault:

There are no Alquist-Priolo earthquake faults designated in the subject area of Siskiyou County. The project involves improvements to the District's existing drinking water system, including upgrading fire hydrants and water meters throughout the District. No impact would occur in this regard.

ii. Strong seismic ground shaking:

The entire northern California region is subject to the potential for moderate to strong seismic shaking due to distant seismic sources. Seismic shaking can be generated on faults many miles from the project vicinity. An earthquake is caused by a sudden slip on a fault. Stresses in the earth's outer layer push the sides of the fault together. Stress builds up, and the rocks slip suddenly, releasing energy in waves that travel through the earth's crust and cause the shaking that is felt during an earthquake. Renewed activity at Mt. Shasta or Mt. Lassen, would presumably be associated with seismicity and potential strong ground shaking. Seismic shaking potential is, therefore, a regional hazard.

It should be noted however that no region is immune from potential earthquake damage. Seismic shaking potential is considered minimal, and the hazard is not higher or lower at the project site than throughout the region. The project involves improvements to the District's existing drinking water system, including upgrading fire hydrants and water meters throughout the District. Before final design and the commencement of construction, a design-level geotechnical investigation with recommendations will be prepared. Necessary recommendations will present geotechnical engineering conclusions and specific recommendations for site preparation, foundation design, site drainage, addressing expansive soils, and pavement design to achieve compliance with the California Building Code, which would reduce risk associated with expansive soils. Impacts would be less than significant in this regard.

iii. Seismic-related ground failure, including liquefaction:

Liquefaction results from an applied stress on the soil, such as earthquake shaking or other sudden change in stress condition, and is primarily associated with saturated, cohesionless soil layers located close to the ground surface. During liquefaction, soils lose strength and ground failure may occur. This is most likely to occur in alluvial (geologically recent, unconsolidated sediments) and stream channel deposits, especially when the groundwater table is high.

Although located in a seismically active region (northern California), the project site is not likely to be subject to seismic shaking of adequate strength or duration to generate secondary seismic effects. Likely seismic sources are too far from the project site to generate sufficient long-duration strong shaking. Older volcanic deposits are not subject to seismic effects (they have taken on the qualities of bedrock), and older glacial outwash deposits appear too coarse (texturally) to be susceptible to liquefaction or other secondary seismic effects. Construction standards that meet the current California Building Codes (as applicable) will provide adequate protections and ensure less than significant impacts with respect to the General Plan Geologic Hazards overlay for the area.

iv. Landslides:

Landslides occur throughout Shasta County, although they have not been considered a major problem. Landslides are more prevalent in the eastern and northern portions of the County and are commonly related to the sedimentary and volcanic rocks in these vicinities According to DOC's Fire Perimeters and Deep Landslide Susceptibility Mapping, the project site is not identified as a very high landslide susceptibility area (DOC, 2023b). No impact would occur in this regard.

b) *Result in substantial soil erosion or the loss of topsoil?*

Construction of the proposed project would involve excavation, grading, and installation of project components, which would result in the temporary disturbance of soil and would expose disturbed areas to potential storm events. This could generate accelerated runoff, localized erosion, and sedimentation. In addition, construction activities could expose soil to wind erosion that could adversely affect onsite soils and the re-vegetation potential of the area.

Earthwork, grading, and soil stockpiling activities associated with construction will be conducted in accordance with the conditions of a grading permit issued by the Siskiyou County and a Construction Stormwater Pollution Prevention Plan (SWPPP) and Notice of Intent (NOI) administered by the North Coast Regional Water Quality Control Board (NCRWQCB). The Construction SWPPP will specify Best Management Practices (BMPs) for erosion and sediment control measures.

Typical BMPs are developed to address spill prevention and erosion/sediment control to prevent damage to streams, watercourses, and aquatic habitats. BMPs may include, but are not limited to, limiting construction to the dry season; pruning plants at ground level (where appropriate); use of straw wattles, silt fences, and/or gravel berms to prevent sediment from discharging to surface waters; installation of a spill containment system to prevent grease, oil, and other hazardous substances from discharging off-site; and revegetating temporarily disturbed sites upon completion of construction. Because BMPs for erosion and sediment control would be implemented in accordance with existing requirements, the potential for soil erosion and loss of topsoil would be less than significant.

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?*

Refer to impact discussion VII.a, above. Impacts would be less than significant.

d) *Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial direct or indirect risks to life or property?*

Expansive soils have high shrink-swell potential that expand when wet and shrink when dry. This can result in damage to foundations and structures. Expansive soils are not known to exist at the project site or I the project vicinity. Soil mapping by the Natural Resource Conservation Service do not identify expansive soils in the area (NRCS, 2023). No impact would occur in this regard.

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?*

The project does not proposed the installation or use of alternative wastewater disposal systems. No impact would occur in this regard.

f) *Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?*

No paleontological resources or unique geologic features existing on the project site and the potential for their occurrence is considered minimal. No impact would occur in this regard.

Mitigation Measures

No mitigation measures are required.

Findings

Based upon the review of the information above, implementation of the proposed project will have a less than significant impact with respect to *Geology and Soils*.

Documentation and References

DOC (California Department of Conservation). 2023a. *EQ ZAPP: California Earthquake Hazards Zone Application*. [Online]: https://maps.conservation.ca.gov/cgs/EQZApp/app/. Accessed December 26, 2023.

DOC. 2023b. *Fault Activity Map of California*. [Online]: https://gis.conservation.ca.gov/server/rest/services/CGS/FaultActivinityMapCA/MapServer. Accessed December 26, 2023.

DOC. 2023c. *Fire Perimeters and Deep Landslide Susceptibility*. [Online]: https://Fire Perimeters and Deep-Seated Landslide Susceptibility (ca.gov). Accessed December 26, 2023.

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SHN (SHN Consulting Engineers and Geologists). 2023. *Preliminary Engineering Report for Drinking Water System Improvements*. December 22, 2023.

SCOES (Siskiyou County Office of Emergency Services). 2018a. *Hazard Mitigation Plan Volume 1: Planning Area Wide Elements*. August 2018.

SCOES. 2018b. *Hazard Mitigation Plan Volume 2: Planning Partner Annexes*. August 2018.

Siskiyou (Siskiyou County). 1972. *Siskiyou County General Plan*. 1972, as amended.

Siskiyou. 2023. *Siskiyou County Geographic Information System*. [Online]: https://www.co.siskiyou.ca.us/gis. Accessed December 8, 2023.

VIII. Greenhouse Gas Emissions

This section of the Initial Study evaluates greenhouse gas (GHG) emissions associated with the proposed project and analyzes project compliance with applicable regulations. Consideration of the project's consistency with applicable plans, policies, and regulations, as well as the introduction of new sources of GHGs, is included in this section.

Environmental Setting

"Global warming" and "global climate change" are the terms used to describe the increase in the average temperature of the earth's near-surface air and oceans since the mid-20th century and its projected continuation. Warming of the climate system is now considered to be unequivocal, with global surface temperature increasing approximately 1.33 degrees Fahrenheit (°F) over the last 100 years. Continued warming is projected to increase global average temperature between 2 and 11°F over the next 100 years.

Natural processes and human actions have been identified as the causes of this warming. The International Panel on Climate Change (IPCC) concludes that variations in natural phenomena such as solar radiation and volcanoes produced most of the warming from pre-industrial times to 1950 and had a small cooling effect afterward.[7] After 1950, however, increasing GHG concentrations resulting from human activity such as fossil fuel burning, and deforestation have been responsible for most of the observed temperature increase. These basic conclusions have been endorsed by more than 45 scientific societies and academies of science, including all the national academies of science of the major industrialized countries. Since 2007, no scientific body of national or international standing has maintained a dissenting opinion.

Increases in GHG concentrations in the earth's atmosphere are thought to be the main cause of human-induced climate change. The IPCC is now 95 percent certain that humans are the main cause of current global warming.[8] GHG naturally trap heat by impeding the exit of solar radiation that has hit the earth and is reflected back into space. Some GHG occur naturally and are necessary for keeping the earth's surface inhabitable. However, increases in the concentrations of these gases in the atmosphere during the last 100 years have decreased the amount of solar radiation that is reflected into space, intensifying the natural greenhouse effect, and resulting in the increase of global average temperature.

Gases that trap heat in the atmosphere are referred to as GHG because they capture heat radiated from the sun as it is reflected back into the atmosphere, much like a greenhouse does. The accumulation of GHG has been implicated as the driving force for global climate change. The primary GHG are carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O), ozone, and water vapor.

While the presence of the primary GHG in the atmosphere are naturally occurring, CO_2, CH_4, and N_2O are also emitted from human activities, accelerating the rate at which these compounds occur within earth's atmosphere. Emissions of CO_2 are largely by-products of fossil fuel combustion, whereas methane results from off-gassing associated with agricultural practices, coal mines, and landfills. Other GHG include hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride, and are generated in certain industrial processes.

CO_2 is the reference gas for climate change because it is the predominant GHG emitted. The effect that each of the aforementioned gases can have on global warming is a combination of the mass of their emissions and their global warming potential (GWP). GWP indicates, on a pound-for-pound basis, how much a gas is predicted to contribute to global warming relative to how much warming would be predicted to be caused by the same mass of CO_2. CH_4 and N_2O are substantially more potent GHG than CO_2, with GWP of 28 and 265 times that of CO_2, respectively.[9]

[7] IPCC, *2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, https://www.ipcc.ch/site/assets/uploads/2018/05/SYR_AR5_FINAL_full_wcover.pdf
[8] IPCC, *2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, https://www.ipcc.ch/site/assets/uploads/2018/05/SYR_AR5_FINAL_full_wcover.pdf
[9] IPCC, *2014: Climate Change 2014: Synthesis Report. Contribution of Working Groups I, II and III to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change*, https://www.ipcc.ch/site/assets/uploads/2018/05/SYR_AR5_FINAL_full_wcover.pdf

In emissions inventories, GHG emissions are typically reported in terms of pounds or metric tons (MT) of CO_2 equivalents (CO_2e). CO_2e are calculated as the product of the mass emitted of a given GHG and its specific GWP. While CH_4 and N_2O have much higher GWP than CO_2, CO_2 is emitted in such vastly higher quantities that it accounts for the majority of GHG emissions in CO_2e.

Regulatory Setting

This section summarizes current federal, State, and local regulations relevant to the review of *Greenhouse Gas Emissions* for this project. Ordinances, regulations, or standards that are applicable to the environmental review of potential impacts related to greenhouse gases include the following:

California Renewable Portfolio Standard

In 2002, California established a Renewable Portfolio Standard (RPS) that requires a retail seller of electricity to include in its resource portfolio a certain amount of electricity from renewable energy sources, such as wind, geothermal, small hydro, and solar energy. The retailer can satisfy this obligation by using renewable energy from its own facilities, purchasing renewable energy from another supplier's facilities, using Renewable Energy Credits (RECs) that certify renewable energy has been created, or a combination of all of these. California's RPS requirements have been accelerated and expanded a number of times since the program's inception. Most recently, then-Governor Jerry Brown signed into law Senate Bill (SB) 100 in September 2018, which requires utilities to procure 60 percent of their electricity from renewables by 2030 and sets as a state policy that state agencies and end-use retail customers receive 100 percent of energy from renewable and zero-carbon resources by 2045. In addition, SB 350 requires California utilities to develop Integrated Resource Plans (IRPs) that incorporate a GHG emission reduction planning component. Compliance with the California RPS requires PG&E to develop and implement an IRP that demonstrates they are on schedule to comply with the goals of providing 60 percent renewable sources by 2030. To ensure retail sellers meet their RPS requirement, the California Public Utilities Commission (CPUC) is responsible for establishing enforcement procedures and imposing penalties for non-compliance with the program (CPUC, 2018).

Executive Order S-3-05

In 2005, in recognition of California's vulnerability to the effects of climate change, then-Governor Arnold Schwarzenegger established Executive Order S-3-05. This order sets forth target dates by which statewide GHG emissions would be reduced. These include by 2010, reduce GHG emissions to 2000 levels; by 2020, reduce GHG emissions to 1990 levels; and by 2050, reduce GHG emissions to 80 percent below 1990 levels.

Assembly Bill 32 (California Global Warming Solutions Act of 2006)

The primary legislation that has driven GHG regulation and analysis in California is the California Global Warming Solutions Act of 2006 (AB 32; California Health and Safety Code Division 25.5, Sections 38500 - 38599), which instructs CARB to develop and enforce regulations for the reporting and verifying of statewide GHG emissions. The act directed CARB to set a greenhouse gas emissions limit based on 1990 levels, to be achieved by 2020. The bill set a timeline for adopting a scoping plan for achieving GHG reductions in a technologically and economically feasible manner.

Executive Order B-30-15

In April 2015, Governor Edmund G. Brown, Jr. signed Executive Order B-30-15 in order to establish an interim GHG reduction goal for California of 40 percent below 1990 levels by 2030. This target GHG reduction by 2030 would make it possible for California to reach the ultimate goal of reducing GHG emissions by 80 percent under 1990 levels by the year 2050.

Senate Bill 32

On September 8, 2016, Governor Jerry Brown signed Senate Bill 32 (Pavley - Chapter 249, Stats. of 2016), requiring California to reduce GHG emissions to 40 percent below 1990 levels by 2030. SB 32 states that: "In adopting rules and regulations to achieve the maximum technologically feasible and cost-effective greenhouse gas emissions reductions authorized by this division, the state [air resources] board shall ensure that statewide greenhouse gas emissions are reduced to at least 40 percent below the statewide greenhouse gas emissions limit no later than December 31, 2030." SB 32 codifies the interim target created by EO B-30-15 for 2030.

CARB Climate Change Scoping Plan

The California Air Resources Board (CARB) adopted the Scoping Plan to achieve the goals of AB 32. The Scoping Plan establishes an overall framework for the measures that would be adopted to reduce California's GHG emissions. CARB determined that achieving the 1990 emissions level would require a reduction of GHG emissions of approximately 29 percent below what would otherwise occur in 2020 in the absence of new laws and regulations (referred to as "business-as-usual"). The Scoping Plan functions as a roadmap to achieve GHG reductions in California required by AB 32 through subsequently enacted regulations. AB 32 requires CARB to update the Scoping Plan at least once every five years. CARB adopted the first major update to the Scoping Plan on May 22, 2014. The May 2014 updated Scoping Plans summarized science related to climate change, including anticipated impacts to California and the levels of GHG reduction necessary to likely avoid risking irreparable damage. The second major Scoping Plan update was on December 14, 2017, which identified the actions California has already taken to reduce GHG emissions and focuses on areas where further reductions could be achieved to reduce the GHG emissions by 40 percent from the 1990 levels by 2030. In December 2022, CARB adopted a third update to the Scoping Plan[10]. The 2022 Scoping Plan details how the State will achieve carbon neutrality and reduce anthropogenic GHG emissions by 85 percent below the 1990 levels by 2045, as directed by AB 1279.

California Building Energy Efficiency Standards and Green Building Standards

Title 24 of the California Code of Regulations regulates how each new home and business is built or altered in California. It includes requirements for the structural, plumbing, electrical, and mechanical systems of buildings, and for fire and life safety, energy conservation, green design, and accessibility in and about buildings. Two sections of Title 24 – Part 6, the California Energy Code, and Part 11, the California Green Building Standards Code or CalGreen Code – contain standards that address GHG emissions related to construction. The current 2022 Title 24 standards became effective January 1, 2023.

Siskiyou County Air Pollution Control District

The County's current General Plan does not contain goals or policies directly aimed at reducing greenhouse gas emissions. Additionally, there are currently no State, regional, or county guidelines or thresholds with which to direct project-level CEQA review. As a result, Siskiyou County reserves the right to use a qualitative and/or quantitative threshold of significance until a specific quantitative threshold is adopted by the state or regional air district. The United States Environmental Protection Agency (EPA) identifies four primary constituents that are most representative of the GHG emissions. They are:

- *Carbon Dioxide (CO_2).* Emitted primarily through the burning of fossil fuels. Other sources include the burning of solid waste and wood and/or wood products and cement manufacturing.
- *Methane (CH_4).* Emissions occur during the production and transport of fuels, such as coal and natural gas. Additional emissions are generated by livestock and agricultural land uses, as well as the decomposition of solid waste.

[10] California Air Resources Board, *California's 2022 Climate Change Scoping Plan, https://ww2.arb.ca.gov/sites/default/files/2023-04/2022-sp.pdf.* Accessed July 11, 2024.

- *Nitrous Oxide (N_2O).* The principal emitters include agricultural and industrial land uses and fossil fuel and waste combustion.
- *Fluorinated Gases.* These can be emitted during some industrial activities. Also, many of these gases are substitutes for ozone-depleting substances, such as CFC's, which have been used historically as refrigerants. Collectively, these gases are often referred to as "high global-warming potential" gases.

The primary generators of GHG emissions in the United States are electricity generation and transportation. The EPA estimates that nearly 85 percent of the nation's GHG emissions are comprised of carbon dioxide (CO_2). The majority of CO_2 is generated by petroleum consumption associated with transportation and coal consumption associated with electricity generation. The remaining emissions are predominately the result of natural-gas consumption associated with a variety of uses.

Impact Analysis

At this time, neither the SCAPCD nor Siskiyou County has adopted numerical thresholds of significance for GHG emissions that would apply to the proposed project. Additionally, there is no Climate Action Plan that has been adopted by the County and is applicable to the proposed project. However, it is recommended that all projects subject to CEQA review be considered in the context of GHG emissions and climate change impacts, and that CEQA documents include a quantification of GHG emissions from all project sources, as well as minimize and mitigate GHG emissions as feasible. The project would generate GHG emissions through short-term construction activities and long-term operational activities.

In light of the lack of established GHG emissions thresholds that would apply to the proposed project, CEQA allows lead agencies to identify thresholds of significance applicable to a project that are supported by substantial evidence. Substantial evidence is defined in the CEQA statute to mean "facts, reasonable assumptions predicated on facts, and expert opinion supported by facts" (14 CCR 15384(b)).[11] Substantial evidence can be in the form of technical studies, agency staff reports or opinions, expert opinions supported by facts, and prior CEQA assessments and planning documents. Therefore, to establish additional context in which to consider the order of magnitude of the proposed project's GHG emissions, this analysis accounts for the following considerations by other government agencies and associations about what levels of GHG emissions constitute a cumulatively considerable incremental contribution to climate change:

- Sacramento Metropolitan Air Quality Management District established thresholds, including 1,100 metric tons of CO_2e per year for the construction phase of development projects, or 10,000 direct metric tons of CO_2e per year from the operation of stationary source projects.[12]

- Placer County Air Pollution Control District recommends a tiered approach to determine if a project's GHG emissions would result in a significant impact. First, project GHG emissions are compared to the de minimis level of 1,100 metric tons of CO_2e per year. If a project does not exceed this threshold, it does not have significant GHG emissions. If the project exceeds the de minimis level and does not exceed the 10,000 metric tons of CO_2e per year bright line threshold, then the project's GHG emissions can be compared to the efficiency thresholds. These thresholds are 26.5 metric tons of CO_2e per 1,000 s.f. for non-residential projects in an urban area, and 27.3 metric tons of CO_2e per 1,000 s.f. for non-residential projects in a rural area.[13]

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[11] 14 CCR 15384 provides the following discussion: "Substantial evidence" as used in the Guidelines is the same as the standard of review used by courts in reviewing agency decisions. Some cases suggest that a higher standard, the so called "fair argument standard" applies when a court is reviewing an agency's decision whether to prepare an EIR. Public Resources Code section 21082.2 was amended in 1993 (Chapter 1131) to provide that substantial evidence shall include "facts, reasonable assumptions predicated upon facts, and expert opinion supported by facts." The statute further provides that "argument, speculation, unsubstantiated opinion or narrative, evidence which is clearly inaccurate or erroneous, or evidence of social or economic impacts which do not contribute to, or are not caused by, physical impacts on the environment, is not substantial evidence."

[12] Sacramento Metropolitan Air Quality Management District, Guide to Air Quality Assessment in Sacramento County - SMAQMD Thresholds of Significance Table, April 2020, https://www.airquality.org/LandUseTransportation/Documents/CH2ThresholdsTable4-2020.pdf

[13] Placer County Air Pollution Control District, 2017 CEQA Handbook – Chapter 2, Thresholds of Significance. https://placerair.org/DocumentCenter/View/2047/Chapter-2-Thresholds-of-Significance-PDf

As described, the 1,100 metric tons of CO_2e per year threshold is used by other air districts for land use development projects. Therefore, the proposed project's GHG emissions were compared to the 1,100 metric tons of CO_2e per year quantitative threshold. The substantial evidence for this GHG emissions threshold is based on the expert opinion of various California air districts, which have applied the 1,100 metric tons of CO_2e per year threshold in numerous CEQA documents where those air districts were the lead agency.

The following includes an analysis of environmental parameters related to *Greenhouse Gas Emissions* based on Appendix G of the State CEQA Guidelines. The discussion not only includes the areas for which there is potential for environmental impacts but also provides justification for the conclusions that either no impacts, less than significant impacts, or less than significant impacts with mitigation could occur.

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

a) *Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?*

As described throughout this document, implementation of the proposed project would occur over a period of approximately 4 years (SHN, 2023) and would include improvements, including but not limited to, the construction of a new water tank, booster pump station improvements, and the replacement of up to 320 fire hydrants. The project would result in a temporary increase in GHG emissions during construction activities, including but not limited to exhaust emissions from worker commute vehicles, and off-road heavy-duty equipment. Once construction activities are complete there is limited potential for the project to generate operational GHG emission impacts. Operational emissions are anticipated to result from maintenance activities by District personnel. The proposed project would generate both direct and indirect GHG emissions. Direct GHG emissions include emissions from construction activities, area sources, and mobile (vehicles and equipment) sources. Indirect GHG emissions include emissions from energy consumption, solid waste, and water demand.

Construction and operational emissions for the proposed project were estimated using the California Emissions Estimator Model (CalEEMod), which is a statewide land use emissions computer model designed to provide a uniform platform for government agencies to quantify potential GHG emissions associated with both construction and operation of a variety of land use projects (CAPCOA, 2022). The model applies inherent default values for various land uses, including trip generation rates based on the Institute of Transportation Engineers (ITE) Manual, vehicle mix, trip length, average speed, etc. However, where project-specific data is available, such data should be input into the model. Project-specific information from Section 2.0, PROJECT DESCRIPTION, where available, was input into the model. Otherwise, where project-specific information was not available, the model default values were used for estimating emissions from the project.

Table 4-6, ANNUAL GHG EMISSIONS FROM CONTRUCTION AND OPERATIONAL (UNMITIGATED) presents the estimates of unmitigated annual GHG emissions from the proposed construction and operational activities as compared to the 1,100 $MTCO_2e$/yr threshold of significance.

Table 4-6
ANNUAL GHG EMISSIONS FROM CONSTRUCTION AND OPERTATION (UNMITIGATED)

Project Phase	GHG Emission ($MTCO_2e/yr$)[1]	Threshold of Significance ($MTCO_2e/yr$)[2]	Significant Impact?
Construction	150	1,100	No
Operations	150	1,100	No
1. Derived from CalEEMod modeling results (CAPCOA, 2022). 2. SCACPD, 2001.			

As indicated in Table 4-6, the construction and operational GHG emissions from the proposed project are well below the threshold of significance of 1,100 $MTCO_2e$/yr used by multiple air districts in the State. Therefore, the proposed project would not generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment. Impacts are less than significant in this regard.

b) *Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?*

As described throughout this document, implementation of the proposed project would occur over a period of approximately 4 years (SHN, 2023) and would include improvements, including but not limited to, the construction of a new water tank, backup generators, booster pump station improvements, and the replacement of up to 320 fire hydrants. The proposed project would result in GHG emissions from construction and operations. A GHG impact would be significant if the project would conflict with an applicable plan, policy, or regulation for the purpose of reducing GHG emissions.

The proposed project is subject to myriad State and local regulations applicable to project design, construction, and operation that would reduce GHG emissions, increase energy efficiency, and provide compliance with the CARB Climate Change Scoping Plan (CARB, 2022). The State of California has the most comprehensive GHG regulatory requirements in the United States, with laws and regulations requiring reductions that affect project emissions. Legal mandates to reduce GHG emissions from vehicles, for example, reduce project-related vehicular emissions. Legal mandates to reduce per capita water consumption and impose waste management standards to reduce methane and other GHGs from solid wastes are all examples of mandates that reduce GHGs.

As discussed above under subsection a), GHG emissions from the proposed project's construction and operational activity are well below the threshold of significance of 1,100 MTCO2e/yr that is used by several air districts in the state to determine the significance of impacts from GHG emissions. As such, construction and operational emissions from the proposed project would be less than significant and would not conflict with any plans, policies, or regulations related to GHG emissions.

Additionally, the project would result in improved energy efficiency through the following:

- Infrastructure—The new pump stations and pump station modifications associated with this project are expected to result in less energy consumption because they would include equipment that is more energy efficient, such as modern pumps with variable frequency drives (VFDs). The proposed VFDs are energy management devices that improve efficiency, performance, and reliability of the system. A VFD will reduce the frequency of the motor, thus reducing the speed and ultimately the discharge of the pump. By reducing the frequency of the motor, significant energy savings are achievable. Another feature of a VFD is the integrated soft start feature. A VFD employs a soft start feature that conserves energy by gradually increasing the frequency of a pump and reducing the initial current surge when a pump starts. The soft start feature improves efficiency while also reducing stresses to the pump and other system components.

These energy efficiency improvements represent a substantial reduction in the existing waste of energy for pumping water (as well as energy used during water treatment) and would reduce indirect GHG emissions generated by electricity consumption during project operation. The reductions that would result in indirect GHG emissions from operation of the water system due to the proposed energy efficiency improvements would provide consistency with the goals of the CARB Scoping Plan related to reducing GHG emissions from the public utility sector (CARB, 2022).

Therefore, the proposed project as designed and in compliance with existing laws and regulations, would not generate GHG emissions that would conflict with an applicable plan, policy, or regulation for the purpose of reducing GHG emissions. Impacts would be less than significant in this regard.

Mitigation Measures

No mitigation measures are required.

Findings

Based upon the review of the information above, implementation of the proposed project will have a less than significant impact with respect to *Greenhouse Gas Emissions*.

Documentation and References

California Air Pollution Control Officer's Association (CAPCOA). 2024. *California Emission Estimator Model (CalEEMod) – Detailed Reports*. *Version 2022.1.1.22*. Model Run on 07/09/2024 [Online]: https://www.caleemod.com/.

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California Office of the Attorney General. 2010. *The California Environmental Quality Act Addressing Global Warming Impacts at the Local Agency Level.* Updated January 6, 2010.

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IX. Hazards and Hazardous Materials

Hazards are those physical safety factors that can cause injury or death, and while by themselves in isolation may not pose a significant safety hazard to the public, when combined with development of projects can exacerbate hazardous conditions. Hazardous materials are typically chemicals or processes that are used or generated by a project that could pose harm to people working at the site or on adjacent areas. Many of these chemicals can cause hazardous conditions to occur should they be improperly disposed of or accidentally spilled as part of project development or operations.

Hazardous materials refer generally to hazardous substances, hazardous waste, and other materials that exhibit corrosive, poisonous, flammable, and/or reactive properties and have the potential to harm human health and/or the environment. The term "hazardous materials" as used in this section includes all materials defined in the California Health and Safety Code Section 25501(n): *"A material that, because of its quantity, concentration, or physical or chemical characteristics, poses a significant present or potential hazard to human health and safety or to the environment if released into the workplace or the environment. 'Hazardous materials' include, but are not limited to, hazardous substances, hazardous waste, and any material that a handler or the unified program agency has a reasonable basis for believing that it would be injurious to the health and safety of persons or harmful to the environment if released into the workplace or the environment."*

The purpose of this section of the Initial Study is to identify, to the extent feasible, the potential for hazards associated with historic and current site uses, surrounding sites, and recognized environmental conditions in connection with the project site and to identify potential risks to human health.

Environmental Setting

Emergency Response

Emergency response plans include elements to maintain continuity of government, emergency functions of governmental agencies, mobilization and application of resources, mutual aid, and public information. Emergency response plans are maintained at the federal, State, and local levels for all types of disaster, both natural and human caused. Local governments have the primary responsibility for preparedness and response activities. The Lake Shastina Community Property Owners Association (LSPOA) and Lake Shastina Fire Department (LSFD) have partnered with the Greater Lake Shastina Fire Safe Council (GLFSC) to prepare and implement the Community Wildfire Protection Plan (CWPP) in an effort to protect community residents and property owners. The CWPP identifies several emergency evacuation routes in and throughout the Lake Shasta Community Services District (District). There is no adopted emergency evacuation plan applicable to the project area.

Fire Protection

The LSFD, located at 16309 Everhard Drive, is a 19 person department that staff's one structural engine, two wildland brush engines, one attack and one rescue during normal daylight hours. The fire department relies on a combination part-time paid firefighters, seasonal firefighters, and paid call volunteers. The project site and the large surrounding area of State Responsibility Area (SRA) lands are primarily CAL FIRE's responsibility for fire protection (LSFD, 2023; GLFSC, 2018).

CAL FIRE has mapped areas of significant fire hazards in the state through its Fire and Resources Assessment Program (FRAP). These maps place areas of the state into different fire hazard severity zones (FHSZ) based on a hazard scoring system using subjective criteria for fuels, fire history, terrain influences, housing density, and occurrence of severe fire weather where urban conflagration could result in catastrophic losses. This classification system designates lands in three general classifications, "Moderate", "High" and "Very High" Fire Hazard Severity Zones. The FRAP identifies the project area as a high and very high fire hazard severity zone (CAL FIRE, 2023).

Hazardous Materials

The U.S. Environmental Protection Agency (EPA) maintains the Enforcement and Compliance History Online (ECHO) program. The ECHO website provides environmental regulatory compliance and enforcement information for approximately 800,000 regulated facilities nationwide. The ECHO website includes environmental permit, inspection, violation, enforcement action, and penalty information about EPA-regulated facilities. Facilities included on the site are Clean Air Act (CAA) stationary sources; Clean Water Act (CWA) facilities with direct discharge permits, under the National Pollutant Discharge Elimination System; generators and handlers of hazardous waste, regulated under the Resource Conservation and Recovery Act (RCRA); and public drinking water systems, regulated under the Safe Drinking Water Act (SDWA). ECHO also includes information about EPA cases under other environmental statutes. When available, information is provided on surrounding demographics, and ECHO includes other EPA environmental data sets to provide additional context for analyses, such as Toxics Release Inventory data. According to the ECHO program, the project site and adjoining properties are not listed as having a hazardous materials violation (EPA, 2023).

Under Government Code Section 65962.5, both the California Department of Toxic Substances Control (DTSC) and the State Water Resources Control Board (SWRCB) are required to maintain lists of sites known to have hazardous substances present in the environment. Both agencies maintain up-to-date lists on their websites. A search of the DTSC and SWRCB lists identified no open cases of hazardous waste violations onsite or within ½-mile of the site (DTSC, 2023; SWRCB, 2023).

The Siskiyou County Environmental Health Department (EHD) is the administering agency and the Certified Unified Program Agency (CUPA) for Siskiyou County with responsibility for regulating hazardous materials handlers, hazardous waste generators, underground storage tank facilities, above ground storage tanks, and stationary sources handling regulated substances. A Hazardous Materials Business Plan (HMBP) is required of businesses in Shasta County that handle, use, generate, or store hazardous materials. The primary purpose of this plan is to provide readily available information regarding the location, type, and health risks of hazardous materials to emergency response personnel, authorized government officials, and the public. Large cases of hazardous materials contamination or violations are referred to the North Coast Regional Water Quality Control Board (NCRWQCB) and the DTSC. Temporary construction activities associated with the proposed project do not require the preparation of a HMBP.

Regulatory Setting

Hazardous materials and wastes can pose a significant actual or potential hazard to human health and the environment when improperly treated, stored, transported, disposed of, or otherwise managed. Many federal, State, and local programs that regulate the use, storage, and transportation of hazardous materials and hazardous waste are in place to prevent these unwanted consequences. These regulatory programs are designed to reduce the danger that hazardous substances may pose to people and businesses under normal daily circumstances and as a result of emergencies and disasters.

Current federal, State, and local regulations relevant to the review of *Hazards and Hazardous Materials* for this project are summarized below. Ordinances, regulations, or standards that are applicable to the environmental review of potential impacts related to hazards and hazardous materials include the following:

California Environmental Protection Agency

One of the primary agencies that regulate hazardous materials is the Cal EPA. The State, through Cal EPA, is authorized by the EPA to enforce and implement certain federal hazardous materials laws and regulations. The California DTSC, a department of the Cal EPA, protects California and Californians from exposure to hazardous waste, primarily under the authority of the RCRA and the California Health and Safety Code. The DTSC requirements include the need for written programs and response plans, such as Hazardous Materials Business Plans. DTSC programs include dealing with cleanups of improper hazardous waste management; evaluation of samples taken from sites; enforcement of regulations regarding use, storage, and disposal of hazardous materials; and encouragement of pollution prevention.

California Division of Occupational Safety and Health

Like OSHA at the federal level, the California Division of Occupational Safety and Health (Cal/OSHA) is the responsible State-level agency for ensuring workplace safety. Cal/OSHA assumes primary responsibility for the adoption and enforcement of standards regarding workplace safety and safety practices. In the event that a site is contaminated, a site safety plan must be crafted and implemented to protect the safety of workers. Site safety plans establish policies, practices, and procedures to prevent the exposure of workers and members of the public to hazardous materials originating from contaminated sites or buildings.

California Building Code

The State of California provided a minimum standard for building design through the California Building Code (CBC), which is in Part 2 of Title 24 of the California Code of Regulations. Commercial buildings are plan-checked by the County for compliance with the CBC. Typical fire safety requirements of the CBC included the installation of sprinklers, establishment of fire resistance standards for fire doors, certain building materials, and particular types of construction, and the clearance of debris and vegetation within a prescribed distance from occupied structures in wildlife hazard areas.

California Vehicle Code

The State of California regulates the transportation of hazardous waste originating or passing through the state. Common carriers are licensed by the California Highway Patrol (CHP) pursuant to the California Vehicle Code, Section 32000. This section requires licensing for every motor (common) carrier who transports, for a fee, in excess of 500 pounds of hazardous materials at one time and every carrier, if not for hire, who carries more than 1,000 pounds of hazardous material of the type requiring placards. Common carriers conduct a large portion of the business in the delivery of hazardous materials.

California Department of Forestry and Fire Protection

The California Department of Forestry and Fire Protection (CAL FIRE) has mapped fire threat potential throughout California. CAL FIRE ranks fire threat based on the availability of fuel and the likelihood of an area burning (based on topography, fire history, and climate). The rankings include no fire threat, moderate, high, and very high fire threat. CAL FIRE produced the *2010 Strategic Fire Plan for California*, with goals, objectives, and policies to prepare for and mitigate the effects of fire on California's natural and built environments.

California Fire Code

The California Fire Code (CFC) is Part 9 of the California Building Standards Code (California Code of Regulations, Title 24). Updated every 3 years, the CFC includes provisions and standards for emergency planning and preparedness, fire service features, fire protection systems, hazardous materials, fire flow requirements, and fire hydrant locations and distribution. Similar to the CBC, the CFC is generally adopted on a jurisdiction-by-jurisdiction basis, subject to further modification based on local conditions.

Community Wildfire Protection Plan

The Community Wildfire Protection Plan (CWPP) (2018) reflects common goals to better enable the Lake Shastina community to protect itself. This CWPP is a living document which will change over time, as projects are implemented and new priorities arise. The Greater Lake Shastina Fire Safe Council (GLSFSC) will utilize the CWPP as a means for the community to participate in wildfire protection planning for the future.

Emergency Response to Hazardous Materials Incidents

To coordinate emergency services provided by local, state, and federal agencies, California has developed an Emergency Response Plan pursuant to the Emergency Services Act. The Plan is administered by the state Office of Emergency Services. Local agencies are required to develop area plans for an organized response to releases of hazardous materials that are dependent on Business Plans submitted by handlers of hazardous materials and waste within that agency's area. Pursuant to California Health and Safety Code, Section 25503(a) and CCR Section 2729, any business handling hazardous material must establish and implement a Hazardous Materials Business Plan. These Business Plans are then submitted to the local administering agency. In the County, the administering agency is Siskiyou County Environmental Health Department.

Lake Shastina Wildland Fire Evacuation Plan

The Lake Shastina Fire Department, with the assistance of the California Department of Forestry and Fire Protection and the Siskiyou County Office of Emergency Services, prepared the Wild Land Fire Evacuation Plan in the interest of public safety for the citizens of the Lake Shastina Community Services District. The evacuation plan describes potential impact areas within the Lake Shastina Community Services District, the number of people threatened, the designated evacuation routes and any critical or special facilities located within the District.

Siskiyou County Emergency Operations Plan

The Siskiyou County Emergency Operations Plan (EOP) establishes procedures for responding to various emergency situations, including regional flooding, nuclear power plant incident, volcanic activity, tsunami/seiche waves, hazardous materials incident, nuclear defense emergency, dam failure, approaching wildland fire, and seismic activity.

Siskiyou County Hazard Mitigation Plan

The purpose of the Siskiyou County Hazard Mitigation Plan is to implement and sustain actions that reduce vulnerability and risk from hazards or reduce the severity of the effects of hazards on people and property. Mitigation actions are both short-term and long-term activities, which reduce the cause or occurrence of hazards; reduce exposure to hazards or reduce effects of hazards through various means to include preparedness, response, and recovery measures.

Unified Hazardous Waste and Hazardous Materials Management Regulatory Program

In January 1996, Cal-EPA adopted regulations implementing a "Unified Hazardous Waste and Hazardous Materials Management Regulatory Program" (Unified Program). The six elements of the Unified Program are as follows: 1) hazardous waste generators and hazardous waste on-site treatment; 2) underground storage tanks; 3) above-ground storage tanks; 4) hazardous material release response plans and inventories 5) risk management and prevention programs; and 6) Unified Fire Code hazardous materials management plans and inventories. The Unified Program is implemented at the local level by a local agency — the Certified Unified Program Agency (CUPA). The CUPA is responsible for consolidating the administration of the six program elements within its jurisdiction. As mentioned above, the Siskiyou County Environmental Health Department is the designated CUPA for the County.

Impact Analysis

Fire Hazard Severity Zones and State Responsibility Areas maps and information available from the Lake Shastina Community Services District, Greater Lake Shastina Fire Safe Council, and CAL FIRE were reviewed. Evaluation of the potential impacts are based on information obtained from the above agencies and the California Building Code.

The following includes an analysis of environmental parameters related to *Hazards and Hazardous Materials* based on Appendix G of the State CEQA Guidelines. The discussion not only includes the areas for which there is potential for environmental impacts but also provides justification for the conclusions that either no impacts, less than significant impacts, or less than significant impacts with mitigation could occur.

Would the Project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?			X	
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?			X	
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?				X
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?				X
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?				X
f) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?			X	
g) Expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires?				X

a) *Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?*

Hazardous materials are typically chemicals or processes that are used or generated by a project that could pose harm to people working at the site or on adjacent areas. Many of these chemicals can cause hazardous conditions to occur should they be improperly disposed of or accidentally spilled as part of project development or operations. Hazardous materials are also those listed as hazardous pursuant to Government Code Section 65962.5.

The proposed project includes the use of regulated materials (such as petroleum hydrocarbons, fuels, and lubricants) for the use of mechanized equipment during construction. All hazardous or regulated materials that are used on site during construction activities will be properly stored and secured to prevent access by the general public; no construction equipment fuel or lubricants will be stored onsite during the project development. No hazardous materials will be disposed of at the project site. Procedures will be followed when handling or storing hazardous materials, and all job site employees will be trained in the proper usage and storage of hazardous materials, as needed. The potential hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials is less than significant.

In addition, a Stormwater Pollution Prevention Plan (SWPPP) would be prepared and implemented for the project. The SWPPP would describe any hazardous materials required for the project and would include best management practices for prevention of accidental spills as well as cleanup requirements for any accidental spills or releases of hazardous materials. Therefore, compliance with applicable laws and regulations would minimize the potential for the project to create a significant hazard to the public or the environment, and impacts would be less than significant. No mitigation measures are required.

b) *Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?*

Potential construction-related hazards could be created during the course of construction given that construction activities involve the use of heavy equipment, which uses small and incidental amounts of oils and fuels and other potentially flammable substances. The level of risk associated with the accidental release of hazardous substances is not considered significant due to the small volume and low concentration of hazardous materials used during construction. The construction contractor would be required to use standard construction controls and safety procedures that would avoid and minimize the potential for accidental release of such substances into the environment. Standard construction practices would be observed such that any materials released are appropriately contained and remediated as required by local, State, and federal law. All hazardous materials used for operations would be appropriately stored onsite and handled in accordance with County, State, and federal regulations. Because any hazardous materials used for operations would be in small quantities, long-term impacts associated with handling, storing, and disposing of hazardous materials from project operation would be less than significant.

Asbestos and lead paint may be present in the existing well houses or existing piping that may need to be removed or modified. Lead-based paint abatement or removal would include removal of any lead hazard, which, according to Title 17 of the California Code of Regulations, includes deteriorated lead-based paint and lead-contaminated soil (soil contaminated with lead paint chips). The California Occupational Safety and Health Administration (OSHA) lead standard for construction activities is implemented under Title 8 of the California Code of Regulations. The standard applies to any construction or demolition activity that may release lead dust or fumes, including manual scraping, manual sanding, heat gun applications, power tool cleaning, rivet busting, abrasive blasting, welding, cutting, or torch burning of lead-based coatings. With implementation of Mitigation Measure HAZ-1 and Mitigation Measure HAZ-2 impacts would be less than significant.

c) *Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?*

The proposed project would not emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school. No impacts would occur in this regard.

d) *Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?*

Under Government Code Section 65962.5, both the DTSC and the SWRCB are required to maintain lists of sites known to have hazardous substances present in the environment. Both agencies maintain up-to-date lists on their websites. A search of the DTSC and SWRCB lists identified no open cases of hazardous waste violations onsite or within ½-mile of the site (DTSC, 2023; SWRCB, 2023). No impact would occur in this regard.

e) *For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard or excessive noise for people residing or working in the project area?*

The proposed project is not located within an airport land use plan or within two miles of a public airport or public use airport. The nearest airport to the project site is the Weed Airport located approximately 4 miles to the west. No impact would occur in this regard.

f) *Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?*

As discussed above under the *Environmental Setting*, a Community Wildfire Protection Plan (CWPP) has been prepared for the greater Lake Shastina area in an effort to protect community residents and property owners from wildfires. The

CWPP identifies several emergency evacuation routes in and throughout the District; however, there is no adopted emergency evacuation plan applicable to the project area. No roadway closures are anticipated during temporary construction activities. As a result, the proposed project would not impair implementation of any emergency response plan or emergency evaluation plan as it would not alter existing roadways, or physically interfere with existing roadway patterns. Impacts would be less than significant.

g) *Expose people or structures, either directly or indirectly, to a significant risk of loss, injury, or death involving wildland fires?*

The District has identified several deficiencies in the overall water treatment system including aging tanks, inadequate water storage, inadequate pressure in the southeast zone, lack of backup power, and aging fire hydrants. To remedy these deficiencies, the District proposes a combination of replacement components and new construction (well house buildings and one above ground water tank). As a result, the proposed project is considered to provide a long-term benefit to fire protection services within the District.

The proposed project is located within the response area of LSFD. The LSFD is located onsite at 16309 Everhart Drive. The proposed project would not result in any alterations to slope, wind, or other factors that could potentially exacerbate wildfire risks onsite or within the project vicinity. No impact would occur in this regard.

Mitigation Measures

The following mitigation measures have been developed to reduce potential impacts related to *Hazards and Hazardous Materials* to less than significant levels:

Mitigation Measure HAZ-1

Prior to initiation of construction activities that would affect existing structures and associated piping, a comprehensive survey shall be completed in locations where asbestos and lead-based paint are suspected. Removal or disturbance of material with any detectable amount of asbestos or lead-based paint must be handled in accordance with OSHA regulations. All hazardous materials shall be removed by trained and authorized personnel and disposed of at a licensed facility in compliance with local, State, and federal regulations and guidelines.

Mitigation Measure HAZ-2

In the event previously undetected asbestos or lead-containing materials are discovered during construction, activities that may affect the materials shall cease until results of additional surveys are reviewed. Alternatively, the District can assume that the materials are hazardous. Any identified hazardous materials shall be disposed of in accordance with applicable hazardous waste regulations.

Findings

Based upon the review of the information above, with implementation of mitigation measures the proposed project will have a less than significant impact with respect to *Hazards and Hazardous Materials*.

Documentation and References

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X. Hydrology and Water Quality

The purpose of this section of the Initial Study is to describe the hydrologic and water quality setting of the proposed project site and surrounding area. This section also evaluates potential long-term and short-term water quality impacts associated with construction and long-term operation of the proposed project.

Environmental Setting

The Lake Shastina Community Services District (District) surrounds a portion of Lake Shastina, a lake that is formed by Dwinell Dam. The lake is primarily fed by surface water from precipitation and the Shasta River that enters the lake from the south. Water leaves the lake below Dwinell Dam and continues down the Shasta River or is taken through surface ditches for agricultural use by local irrigation users.

Surface Water Resources

The project location is within the Shasta River watershed (hydrologic unit code 18010207). Snowmelt from Mount Shasta contributes significantly to surface runoff and groundwater hydrology. Water from melted snow percolates down through porous volcanic rocks and flows subsurface, eventually emerging as springs and seeps on the valley margin or floor. The project area contains four hydrology types: one lake (Lake Shastina), two freshwater ponds, and one river (Shasta River). Lake Shastina is a 1,613-acre lake that is classified as L1UBHh (lacustrine, limnetic, unconsolidated bottom, permanently flooded, and diked). Lost Lake, which is one of the freshwater ponds, is 10.41 acres and situated 0.28 miles west of Lake Shastina and is classified as a PABG (palustrine, aquatic bed, and intermittently exposed). The unnamed freshwater pond that is located within the northeast mouth of Lake Shastina, is 2.94 acres and classified as a PABGx (palustrine, aquatic bed, intermittently exposed, and excavated). The Shasta River enters Lake Shastina in the southwest corner and flows/exists through the riverine north of Lake Shastina. After 0.5 miles due north, the river flows northwest towards the Klamath River. Shasta River has various classifications within the study area that include R3UBH (riverine, upper perennial, unconsolidated bottom, permanently flooded), PEM1C (palustrine, emergent, persistent, seasonally flooded), PSSC (palustrine, scrub-shrub, seasonally flooded), PEM1A (palustrine, emergent, persistent, and temporary flooded), PEM1Ch (palustrine, emergent, persistent, seasonally flooded, diked), and PFOC (Palustrine, forested, and seasonally flooded) (SHN, 2023a).

Lake Shastina has a large seepage rate to the groundwater basin beneath the Shasta River to the northwest. The Montague canal from Lake Shastina also has a high seepage rate (estimated as 25% of the canal flow) that recharges the groundwater between Lake Shastina and Montague. There is also considerable recharge from the irrigated pastures and alfalfa fields in other parts of Shasta Valley (SHN, 2023a).

Groundwater Resources

The Siskiyou County Flood Control and Water Conservation District is participating in a consortium of nearby groundwater users to form a Groundwater Sustainability Agency (GSA) pursuant to the requirements of AB 1739, SB 1168, and SB 1319 collectively known as the Sustainable Groundwater Management Act (SGMA).

The proposed project is located within the Shasta Valley Groundwater Basin (SVWB). The SVWB is a medium priority basin located in Northern California and is bounded by Mount Shasta to the South, the Klamath Mountains to the west and the Cascade Range to the east and the Klamath River to the north. As a medium priority basin, a Groundwater Sustainability Plan (GSP) is required which outlines a 20-year plan to direct sustainable groundwater management activities that considers the needs of all users in the SVWB and ensures a viable groundwater resource for beneficial use by agricultural, residential, industrial, municipal, and ecological users (SCFCWCD, 2021; 2023).

Flood Hazards

The Federal Emergency Management Agency (FEMA) has mapped the 100-year and 500-year floodplains throughout Siskiyou County. The majority of the site is located outside of the mapped 100-year floodplain; however, there are several existing residents along the shore of Lake Shastina within Zone A, Special Flood Hazard Areas (without base flood elevation) (FEMA, 2011).

Regulatory Setting

This section summarizes current federal, State, and local regulations relevant to the review of *Hydrology and Water Quality* for this project. Ordinances, regulations, or standards that are applicable to the environmental review of potential impacts related to hydrology and water quality include the following:

Clean Water Act

The Clean Water Act (CWA) is a federal law that protects the nation's surface waters, including lakes, rivers, coastal wetlands, and "waters of the United States." The CWA specifies that discharges to waters are illegal, unless authorized by an appropriate permit. The permits regulate the discharge of dredged and fill materials, construction-related stormwater discharges, and activities that may result in discharges of pollutants to waters of the United States. If waters of the U.S. are located on a project site, a proposed project is likely to discharge to them, and if impacts on them are anticipated, the project must obtain a CWA Section 401 Water Quality Certification from the appropriate Regional Water Quality Control Board (RWQCB).

Federal Anti-Degradation Policy

The federal Anti-Degradation Policy is part of the CWA (Section 303(d)) and is designed to protect water quality and water resources. The policy directs states to adopt a statewide policy that includes the following primary provisions: (1) existing instream uses and water quality necessary to protect those uses shall be maintained and protected; (2) where existing water quality is better than necessary to support fishing and swimming conditions, that quality shall be maintained and protected unless the state finds that allowing lower water quality is necessary for important local economic or social development; and (3) where high-quality waters constitute an outstanding national resource, such as waters of national and state parks, wildlife refuges, and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected.

National Pollutant Discharge Elimination System

The NPDES program is administered by the U.S. Environmental Protection Agency (EPA), which delegated oversight in California to the Regional Water Quality Control Boards. The NPDES program provides general permits and individual permits. The general permits are for construction projects that disturb more than one acre of land. The general permit requires the applicant to file a public Notice of Intent (NOI) to discharge stormwater and to prepare and implement a Stormwater Pollution Prevention Plan (SWPPP). The SWPPP includes a site map, description of proposed activities, demonstration of compliance with applicable ordinances and regulations, and a description of Best Management Practices (BMPs) that would be implemented to reduce erosion and discharge of construction-related pollutants. The CWA-established NPDES permit program regulates municipal and industrial discharges to surface waters of the United States from their municipal separate storm sewer systems (MS4s). Under the NPDES program, all facilities that discharge pollutants into waters of the United States are required to obtain a NPDES permit. Requirements for stormwater discharges are also regulated under this program.

Porter-Cologne Water Quality Control Act

The Porter-Cologne Water Quality Control Act acts in cooperation with the CWA to establish the SWRCB. The SWRCB is divided into nine regions, each overseen by an RWQCB. The SWRCB, and thus each RWQCB, is responsible for protecting

California's surface waters and groundwater supplies. The Porter-Cologne Water Quality Control Act develops Basin Plans that designate the beneficial uses of California's rivers and groundwater basins. The Basin Plans also establish narrative and numerical water quality objectives for those waters. Basin Plans are updated every three years and provide the basis of determining waste discharge requirements, taking enforcement actions, and evaluating clean water grant proposals. The Porter-Cologne Water Quality Control Act is also responsible for implementing CWA Sections 401-402 and 303(d) to SWRCB and RWQCBs.

Siskiyou County Emergency Operations Plan

The Siskiyou County Emergency Operations Plan (EOP) establishes procedures for responding to various emergency situations, including regional flooding, nuclear power plant incident, volcanic activity, tsunami/seiche waves, hazardous materials incident, nuclear defense emergency, dam failure, approaching wildland fire, and seismic activity.

State Water Resources Control Board Waste Discharge Requirements

Waste discharges that can be exempted from the California Code of Regulations (CCR) requirements are issued waste discharge requirements (WDRs) and are regulated by the WDR Program. Typical discharge types include domestic or municipal wastewater, food processing related wastewater, and industrial wastewater.

Statewide General Construction Permit

Construction projects of one acre or more are regulated under the Construction General Permit, Order No. 2012-0006-DWQ, issued by the SWRCB. Under the terms of the permit, applicants must file permit registration documents with the SWRCB prior to the start of construction, including a Notice of Intent, risk assessment, site map, SWPPP, annual fee, and signed certification statement.

Sustainable Groundwater Management Act

In 2014, California enacted the Sustainable Groundwater Management Act (SGMA; Water Code Section 10720 et seq.). SGMA and related amendments to California law require all groundwater basins designated as high or medium priority in the DWR California Statewide Groundwater Elevation Monitoring (CASGEM) Program, and that are subject to critical overdraft conditions, must be managed under a new Groundwater Sustainability Plan (GSP) or a coordinated set of GSPs. High or medium priority basins that are not subject to a critical overdraft must be regulated under one or more GSPs by 2022. Where GSPs are required, one or more local Groundwater Sustainability Agencies (GSAs) must be formed to implement applicable GSPs. A GSA has the authority to require registration of groundwater wells, measure and manage extractions, require reports, and assess fees, and to request revisions of basin boundaries, including establishing new subbasins.

In Siskiyou County there are four basins that fall under the requirements of SGMA; the Shasta, Scott and Butte Valley Basins and the Tulelake Subbasin. To carry out the requirements of SGMA, the Siskiyou County Flood Control and Water Conservation District serves as the Groundwater Sustainability Agency (GSA) for the three basins, and the Siskiyou County Board of Supervisors serves as a member of the GSA for the Tulelake Subbasin; alongside Tulelake Irrigation District, Modoc County and the City of Tulelake.

Water Quality Control Plan for the North Coast Region

The *Water Quality Control Plan for the North Coast Region* (Basin Plan) contains the regulations adopted by the North Coast Regional Water Quality Control Board (Regional Water Board) to control the discharge of waste and other controllable factors affecting the quality of waters of the state within the boundaries of the North Coast Region. Porter-Cologne defines "Waters of the state" to mean any surface water or groundwater, including saline waters, within the boundaries of the state. The Basin Plan, as amended periodically, establishes the beneficial uses of water within the region; the water quality objectives necessary to protect those uses, including an Anti-degradation policy; the prohibitions, policies, and action plans, by which protections are implemented; and the monitoring, which is conducted to ensure attainment of water quality standards. Under the Clean Water Act, water quality standards include designated uses, water quality criteria, and an Anti-degradation policy. Porter-Cologne modifies the federal language to refer to designated uses as *beneficial uses* and water quality criteria as *water quality objectives*, which includes the State Water Board's Anti-degradation policy (Resolution 68-16). Porter-Cologne also requires a *program of implementation* for water quality protection in California. A program of implementation includes actions necessary to achieve objectives, a time schedule for the actions to be taken, and monitoring to determine compliance with water quality objectives and protection of beneficial uses of water.

The Basin Plan is adopted by the Regional Water Board and approved by the State Water Resources Control Board (State Board), and the Office of Administrative Law (OAL). The United State Environmental Protection Agency (USEPA) approves the water quality standards contained in the Basin Plan, as required by the Clean Water Act.

The Basin Plan is used as a regulatory tool by the Regional Water Board. Regional Water Board orders cite the Basin Plan's water quality standards, prohibitions, and other programs of implementation applicable to a particular discharge or category of discharge. The Basin Plan is also used by other agencies in their permitting and resource management activities. Further, it serves as an educational and reference document for dischargers and members of the public.

Impact Analysis

The following includes an analysis of environmental parameters related to *Hydrology and Water Quality* based on Appendix G of the State CEQA Guidelines. The discussion not only includes the areas for which there is potential for environmental impacts but also provides justification for the conclusions that either no impacts, less than significant impacts, or less than significant impacts with mitigation could occur.

Would the Project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?			X	
b) Substantially decease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?			X	
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:				
i) Result in substantial erosion or siltation on- or off-site;			X	
ii) Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site;			X	
iii) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or			X	
iv) Impede or redirect flood flows?			X	
d) In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?			X	
e) Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?			X	

a) *Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?*

Implementation of the proposed project would not require the District to secure a waste discharge requirements (WDR) from the North Coast Regional Water Quality Control Board (NCRWQCB). Construction of the proposed project would involve excavation, grading, and installation of project components, which would result in the temporary disturbance of soil and would expose disturbed areas to potential storm events. This could generate accelerated runoff, localized erosion, and sedimentation. In addition, construction activities could expose soil to wind erosion that could adversely affect onsite soils and the re-vegetation potential of the area.

Earthwork, grading, and soil stockpiling activities associated with construction will be conducted in accordance with the conditions of a grading permit issued by the Siskiyou County. The area of ground disturbing activity is anticipated to be over 1-acre and is subject to coverage under the General Permit for Discharges of Storm Water Associated with Construction Activity (NPDES General Permit No. CAS000002). A Construction Stormwater Pollution Prevention Plan (SWPPP) and Notice of Intent (NOI) administered by the NCRWQCB will be required prior to construction. The Construction SWPPP will specify Best Management Practices (BMPs) for erosion and sediment control measures.

Typical BMPs are developed to address spill prevention and erosion/sediment control to prevent damage to streams, watercourses, and aquatic habitats. BMPs may include, but are not limited to, limiting construction to the dry season; pruning plants at ground level (where appropriate); use of straw wattles, silt fences, and/or gravel berms to prevent sediment from discharging to surface waters; installation of a spill containment system to prevent grease, oil, and other hazardous substances from discharging offsite; and revegetating temporarily disturbed sites upon completion of construction. Because BMPs for erosion and sediment control would be implemented in accordance with existing requirements, the potential to violate any water quality standards or otherwise substantially degrade surface or ground water quality would be less than significant.

b) *Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?*

A test well (Well No. 10) was installed in 2017 to a total depth of 180 feet below ground surface. Groundwater was first encountered at 145 feet below ground surface and rose rapidly to 86 feet below ground surface. This test well achieved 280 gallons per minute, steady state conditions were achieved with a 25 foot drawdown and held for 15 hours. This data yields a specific capacity of 11.02 gallons per minute per foot. This specific capacity at 25 feet of drawdown corresponds to approximately 750 gallons per minute in a 10 inch well, 1,000 gallons per minute in a 12 inch well, 1,450 gallons per minute in a 14 inch well, or 1,900 gallons per minute in a 16 inch well. Based on the calculated specific capacity, a pumping rate of 1,450 gallons per minute with a 25 foot drawdown can be expected with a 14 inch diameter well. To provide backup a backup water source The project would install a new 14 inch production well meeting these requirements within the vicinity of Well No. 2 or Well No. 4 in the event that Well No. 4 fails or conditions otherwise necessitate the need for additional water.

Properties surrounding the new well location (near Well No. 2 or Well No. 4) are either connected to the District's water system or are agricultural properties that are served by irrigation wells. The closest existing non-District well is located approximately 0.75 miles to the northeast and drawdown at this well as a result of the District's new production well is not anticipated. Once installed the District will conduct groundwater and water quality monitoring, meter groundwater pumping, and continue to promote water conservation. These measures ensure that impacts to groundwater supplies are not adversely impacted. In addition, because the purpose of the proposed well is to provide an emergency backup to water supply to Well No. 4, excessive groundwater pumping would not occur.

With respect to groundwater recharge, the proposed water tank would increase the amount of imperious surfaces that would prevent the infiltration of water into the soil. However, the amount of new surface coverage would be on the order of 2,000 square feet for the water tank and approximately 200 square feet for the new well house; this would not substantially affect the potential for groundwater recharge.

Therefore, because the District will conduct ongoing water level and water quality monitoring, and meter groundwater pumping; and the proposed project would not significantly increase the amount of impervious surface that would interfere with groundwater recharge, impacts on groundwater supplies and groundwater recharge are less than significant.

c) *Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:*

i. *Result in substantial erosion or siltation on- or offsite:*

As previously discussed above, earthwork, grading, and soil stockpiling activities associated with construction activities will be conducted in accordance with the conditions of a Construction SWPPP and NOI administered by the NCRWQCB. The Construction SWPPP will specify BMPs for erosion and sediment control measures. Therefore, the potential for substantial soil erosion and loss of topsoil associated with the proposed project is considered to be less than significant.

ii. *Substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or offsite:*

The new above ground water storage tank and well house will be constructed to conform to existing drainage patterns. The increase in impervious surfaces would be minimal, would occur outside of flood hazard zones, and would not result in a substantial increase in the rate or amount of surface runoff. All fire hydrants to be replaced at their current location with water meters placed underground and would not alter existing drainage patterns or increase impervious surfaces. In addition, implementation of the proposed project would not involve vegetation or soil disturbance within 50 feet of a stream or drainage and will not have hydrological impacts to any adjacent jurisdictional (RWQCB or California Department of Fish and Wildlife [CDFW]) features. As a result, the proposed project does not have the potential to result in significant flooding on or offsite. Less than significant impacts would occur in this regard.

iii. *Create or contribute runoff water which would exceed the capacity of existing planned stormwater drainage systems or provide substantial additional sources of polluted runoff:*

Refer to previous impact discussions under X.a, X.c.i, and X.c.ii. Impacts would be less than significant.

iv. *Impede or redirect flood flows:*

The majority of the site is located outside of the mapped 100-year floodplain; however, there are several existing residents along the shore of Lake Shastina within Zone A, Special Flood Hazard Areas (without base flood elevation) (FEMA, 2011). Work within Zone A would be limited to replacing existing fire hydrants and water meters in their existing location. No new impermeable surfaces or changes in flood flows would occur. All other proposed improvements are located outside the flood hazard zone. Impacts would be less than significant.

d) *In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation?*

For flood hazards, refer to previous impact discussion under X.c.iv. Fire hydrant and meter replacement activities within Zone A will be conducted in accordance with the conditions of a Construction SWPPP and NOI administered by the NCRWQCB. In addition, this type of infrastructure replacement requires limited ground disturbance for short periods of time, thereby reducing the duration of exposed soils and the presence of construction materials and equipment. Soil disturbance would occur within 10 feet of each fire hydrant and approximately 48 inches of depth with the use of a backhoe and hand tools. Therefore, the risk of releasing pollutants due to inundation is considered less than significant.

A tsunami is a wave generated in a large body of water (typically the ocean) by fault displacement or major ground movement. The project area is approximately 88 miles east of the Pacific Ocean, and there is no risk of inundation from a tsunami.

A seiche is a large wave generated in an enclosed body of water in response to ground shaking. The closest body of water to the project site is the Lake Shastina reservoir. Seiches could potentially be generated in the reservoir due to very strong ground-shaking. However, the reservoir is located in an area with little seismic activity; therefore, the risk of inundation of project facilities from a seiche is negligible.

e) *Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?*

The proposed project is located within the Shasta Valley Groundwater Basin. The NCRWQB has prepared the *Water Quality Control Plan for the North Coast Regional* that encompasses that Shasta Valley Basin and includes water quality objectives for the Shasta River. Implementation of the plan is conducted through the NPDES permits and waste discharge requirements for pollution (NCRWQCB, 2018). As discussed above, a Construction SWPPP and NOI administered by the NCRWQCB will be required prior to construction. The Construction SWPPP will specify BMPs for erosion and sediment control measures. Therefore, implementation of the proposed project would not result in a conflict with the water quality control plan.

As previously discussed above under *Environmental Setting,* the project site and surrounding area is located within the Shasta Valley Groundwater Basin (DWR, 2023). The SVWB is a medium priority basin, a Groundwater Sustainability Plan (GSP) is required which outlines a 20-year plan to direct sustainable groundwater management activities that considers the needs of all users in the SVWB and ensures a viable groundwater resource for beneficial use by agricultural, residential, industrial, municipal, and ecological users (SCFCWCD, 2021; 2023). It is important to note that the area of the proposed project within the SVWB is not adjudicated. As the basin is not in overdraft, no legal pumping limit has been set; therefore, no overdraft mitigation efforts are currently underway. Given the current status of the SVWB as a non-adjudicated basin, the proposed project's lack of groundwater impacts, and the continued management of the of the SVWB by the GSP, the proposed project would not result in adverse impacts to groundwater resources. Impacts are considered less than significant in this regard.

Mitigation Measures

No mitigation measures are required.

Findings

Based upon the review of the information above, implementation of the proposed project will have a less than significant impact with respect to *Hydrology and Water Quality*.

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XI. Land Use and Planning

This section of the Initial Study describes the impacts on land use and planning that would result from implementation of the proposed project, including consistency with relevant local land use plans and compatibility with surrounding land uses.

Environmental Setting

The project area is situated between approximately 2,680 and 3,230 feet above the mean sea level, with the highest elevations represented at the most southeastern corner of the project area where Jackson Ranch Road and A29/Big Springs Road meet. Lake Shastina was created with the construction of the Dwinnell Dam. The Lake Shastina community has been under development for the past 54 years with road, underground power, water, and sewage improvements to support approximately 2,400 residents. The overall environmental setting within the project area consists of rural residential development with managed landscapes.

Existing General Plan and Zoning

The Siskiyou County General Plan does not have specific zoning based on designations (such as commercial, residential, agriculture, etc.). Rather, it is based on land classifications, such as hazards and other resource area specific topics which are overlays. Evaluation for the project Site and immediately surrounding lands shows that the designated overlays for the Project include Erosion Hazard, Building Foundation Limitations, Flood Hazard, Surface Hydrology, Deer Wintering Area and Wildfire Hazard. The existing Siskiyou County zoning is RES-1 (Single-Family Residential).

Regulatory Setting

Siskiyou County General Plan

The Siskiyou County General Plan is a blueprint for future development and describes the County's development goals and policies, It also is the foundation for land use decisions made by the Planning Commission and Board of Supervisors Although the General Plan established standards for the location and density of land uses, it does not directly regulate the land use as does zoning. The County's General Plan was utilized throughout this Initial Study as the fundamental planning document governing development on the proposed project site.

Siskiyou County Code

The Zoning Ordinance (Title 10) of the Siskiyou County Code of Ordinances promotes the protection of public health, safety, peace, morals, comfort, convenience and general well fare of the County. Specially, the zoning ordinance assists in providing a definite plan of development of the County and to guide, control and regulate future growth of the County through the regulation of land uses, buildings and structures.

Impact Analysis

The following includes an analysis of environmental parameters related to *Land Use and Planning* based on Appendix G of the State CEQA Guidelines. The discussion not only includes the areas for which there is potential for environmental impacts but also provides justification for the conclusions that either no impacts, less than significant impacts, or less than significant impacts with mitigation could occur.

Would the Project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Physically divide an established community?				X

Would the Project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
b) Cause a significant environmental impact due to conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?				X

a) *Physically divide an established community?*

The District has identified several deficiencies in the overall water treatment system including aging tanks, inadequate water storage, inadequate pressure in the southeast zone, lack of backup power, and aging fire hydrants. To remedy these deficiencies, the District proposes a combination of replacement components and new construction (well house buildings and one above ground water tank). No onsite development is proposed at this time. The proposed project does not include the creation of any road, ditch, wall, or other feature which would physically divide an established community. No impact would occur in this regard.

b) *Cause a significant environmental impact due to conflict with any land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect?*

The proposed project would not conflict with any applicable land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect. As discussed in each resource section of this Initial Study, the proposed project is consistent with applicable policies and regulations of the regulatory agencies identified in the Environmental Checklist Form of this Initial Study. Were necessary, mitigation measures are included to reduce impacts to less than significant levels. Therefore, the proposed project would not conflict with any plans, policies, or regulations adopted for the purpose of avoiding or mitigating an environmental effect. Impacts would be less than significant.

Mitigation Measures

No mitigation measures are required.

Findings

In the course of the above evaluation, impacts associated with *Land Use and Planning* were found to not be significant because of the inability of a project of this scope to create such impacts or the absence of project characteristics producing effects of this type.

Documentation and References

SHN (SHN Consulting Engineers and Geologists). 2023. *Preliminary Engineering Report for Drinking Water System Improvements*. December 2023.
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XII. Mineral Resources

The purpose of this section of the Initial Study is to address potential impacts of the proposed project on mineral resources. This section also discusses the proposed project in the context of regional and local mineral resources and addresses the potential impacts to mineral resource deposits that may occur as a result of implementation of the proposed project.

Environmental Setting

A mineral resource is land on which known deposits of commercially viable mineral or aggregate deposits exist. This designation is applied to sites determined by the State Division of Mines and Geology as being a resource of regional significance and is intended to help maintain any quarrying operations and protect them from encroachment of incompatible uses.

The California Department of Conservation's (DOC) Division of Mine Reclamation (DMR) compiles data on the status of mines and the commodities produced. The California Geological Survey (CGS) produces Mineral Land Classification (MLC) studies that identify areas with potentially important mineral resources that should be considered in local and regional planning. Based on maps prepared by the DOC and CGS, this area of Siskiyou County does not contain oil, natural gas, or geothermal fields (DOC, 2023).

Regulatory Setting

This section summarizes current State and local regulations relevant to the review of *Mineral Resources* for this project. Ordinances, regulations, or standards that are applicable to the environmental review of potential impacts related to mineral resources include the following:

Surface Mining and Reclamation Act

The Surface Mining and Reclamation Act of 1975 (SMARA, Public Resources Code, Sections 2710-2796) provides a comprehensive surface mining and reclamation policy with the regulation of surface mining operations to assure that adverse environmental impacts are minimized, and mined lands are reclaimed to a usable condition. SMARA also encourages the production, conservation, and protection of the state’s mineral resources. Public Resources Code Section 2207 provides annual reporting requirements for all mines in the state, under which the State Mining and Geology Board is also granted authority and obligations. SMARA also requires the State Geologist to classify land into MRZs according to its known or inferred mineral potential. The primary goal of mineral land classification is to ensure that the mineral potential of land is recognized by local government decision makers and considered before land-use decisions are made that could preclude mining.

Division of Mine Reclamation

In 1991, the Division of Mine Reclamation (DMR) was created to provide a measure of oversight for local governments as they administer the Surface Mining and Reclamation Act (SMARA) within their respective jurisdictions. While the primary focus is on existing mining operations and the return of those mined lands to a usable and safe condition, issues relating to abandoned legacy mines are addressed through the Abandoned Mine Lands Unit.

Impact Analysis

The following includes an analysis of environmental parameters related to *Mineral Resources* based on Appendix G of the State CEQA Guidelines. The discussion not only includes the areas for which there is potential for environmental impacts but also provides justification for the conclusions that either no impacts, less than significant impacts, or less than significant impacts with mitigation could occur.

Would the Project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the State?				X
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?				X

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?*

The project would not 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. There are no known mineral resources of regional value located on or near the proposed project site. No impact would occur in this regard.

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?*

The proposed project would not result in the loss of availability of a locally-important mineral resource recovery site delineated the County's General Plan or other land use plan. The proposed project is not located within or adjacent to a specific plan adopted by the County. The proposed project is not identified in either General Plan as having any known mineral resource value, or as being located within any "Mineral Resource Buffer" district. No impact would occur in this regard.

Mitigation Measures

No mitigation measures are required.

Findings

In the course of the above evaluation, impacts associated with *Mineral Resources* were found to not be significant because of the inability of a project of this scope to create such impacts or the absence of project characteristics producing effects of this type.

Documentation and References

DOC (California Department of Conservation). 2023. *The CGS Information Warehouse: MLC.* [Online]: https://maps.conservation.ca.gov/cgs/informationwarehouse/mlc/. Accessed December 8, 2023.

SHN (SHN Consulting Engineers and Geologists). 2023. *Preliminary Engineering Report for Drinking Water System Improvements*. December 2023.

Siskiyou (Siskiyou County). 1972. *Siskiyou County General Plan*. 1972, as amended.

Siskiyou. 2023. *Siskiyou County Geographic Information System*. [Online]: https://www.co.siskiyou.ca.us/gis. Accessed December 8, 2023.

XIII. Noise

The purpose of this section of the Initial Study is to evaluate noise source impacts to onsite and surrounding land uses as a result of project implementation.

Environmental Setting

Noise impacts are those that exceed general plan or other local ordinances developed to provide reasonable control of noise to residences, parks, open spaces and other specific designated sites. Noise sources typically include roadways, freeways, schools, industrial and commercial operations and other facilities that can generate noise.

In the vicinity of the project, noise generation sources include traffic along Big Springs Road, seasonal agricultural operations (haying, harvesting, grading, etc.), residential use noise (music, lawn mowers, cars, etc.) and some limited noise from users of the golf courses. These types of uses can produce noise levels in the 60-100 dBA range. There are no other noise sources of significance in the area.

Sensitive Noise Receptors

Residential developments, schools and hospitals are considered sensitive noise receptors as these are locations where people sleep or typically expect quiet conditions. Sensitive noise conditions are typically at night and measured as indoor levels in decibels (dB). Based on findings in the Siskiyou County General Plan Noise Element (Siskiyou County, 1980), the average median ambient noise level standards for residential areas is 51 dBA, which will be used for impact assessments. Sensitive receptors within the project area are primarily rural residential uses.

Airports

The Weed Municipal Airport is a public-use airport located approximately four miles west of the project area and is not located within the Weed Municipal Airport Land Use Plan or within two miles of a private airport or airstrip.

Regulatory Setting

This section summarizes current State and local regulations relevant to the review of *Noise* for this project. Ordinances, regulations, or standards that are applicable to the environmental review of potential impacts related to noise include the following:

California Government Code

California Government Code Section 65302 (f) mandates that the legislative body of each county and city adopt a noise element as part of its comprehensive general plan. The local noise element must recognize the land use compatibility guidelines established by the State Department of Health Services. The guidelines rank noise land use compatibility in terms of “normally acceptable”, “conditionally acceptable”, “normally unacceptable”, and “clearly unacceptable” noise levels for various land use types. Single-family homes are “normally acceptable” in exterior noise environments up to 60 CNEL and “conditionally acceptable” up to 70 CNEL. Multiple-family residential uses are “normally acceptable” up to 65 CNEL and “conditionally acceptable” up to 70 CNEL. Schools, libraries, and churches are “normally acceptable” up to 70 CNEL, as are office buildings and business, commercial, and professional uses.

Siskiyou County General Plan

The Siskiyou County General Plan Noise Element (Siskiyou, 1980) provides general guidance for noise related activities in the County with some very limited site specific noise contours and analysis for portions of the County. For this project, there is no information in the Noise Element that relates to the project area, other than a brief designation that Lake Shastina is denoted as a residential area. The Noise Element provides general guidance with the establishment of an outdoor noise criterion of 55 decibels for outdoor activity noise annoyance. Meaning that at about 55 decibels, noise may be considered annoying or interfering with peoples' enjoyment of the outdoors. While the threshold is established, there is no criteria that discusses permanent versus temporary noise thresholds.

Title 24 - Building Code

The State's noise insulation standards are codified in the California Code of Regulations, Title 24: Part 1, Building Standards Administrative Code, and Part 2, California Building Code. These noise standards are applied to new construction in California for the purpose of interior noise compatibility from exterior noise sources. The regulations specify that acoustical studies must be prepared when noise-sensitive structures, such as residential buildings, schools, or hospitals, are located near major transportation noise sources, and where such noise sources create an exterior noise level of 65 dBA CNEL or higher. Acoustical studies that accompany building plans must demonstrate that the structure has been designed to limit interior noise in habitable rooms to acceptable noise levels. For new residential buildings, schools, and hospitals, the acceptable interior noise limit for new construction is 45 dBA CNEL.

Impact Analysis

The following includes an analysis of environmental parameters related to *Noise* based on Appendix G of the State CEQA Guidelines. The discussion not only includes the areas for which there is potential for environmental impacts but also provides justification for the conclusions that either no impacts, less than significant impacts, or less than significant impacts with mitigation could occur.

Would the project result in:		Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a)	Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?		X		
b)	Generation of excessive ground-borne vibration or ground-borne noise levels?			X	
c)	For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?				X

a) *Generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?*

Construction activities generally are temporary and have a short duration, resulting in periodic increases in the ambient noise environment. As described throughout this document, implementation of the proposed project would occur over a period of approximately 4 years and would include the construction on a new water tank, booster pump station improvements, and the replacement of up to 320 fire hydrants. Ground-borne noise and other types of construction-related noise impacts typically occur during the grading phase. Activities and equipment involved with construction activities are estimated to generate maximum noise levels ranging from 85 to 89 dBA at a distance of 50 feet (FHWA, 2006). As described in the *Regulatory Setting* section, the County does not have any standards related to construction noise in either the General Plan or County Code. However, the estimated noise levels from project implementation have the potential to cause significant impacts to sensitive receptors surrounding the project site without mitigation.

Sensitive receptors that could be impacted by temporary construction activities include existing residents within 100 feet of the proposed improvements. Given its temporary nature, the proposed construction activities would result in a short-term noise impact in the vicinity of the project site. To mitigate the noise impacts from short-term construction activities, Mitigation Measure N-1 has been required for the proposed project. Mitigation Measure N-1 limits construction activities to the hours between 7:00 a.m. and 7:00 p.m. Monday through Saturday. No demolition or other activities would be allowed during evening, nights, or on Sundays. With implementation of Mitigation Measure N-1, impacts to nearby sensitive receptors from construction activities would be less than significant.

b) *Generation of excessive ground-borne vibration or ground-borne noise levels?*

The proposed project's construction activity has the potential to result in minor groundborne vibration and groundborne noise primarily from the use of off-road heavy-duty equipment. The closest land uses potentially impacted by groundborne vibration and groundborne noise include residences adjacent to existing well houses, fire hydrants, and new water tank location. Construction activities would occur within approximately 100 feet of existing residents on average. Ground vibrations from the use of off-road heavy-duty equipment rarely reaches the levels that can damage structures. Any potential damage would typically be due to direct proximity to a structure, which would not occur during the proposed demolition activities. Pile-driving during construction generates the highest levels of vibration; however, pile-driving would not be required. Although minor vibration may occur from the proposed construction activities at the nearest land uses, it is not anticipated that project implementation would result in the generation of excessive groundborne vibration or groundborne noise levels. Therefore, the proposed project would result in a less than significant impact in this regard.

c) *For a project located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?*

The closest public use airport to the project site is the Weed Municipal Airport, which is just over four miles west of the project site. In addition, according to the Federal Aviation Administration, the project site is not located in the vicinity of a private air strip. Since the project would not result in people residing at the project site and the project area is located well beyond the noise impacts zone for this airport, it is not anticipated that the project would result in exposing people to excessive noise levels from the Weed Municipal Airport. No impact would occur in this regard.

Mitigation Measures

The following mitigation measure has been developed to reduce potential impacts related to *Noise* to less than significant levels:

Mitigation Measure N-1

The project contractor shall be responsible for complying with the following measures during construction activities to reduce potential noise impacts:

- Construction activities shall be restricted to the hours between 7:00 a.m. and 7:00 p.m. Monday through Saturday. Construction activities shall also be prohibited during evening, nights, or on Sunday.

Findings

Based upon the review of the information above, with implementation of mitigation measures the proposed project will have a less than significant impact with respect to *Noise*.

Documentation and References

FHWA (Federal Highway Administration). 2006. *FHWA Highway Construction Noise Handbook, Final Report.* August. [Online]: https://rosap.ntl.bts.gov/view/dot/8837/dot_8837_DS1.pdf?%20.

SHN (SHN Consulting Engineers and Geologists). 2023. *Preliminary Engineering Report for Drinking Water System Improvements*. December 2023.

Siskiyou (Siskiyou County). 1980. *Siskiyou County General Plan Noise Element*. 1980, as amended.

Siskiyou. 2023. *Siskiyou County Geographic Information System*. [Online]: https://www.co.siskiyou.ca.us/gis. Accessed December 8, 2023.

XIV. Population and Housing

This section addresses potential impacts of the project on population and housing in the project area and provides an overview of current population estimates and projected population growth.

Environmental Setting

The population of Lake Shastina has remained stable since the 1980s, with a small growth rate prior to that. The most significant recent growth in population occurred in 2014 due to the Boles Fire. The fire destroyed more than 100 homes and structures in nearby Weed, California. Some of these displaced residents moved permanently to Lake Shastina. The current population of Lake Shastina is approximately 2,800. The population is generally clustered around Lake Shastina where residential developments have been created. The growth within the District is anticipated to be approximately ten residential units per year, based on the current trend.

Regulatory Setting

This section summarizes current federal, State, and local regulations relevant to the review of *Population and Housing* for this project. Ordinances, regulations, or standards that are applicable to the environmental review of potential impacts related to population and housing include the following:

State of California Housing Element Law

State law requires each city and county to adopt a general plan for future growth. This plan must include a housing element that identifies housing needs for all economic segments and provides opportunities for housing development to meet that need. At the State level, the California Department of Housing and Community Development (HCD) estimates the relative shares of California's projected population growth that could occur in each county in the State based on Department of Finance (DOF) population projections and economic projections.

Impact Analysis

The following includes an analysis of environmental parameters related to *Population and Housing* based on Appendix G of the State CEQA Guidelines. The discussion not only includes the areas for which there is potential for environmental impacts but also provides justification for the conclusions that either no impacts, less than significant impacts, or less than significant impacts with mitigation could occur.

Would the Project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Induce substantial unplanned population growth in an area, either directly *(for example, by proposing new homes and businesses)* or indirectly *(for example, through extension of roads or other infrastructure)*?				X
b) Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?				X

a) *Induce substantial unplanned population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?*

Implementation of the proposed project would not induce substantial unplanned population growth in an area, either directly or indirectly. The project will upgrade the District's existing drinking water facilities to meet regulatory requirements and provide appropriate capacity for existing and planned uses. The proposed project does not extend services to additional areas outside of the District's water service area, or otherwise serve new areas that would increase population. As a result, the proposed project would not induce unplanned population. No impact would occur in this regard.

b) *Displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere?*

The proposed project would not displace people or existing housing. The proposed project does not include the demolition of any existing housing. No impact would occur in this regard.

Mitigation Measures

No mitigation measures are required.

Findings

In the course of the above evaluation, impacts associated with *Population and Housing* were found to not be significant because of the inability of a project of this scope to create such impacts or the absence of project characteristics producing effects of this type.

Documentation and References

SHN (SHN Consulting Engineers and Geologists). 2023. *Preliminary Engineering Report for Drinking Water System Improvements*. December 2023.

Siskiyou (Siskiyou County). 1972. *Siskiyou County General Plan*. 1972, as amended.

Siskiyou. 2023. *Siskiyou County Geographic Information System*. [Online]: https://www.co.siskiyou.ca.us/gis. Accessed December 8, 2023.

XV. Public Services

This section of the Initial Study describes the affected environment for public services that serve the project area. It also describes the impacts on existing public services that would result from implementation of the proposed project and mitigation measures, if necessary, that would reduce these impacts.

Environmental Setting

Fire Protection

The Lake Shastina Fire Department (LSFD), located at 16309 Everhard Drive, is a 19 person department that staffs one structural engine, two wildland brush engines, one attack and one rescue during normal daylight hours. The fire department relies on a combination part-time paid firefighters, seasonal firefighters, and paid call volunteers. The Greater Lake Shastina Fire Safe Council (GLFSC) also includes a large surrounding area of State Responsibility Area lands that are primarily CAL FIRE's responsibility for fire protection (LSFD, 2023; GLFSC, 2018).

Police Protection

Law enforcement within the District is provided by the Lake Shastina Police Department (LSPD) located at 16309 Everhard Drive. The LSPD currently consists of a Chief of Police, Police Sergeant, two Police Officers, and several volunteers (LSPD, 2023).

Schools

The are no public or private schools located within Lake Shastina.

Parks

The Lake Shastina area has developed parks, boat ramps and two public golf courses, operated by the District, the County or private developers.

Other Public Facilities

With the exception of the Lake Shastina Property Owners Association (LSPOA), the District does not provide additional public services other than those described above. The LSPOA assists community members with improvement projects including road and trails maintenance and the management of boat launch facilities and common areas. Shasta County provides library services throughout the County, including Montague, Mount Shasta, Weed, and Yreka. Library services are provided within the District.

Impact Analysis

The following includes an analysis of environmental parameters related to *Public Services* based on Appendix G of the State CEQA Guidelines. The discussion not only includes the areas for which there is potential for environmental impacts but also provides justification for the conclusions that either no impacts, less than significant impacts, or less than significant impacts with mitigation could occur.

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:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
Fire Protection?				X
Police Protection?				X
Schools?				X
Parks?				X
Other Public Facilities?				X

Fire Protection

Implementation of the proposed project would not result in an increase in demand for fire protection services resulting in new or expanded fire protection facilities. As the proposed project would neither increase the population nor result in employment gains, project implementation would not result in the need for an increase in fire protection or related facilities. Implementation of the proposed project would not increase the response time required for LSFD and not create an additional burden on exiting fire facilities. No impact would occur in this regard.

The District has identified several deficiencies in the overall water treatment system including aging tanks, inadequate water storage, inadequate pressure in the southeast zone, lack of backup power, and aging fire hydrants. To remedy these deficiencies, the District proposes a combination of replacement components and new construction (well house buildings and one above ground water tank). As a result, the proposed project is considered to provide a long-term benefit to fire protection services within the District.

Police Protection

Implementation of the proposed project would not result in an increase in demand for law enforcement resulting in new or expanded law enforcement facilities. As the proposed project would neither increase the population nor result in employment gains, project implementation would not result in the need for an increase in law enforcement or related facilities. No impact would occur in this regard.

Schools

As described above, there are no existing public or private schools within the District. The proposed project would not result in the construction of new residential uses; therefore, the proposed project would not directly require the construction of additional school facilities and/or expansion of existing school facilities within Siskiyou County. No impact would occur in this regard.

Parks

Refer to discussion under Section XVI, RECREATION, below. Implementation of the proposed project will not cause a physical deterioration of an existing park facility or cause an adverse physical impact associated with a new park facility. No impact would occur in this regard.

Other Public Facilities

The proposed project does not involve a substantial change in the land use, does not substantially increase the numbers of people employed in the region, and does not create or require new housing or related facilities, an increased demand on public facilities is unlikely to occur. No impact would occur in this regard.

Mitigation Measures

No mitigation measures are required.

Findings

In the course of the above evaluation, impacts associated with *Public Services* were found to not be significant because of the inability of a project of this scope to create such impacts or the absence of project characteristics producing effects of this type.

Documentation and References

CAL FIRE (California Department of Forestry and Fire Protection). 2023. *Fire Hazard Severity Zones.* [Online]: https://egis.fire.ca.gov/FHSZ/. Accessed December 11, 2023.

GLFSC (Greater Lake Shastina Fire Safe Council). 2018. *Greater Lake Shastina Fire Safe Council Community Wildfire Protection Plan*. January 2018.

LSFD (Lake Shastina Fire Department). 2023. [Online]: https://lakeshastinafire.com/our-department. Accessed December 8, 2023.

LSPD (Lake Shastina Police Department). 2023. [Online]: https://lakeshastinapolice.com. Accessed December 22, 2023.

SHN (SHN Consulting Engineers and Geologists). 2023. *Preliminary Engineering Report for Drinking Water System Improvements*. December 2023.

Siskiyou (Siskiyou County). 1972. *Siskiyou County General Plan*. 1972, as amended.

Siskiyou. 2023. *Siskiyou County Geographic Information System*. [Online]: https://www.co.siskiyou.ca.us/gis. Accessed December 8, 2023.

XVI. Recreation

This section of the Initial Study discusses any increased demand for various recreational facilities and identifies any potential need for new recreational facilities generated by the proposed project. This section also describes the recreational resources within the project area.

Environmental Setting

Regional Recreational Amenities

Multiple jurisdictions manage hundreds of miles of off-road trails within Siskiyou County. The County also provides an array of recreational opportunities through federal, State and County parks, forests, and fishing areas. These jurisdictions include the BLM, U.S. Forest Service (USFS), National Park Service (NPS), and California State Parks.

Local Recreational Amenities

The Lake Shastina area has developed parks, boat ramps and two public golf courses, operated by the District, the County or private developers.

Regulatory Setting

This section summarizes current State and local regulations relevant to the review of *Recreation* for this project. Ordinances, regulations, or standards that are applicable to the environmental review of potential impacts related to recreation include the following:

Siskiyou County General Plan

Government Code Section 65560(b)(3) specifies that open space for outdoor recreation be addressed in a community's general plan. This topic has been addressed in the Conservation Element of the Siskiyou County General Plan. The County's General Plan includes the following policies related parks and recreation:

Impact Analysis

The following includes an analysis of environmental parameters related to *Recreation* based on Appendix G of the State CEQA Guidelines. The discussion not only includes the areas for which there is potential for environmental impacts but also provides justification for the conclusions that either no impacts, less than significant impacts, or less than significant impacts with mitigation could occur.

Would the Project:		Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
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?				X
b)	Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?				X

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?*

The proposed project would not result in an increase in housing or population within the District resulting in an increased use of neighborhood or regional parks. No impact would occur in this regard.

b) *Include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?*

The proposed project does not include recreational facilities, or would it require the construction or expansion of recreational facilities which might have an adverse effect on the environment. Implementation of the proposed project would not result in substantially increased use of any area recreational facilities and would therefore not require construction of new or expansion of any other existing recreational facilities. No impact would occur in this regard.

Mitigation Measures

No mitigation measures are required.

Findings

In the course of the above evaluation, impacts associated with *Recreation* were found to not be significant because of the inability of a project of this scope to create such impacts or the absence of project characteristics producing effects of this type.

Documentation and References

Siskiyou (Siskiyou County). 1972. *Siskiyou County General Plan*. 1972, as amended.
Siskiyou. 2023. *Siskiyou County Geographic Information System*. [Online]: https://www.co.siskiyou.ca.us/gis. Accessed December 8, 2023.

XVII. Transportation

The purpose of the evaluation is to address traffic and transportation impacts of the proposed project on surrounding streets and intersections, as well as provide an assessment of Vehicle Miles of Travel (VMT). This section also discusses the proposed project in the context of local access, roadways, emergency access, bicycle, pedestrian safety, and transit service; and potential hazards due to geometric design features as a result of implementation of the proposed project.

Environmental Setting

Local Access

The Lake Shastina Community Services District (District) and its residential community is situated 7 miles north of Weed, California. The District lies between two major transportation routes; County Roads A29 (Big Springs Road) and Jackson Ranch Road.

Roadways

Roadways within the District are generally 24 feet wide with one lane in each direction of travel.

Emergency Access

The proposed project is not located in an area that is a part of an adopted emergency response or evacuation plan and is not located on any primary transportation route that would act as an emergency evacuation corridor. Access routes have been identified by the District and the Lake Shastina Property Owners Association (LSPOA) along interior development roads.

Bicycle Facilities

There are no existing bicycle facilities within the Lake Shastina community.

Pedestrian Facilities

There are no existing pedestrian facilities (sidewalks) within the Lake Shastina community.

Transit Service

There are no existing transit services provided within the Lake Shastina community.

Regulatory Setting

This section summarizes current State and local regulations relevant to the review of *Transportation* for this project. Regulations that are applicable to the environmental review of potential impacts related to transportation include the following:

Siskiyou County Regional Transportation Plan

The Siskiyou County Regional Transportation Plan (RTP) serves as the planning blueprint to guide transportation investments in Siskiyou County involving local, State, and federal funding over the next twenty years. Transportation improvements in the RTP are identified as short-range (2031) and long-range (2041). The last RTP update was in 2016.

The overall focus of the 2021 RTP is directed at developing a coordinated and balanced multimodal regional transportation system that is financially constrained to the revenues anticipated over the life of the plan. The coordinated focus brings the County, Caltrans, cities of Yreka, Mount Shasta, Weed, Etna, Fort Jones, Dorris, Dunsmuir, Montague, and Tulelake, government resource agencies, commercial and agricultural interests, Native American Tribal governments, and citizens into the planning process. The balance is achieved by considering investment and improvements for moving people and goods across all types of transportation including automobiles, public transit, bicycle, pedestrian, trucking, railroad, and aviation (SCLTC, 2021).

Senate Bill 743

Passed in 2013, SB 743 changes the focus of transportation impact analysis in the California Environmental Quality Act (CEQA) from measuring impacts to drivers, to measuring the impact of driving. The change has been made by replacing level of service (LOS) with VMT. This shift in transportation impact focus is intended to better align transportation impact analysis and mitigation outcomes with the State's goals to reduce greenhouse gas (GHG) emissions, encourage infill development, and improve public health through more active transportation. Level of service or other delay metrics may still be used to evaluate the impact of projects but is not used to determine a significant impact under CEQA.

Impact Analysis

With the introduction of the California Governor's Office of Planning and Research (OPR) Technical Advisory, VMT has become an important indicator for determining if a new development will result in a "significant transportation impact" under CEQA. Passed in 2013, SB 743 changes the focus of transportation impact analysis in CEQA from measuring impacts to drivers, to measuring the impact of driving. The change has been made by replacing level of service (LOS) with VMT. This shift in transportation impact focus is intended to better align transportation impact analysis and mitigation outcomes with the State's goals to reduce greenhouse gas (GHG) emissions, encourage infill development, and improve public health through more active transportation. Level of service or other delay metrics may still be used to evaluate the impact of projects but is not used to determine a significant impact under CEQA.

The following includes an analysis of environmental parameters related to *Transportation* based on Appendix G of the State CEQA Guidelines. The discussion not only includes the areas for which there is potential for environmental impacts but also provides justification for the conclusions that either no impacts, less than significant impacts, or less than significant impacts with mitigation could occur.

Would the Project:		Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a)	Conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities?				X
b)	Conflict or be inconsistent with CEQA Guidelines Section 15064.3, Subdivision (b)?			X	
c)	Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?			X	
d)	Result in inadequate emergency access?			X	

a) *Conflict with a program plan, ordinance or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities?*

Project construction activities would be contained within the project site and would not interfere with existing vehicle, transit, bicycle, and pedestrian circulation other than adding a small amount of temporary vehicle and truck trips going to and coming from the project site during construction activities. Upon completion of construction, there would not be an increase in traffic beyond pre-project levels. Therefore, implementation of the proposed project would not generate additional vehicle, transit, pedestrian, or bicycle use, so there would be no conflicts with programs, plans, ordinances, or policies related to circulation. No impact would occur in this regard.

b) *Conflict or be inconsistent with CEQA Guidelines Section 15064.3, Subdivision (b)?*

CEQA Guidelines Section 15064.3, subdivision (b), focuses on newly adopted criteria (vehicle miles traveled) for determining the significance of transportation impacts. It is further divided into four subdivisions: (1) land use projects, (2) transportation projects, (3) qualitative analysis, and (4) methodology. The proposed project involves improvements to the District's existing drinking water system that would generate temporary construction-related traffic, and therefore would be categorized under subdivision (b)(3), qualitative analysis. Subdivision (b)(3) recognizes that lead agencies may not be able to quantitatively estimate vehicle miles traveled for every project type. In those circumstances, this subdivision encourages lead agencies to evaluate factors such as the availability of transit, proximity to other destinations, and other factors that may affect the amount of driving required by the project.

Construction-related trips are temporary and would cease upon completion of construction. Approximately up to 32 permanent trips could occur with implementation of the proposed project which is well below the 110 daily trip VMT screening threshold (see OPR, 2018). Further, the project construction would be consistent with construction activities in terms of the temporary nature of activities, trip generation characteristics, and the types of vehicles and equipment required. Even though some of the workers could carpool to the site, managing worker and truck trip lengths for the construction projects is not feasible because of the short duration of construction activities.

Per OPR, heavy vehicle traffic is not required to be included in the estimation of a project's VMT. As noted above, worker and truck trips would generate VMT, but once construction is completed, the construction-related traffic would cease, and VMT would return to pre-project conditions. Measures to reduce the VMT generated by construction workers and trucks are limited, and there are no thresholds or significance criteria for temporary, construction-related VMT. Additionally, construction-related VMT would be temporary and short term. It should also be noted that OPR does not require quantitative assessment of temporary construction traffic. As mentioned previously, because the project would generate fewer than 110 new permanent trips, the proposed project would have a less than significant VMT impact.

c) *Substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?*

Construction activities would be confined to the areas within Lake Shastina as described in Section 2.0, PROJECT DESCRIPTION, and would not result in any changes in road geometry or new uses. As a result, demolition activities would not substantially increase hazards to vehicle safety due to increased traffic at locations with geometric design features (e.g., sharp curves or dangerous intersections). The project does not introduce incompatible users (e.g., farm equipment) to a roadway or transportation facility not intended for those users. The project's impact with regard to roadway design and users is not considered significant. Impacts would be less than significant.

d) *Result in inadequate emergency access?*

The project site is located in an established, developed area with ample access for emergency service providers. The proposed project does not involve a use or activity that could interfere with long-term emergency response or emergency evacuation plans for the area. Impacts would be less than significant in this regard.

Mitigation Measures

No mitigation measures are required.

Findings

Based upon the review of the information above, implementation of the proposed project will have a less than significant impact with respect to *Transportation*.

Documentation and References

OPR (Governor's Office of Planning and Research). 2018. *Technical Advisory on Evaluating Transportation Impacts in CEQA*. December 2018.

SCLTC (Siskiyou County Local Transportation Commission). 2021. *2021 Regional Transportation Plan*. August 2021.

SHN (SHN Consulting Engineers and Geologists). 2023. *Preliminary Engineering Report for Drinking Water System Improvements*. December 2023.

Siskiyou (Siskiyou County). 1972. *Siskiyou County General Plan*. 1972, as amended.

Siskiyou. 2023. *Siskiyou County Geographic Information System*. [Online]: https://www.co.siskiyou.ca.us/gis. Accessed December 8, 2023.

XVIII. Tribal Cultural Resources

This section of the Initial Study describes the affected environment and regulatory setting for Tribal Cultural Resources (TCRs) on the project site. Ethnographic information is presented for the Shastan Peoples, the larger cultural group identified for the project location.

Environmental Setting

Ethnographic Context

The four ethnographic cultural geographical divisions of the Shastan peoples are the Okwanuchu, along the upper Sacramento; the New River Shasta and the Konomihu in the Salmon River watershed; and the Shasta proper, farthest to the north (Silver 1978). The following information concerning the ethnographic documentation of the Shastan peoples is summarized from Silver (1978), Voegelin (1942), and Kroeber (1976).

The Shastans spoke four languages which were subdivisions of the Hokan Language family: Konomihu, New River Shasta, Okwanuchu, and Shasta. The tribal name was possibly derived from susti'ka, a Shasta village or social unit in the vicinity of Yreka (Silver 1978). Shastan territory extended from the Rogue River in Oregon, down into the central Klamath River watershed amid the Cascade, Klamath, and Scott Mountains, and south to the Salmon and upper Sacramento Rivers (Silver 1978).

Permanent winter villages were located along the major rivers and tributaries; in the spring, the families moved into brush houses and remained in them through the summer; during acorn season, single family bark houses were used; and during the fall hunt, families camped out (Silver 1978). The basic social unit for the Shastan was the family, although the village may also be considered a social as well as a political and economic unit. The Shastan family was bilateral with a patrilineal bias, and it was not uncommon for an entire village to be made up of only one family (Silver 1978).

As with most other northern California Indian groups, the Shastan were hunters and gatherers who practiced an annual subsistence round based on a series of seasonal moves designed to ensure their arrival at specific areas during the peak period of productivity for certain resources. Thus, economic life revolved around hunting, fishing, and collecting plant foods, with deer, salmon, and acorns representing primary staples. The collection and processing of these various food resources was accomplished with the use of a wide variety of wooden, bone, and stone tools. These included bows and arrows, spears, traps, nets, slings, and blinds for hunting land mammals and birds; and harpoons, hooks, salmon gigs, nets, and weirs for fish. Woven tools, seed beaters, burden baskets, and carrying nets and sharpened digging sticks were used to collect plant resources. For food processing, a variety of tools were used, including bedrock and portable mortars (predominantly basket and hopper mortars) and pestles, stone knives, stone scrapers, and a variety of bone tools. The Shastan groups also carved acorn mush stirring paddles, and each person had his or her own eating baskets, along with wooden spoons. The Shastan groups produced simple closed work and openwork twined baskets but relied heavily on imported basketry (Silver 1978).

The Shastan and other northern California tribes had little to no contact with Europeans until the 1820s, when a few fur trappers passed through their lands on their way from the northwest coast south into the Sacramento River Valley. The 1849 California Gold Rush, however, quickly brought miners and settlers to the territory, and the Shasta were soon crowded out of their primary hunting grounds and fisheries along the rivers. With the start of permanent Euro American logging and farming settlements, there were active campaigns to exterminate the Shastans and the other tribes in the region. Leaders of the Shastan peoples signed the treaty of 1852 that was brought to all the Native American tribes of California, in which they were offered large protected regional reservations for forfeiting their title to the rest of the State. This treaty was never ratified, and the Shastans played a prominent role in the Rogue River Indian wars, which lasted from 1850 to 1857 (Kroeber 1976; Silver 1978).

By the 1870s, the Shastan population and way of life had been impacted drastically by the influx of Euro- Americans. Calculations based on the number of settlements in 1852 led Kroeber to suggest a total population of 2,000 for all Shastan language speaking groups, while Cook (1976) estimated the pre-contact population at 3,000.

In 1925, Kroeber asserted that there were no more living Okwanuchu. After little over a century of contact, it was estimated that there were 36 Shastans living on the Quartz Valley Rancheria. Today, the majority of Shastan people are affiliated with the Quartz Valley, Grande Ronde, and Siletz Indian Reservations while others have been inducted into the neighboring Karuk or Pit River tribes.

Regulatory Setting

This section summarizes current State and local regulations relevant to the review of *Tribal Cultural Resources* for this project. Regulations that are applicable to the environmental review of potential impacts related to Tribal Cultural Resources include the following:

Assembly Bill 52

Assembly Bill 52 (AB 52) amended CEQA to require that: 1) a lead agency provide notice to any California Native American tribes that have requested notice of projects proposed by the lead agency; and 2) for any tribe that responded to the notice within 30 days of receipt with a request for consultation, the lead agency must consult with the tribe. Topics that may be addressed during consultation include tribal cultural resources, the potential significance of project impacts, type of environmental document that should be prepared, and possible mitigation measures and project alternatives.

Pursuant to AB 52, Section 21073 of the Public Resources Code defines California Native American tribes as “a Native American tribe located in California that is on the contact list maintained by the NAHC for the purposes of Chapter 905 of the Statutes of 2004.” This includes both federally and non-federally recognized tribes. Section 21074(a) of the Public Resource Code defines TCRs for the purpose of CEQA as:

1) Sites, features, places, cultural landscapes (geographically defined in terms of the size and scope), sacred places, and objects with cultural value to a California Native American tribe that are either of the following:

    (a) included or determined to be eligible for inclusion in the California Register of Historical Resources; and/or
    (b) included in a local register of historical resources as defined in subdivision (k) of Section 5020.1; and/or

2) a resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Section 5024.1. In applying the criteria set forth in subdivision (c) of Section 5024.1 for the purposes of this paragraph, the lead agency shall consider the significance of the resource to a California Native American tribe.

Because criteria (a) and (b) also meet the definition of a Historical Resource under CEQA, a TCR may also require additional consideration as a Historical Resource. TCRs may or may not exhibit archaeological, cultural, or physical indicators.

Recognizing that California tribes are experts in their tribal cultural resources and heritage, AB 52 requires that CEQA lead agencies provide tribes that requested notification an opportunity to consult at the commencement of the CEQA process to identify TCRs. Furthermore, because a significant effect on a TCR is considered a significant impact on the environment under CEQA, consultation is used to develop appropriate avoidance, impact minimization, and mitigation measures.

Tribal Consultation

Consultation and correspondence with various culturally affiliated Tribal groups and agencies were conducted in accordance with Public Resources Code (PRC) Section 21080.3.1 (AB 52). On January 8, 2024, the District initiated environmental review under the California Environmental Quality Act (CEQA) for the proposed Lake Shastina Drinking Water System Improvements. The District sent a certified project notification letter to the Quartz Valley Indian Community and Shasta Nation, each a California Native American Tribe that is traditionally and culturally affiliated with the geographic area of the proposed project, on January 8, 2024, pursuant to PRC Section 21080.3.1, notifying that the project was under review and to provide the Tribes 30 days from the receipt of the letter to request consultation on the project in writing. No responses were received requesting initiation of consultation under the provisions of AB 52.

Impact Analysis

The following includes an analysis of environmental parameters related to *Tribal Cultural Resources* based on Appendix G of the State CEQA Guidelines. The discussion not only includes the areas for which there is potential for environmental impacts but also provides justification for the conclusions that either no impacts, less than significant impacts, or less than significant impacts with mitigation could occur.

Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:	**Potentially Significant Impact**	**Less Than Significant With Mitigation Incorporated**	**Less Than Significant Impact**	**No Impact**
a) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or		X		
b) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.		X		

a) *Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k)?*

No TCRs were identified within or immediately adjacent to the project area and, therefore, the proposed project would not result in a significant impact to known TCRs. Impacts to unknown TCRs that may be discovered would be less than significant with the incorporation of Mitigation Measure TCR-1, below. Impacts would be less than significant.

b) *A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resources Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.*

As described above, no known TCRs have been identified (as defined in PRC Section 21074) within the project area. Therefore, the project would not cause a significant adverse change in the significance of a TCR that is either listed in, or eligible for listing in, the CRHR, or in a local register of historical resources as defined in PRC Section 5020.1(k). The proposed project would not cause a substantial adverse effect to a known TCR. Mitigation Measures CR-1 and CR-2 address the inadvertent discovery of cultural resources and human remains during construction. Impacts would be less than significant.

Mitigation Measures

The following mitigation measures have been developed to reduce potential impacts related to *Tribal Cultural Resources* to less than significant levels:

Mitigation Measure TCR-1

Unanticipated Discovery - If any suspected TCRs are discovered during ground-disturbing construction activities, all work shall cease within at least 50 feet of the find. The District shall invite a Tribal Representative from a California Native American tribe that is traditionally and culturally affiliated with the geographic area to make recommendations about whether or not the discovery represents a TCR (PRC Section 21074) and, if so, to make recommendations for culturally appropriate treatment. The contractor shall implement any measures determined by the District to be necessary. Work at the discovery location cannot resume until the treatment has been implemented to the satisfaction of the District.

In addition, refer to Mitigation Measure CR-1 and CR-2 in Section V, CULTURAL RESOURCES.

Findings

In the course of the above evaluation impacts associated with *Tribal Cultural Resources* were found to be less than significant with implementation of mitigation. Mitigation measures for the protection of currently unknown but potentially discoverable resources are also provided for in Section V, CULTURAL RESOURCES.

Documentation and References

DZC (DZC Archaeology and Cultural Resource Management). 2023. *Phase I Cultural Resource Inventory Report for the Lake Shastina Community Services District Drinking Water Improvement Project*. December 2023.

XIX. Utilities and Service Systems

This section of the Initial Study addresses the proposed project's potential impacts on certain utilities and services: water, wastewater, stormwater, solid waste and utilities (electrical and gas).

Environmental Setting

Water

The Lake Shastina Community Services District (District) provides water service to all residential commercial users within the area. The proposed project is located within the Shasta Valley Groundwater Basin (SVWB). The SVWB is a medium priority basin located in Northern California and is bounded by Mount Shasta to the South, the Klamath Mountains to the west and the Cascade Range to the east and the Klamath River to the north. As a medium priority basing, a Groundwater Sustainability Plan (GSP) is required which outlines a 20-year plan to direct sustainable groundwater management activities that considers the needs of all users in the SVWB and ensures a viable groundwater resource for beneficial use by agricultural, residential, industrial, municipal, and ecological users (SCFCWCD, 2021; 2023).

Wastewater

Wastewater treatment within the area is provided by the District. The existing Lake Shastina Wastewater Treatment Facility (WWTF), in its current configuration, meets the applicable waste discharge requirement, which set the standards for wastewater discharges. The District is currently in the process of implementing upgrades and improvements to allow the facility to continue to meet permit requirements.

Stormwater

The proposed project surrounds a portion of Lake Shastina, a lake that is formed by Dwinell Dam. The lake is primarily fed by surface water from precipitation and the Shasta River that enters the lake from the south. Water leaves the lake below Dwinell Dam and continues down the Shasta River or is taken through surface ditches for agricultural use by local irrigation users. There are no existing stormwater drainages within the project area.

Solid Waste

Construction waste generated by the proposed project would be disposed of at the Yreka Solid Waste Landfill located south 2420 Oberlin Road. Under existing State permits, the landfill may accept 100 tons of solid water per day until the year 2055.

Utilities

Electricity within the District is provided by Pacific Power. Individual parcels utilize propane tanks.

Regulatory Setting

This section summarizes current State and local regulations relevant to the review of *Utilities and Service Systems* for this project. Ordinances, regulations, or standards that are applicable to the environmental review of potential impacts related to utilities and service systems include the following:

California Integrated Waste Management Act

The California Integrated Waste Management Act of 1989, or Assembly Bill (AB) 939, required the implementation of integrated waste management plans, and mandated that local jurisdictions divert at least 50 percent of all solid waste generated (from 1990 levels), beginning January 1, 2000, and divert at least 75 percent by 2010. Projects that would have an adverse effect on waste diversion goals are required to include waste diversion mitigation measures to assist in reducing these impacts to less than significant levels. With the passage of Senate Bill (SB) 1016 (the Per Capita Disposal Measurement System) in 2006, only per capita disposal rates are measured to determine if a jurisdiction's efforts are meeting the intent of AB 939.

California Solid Waste Reuse and Recycling Access Act

The California Solid Waste Reuse and the Recycling Access Act of 1991 (AB 1327) is codified in Public Resources Code Sections 42900-42911. As amended, AB 1327 requires each local jurisdiction to adopt an ordinance requiring commercial, industrial, or institutional building, marina, or residential buildings having five or more living units to provide an adequate storage area for the collection and removal of recyclable materials. The size of these storage areas is to be determined by the appropriate jurisdictions' ordinance. If no such ordinance exists in the jurisdiction, the Cal Recycle model ordinance shall take effect.

Sustainable Groundwater Management Act

In 2014, California enacted the Sustainable Groundwater Management Act (SGMA; Water Code Section 10720 et seq.). SGMA and related amendments to California law require all groundwater basins designated as high or medium priority in the DWR California Statewide Groundwater Elevation Monitoring (CASGEM) Program, and that are subject to critical overdraft conditions, must be managed under a new Groundwater Sustainability Plan (GSP) or a coordinated set of GSPs. High or medium priority basins that are not subject to a critical overdraft must be regulated under one or more GSPs by 2022. Where GSPs are required, one or more local Groundwater Sustainability Agencies (GSAs) must be formed to implement applicable GSPs. A GSA has the authority to require registration of groundwater wells, measure and manage extractions, require reports, and assess fees, and to request revisions of basin boundaries, including establishing new subbasins.

Impact Analysis

The following includes an analysis of environmental parameters related to *Utilities and Service Systems* based on Appendix G of the State CEQA Guidelines. The discussion not only includes the areas for which there is potential for environmental impacts but also provides justification for the conclusions that either no impacts, less than significant impacts, or less than significant impacts with mitigation could occur.

Would the Project:		Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a)	Require or result in the relocation or construction of new or expanded water or wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?		X		
b)	Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years?			X	

Would the Project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
c) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?				X
d) Generate solid waste in excess of State or local standards, or infrastructure, or otherwise impair the attainment of solid waste reduction goals?			X	
e) Comply with federal, State, and local management and reduction statutes and regulations related to solid waste?				X

a) *Require or result in the relocation or construction of new or expanded water or wastewater treatment or storm water drainage, electric power, natural gas, or telecommunications facilities, the construction or relocation of which could cause significant environmental effects?*

The primary purpose of the proposed project is to upgrade the water supply infrastructure serving the District. All environmental impacts resulting from the improvements are discussed throughout this document and mitigated as appropriate (refer to Mitigation Measures AQ-1, BIO-1, BIO-2, BIO-3, CR-1, CR-2, HAZ-1, HAZ-2, N-1, and TCR-1). Impacts would be less than significant with mitigation incorporated.

b) *Have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry, and multiple dry years?*

The proposed project is intended to upgrade the existing water supply infrastructure within the District. Relatively small amounts of water would be used during project construction, but this is a temporary impact. Additionally, implementation of the proposed project would not induce population growth either directly or indirectly that would require additional long-term water supplies or increase the demand for wastewater treatment. However, the upgrades to the existing system are expected to be able to accommodate anticipated growth within the 20-year planning horizon. The future anticipated growth within the community has been previously approved for residential and commercial properties that are currently parceled but undeveloped. The proposed project addresses the existing infrastructure at existing capacity levels and are not growth related and would not require additional water supplies or a new water source. Impacts would be less than significant in this regard.

c) *Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?*

As the proposed projects includes improvements to the District's drinking water facilities and would not require new or expanded water supplies, there would be no impact on the capacity of the District's wastewater treatment facility. No impact would occur in this regard.

d) *Generate solid waste in excess of State or local standards, or infrastructure, or otherwise impair the attainment of solid waste reduction goals?*

The amount of waste generated during project demolition is not expected to exceed State or local standards, significantly impact landfill capacities, or otherwise impair the attainment of solid waste reduction goals. Impacts are considered less than significant in this regard.

e) *Comply with federal, State, and local management and reduction statutes and regulations related to solid waste?*

The 1989 California Integrated Waste Management Act (AB 939) requires the County to attain specific waste diversion goals. In addition, the California Solid Waste Reuse and Recycling Access Act of 1991, as amended, requires recycling of construction debris to reduce operating expenses and save valuable landfill space. In relation to the local management and reductions techniques, handling, and disposal of this waste, the District would comply with all State solid waste diversion, reduction, and recycling mandates related to construction materials.

Solid waste from project construction would be transported to the transfer station at the Yreka Solid Waste Landfill and subsequently disposed of at the Anderson Solid Waste Landfill in Shasta County. Under existing State permits, the landfill may accept 100 tons of solid waste per day until the year 2055. The proposed project would not increase the tonnage beyond the landfill's permitted amount or result in the closure of the landfill prior to the anticipated 2055 date. No impact would occur in this regard.

Mitigation Measures

No mitigation measures are required.

Findings

Based upon the review of the information above, implementation of the proposed project will have a less than significant impact with respect to *Utilities and Service Systems*.

Documentation and References

SCFCWCD (Siskiyou County Flood Control & Water Conservation District). 2021. *Shasta Valley Groundwater Sustainability Plan, Executive Summary*. December 2021.

SCFCWCD. 2023. *Shasta Valley Groundwater Sustainability Plan – WT 2022 Annual Report*. April 2023.

SHN (SHN Consulting Engineers and Geologists). 2023. *Preliminary Engineering Report for Drinking Water System Improvements*. December 2023.

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Siskiyou. 2023. *Siskiyou County Geographic Information System*. [Online]: https://www.co.siskiyou.ca.us/gis. Accessed December 8, 2023.

XX. Wildfire

This section of the Initial Study provides an analysis of potential wildfire impacts. The analysis considers potential impacts of the project on emergency access and evacuation routes to, through and from the project area and the exacerbation of fire risk or that may result in temporary or ongoing impacts to the environment during or following a fire.

Environmental Setting

Human activities such as equipment operation cause the vast majority of wildland fires that occur on average throughout the State. Generally, the fire season extends from early spring through late fall of each year during the hotter, dryer months.

Fire conditions arise from a combination of high temperatures, low moisture content in the air and fuel, accumulation of vegetation, and high winds. The outbreak and spread of wildland fires within the project area is a potential danger, particularly during the hot, dry summer and fall months. Various factors contribute to the intensity and spread of wildland fires: humidity, wind speed and direction, vegetation type, the amount of vegetation (fuel), and topography. The topography, climate, and vegetation of much of the area are conducive to the spread of wildland fires once started.

The geographic location on the northwest facing slope of Mount Shasta creates a weather environment conducive to high desert scrub vegetation dominated by Chaparral, decadent Chemise, Western Juniper, Sagebrush, and Manzanita. Mount Shasta dominates the terrain to the southeast, with the Eddy Mountains in the Klamath range to the west. Yellow Butte, Herd Peak, and Goosenest Mountain are additional significant landmarks. Dwinnell Reservoir (commonly known as Lake Shastina) is another prominent feature of the landscape. The surface area of the reservoir is approximately 1800 acres when full, with an average depth of 27 feet.

Fire Protection

The Lake Shastina Fire Department (LSFD), located at 16309 Everhard Drive, is a 19 person department that staff's one structural engine, two wildland brush engines, one attack and one rescue during normal daylight hours. The fire department relies on a combination part-time paid firefighters, seasonal firefighters, and paid call volunteers. The Greater Lake Shastina Fire Safe Council (GLFSC) also includes a large surrounding area of State Responsibility Area lands that are primarily CAL FIRE's responsibility for fire protection (LSFD, 2023; GLFSC, 2018).

Emergency Response

The proposed project is not located in an area that is a part of an adopted emergency response or evacuation plan and is not located on any primary transportation route that would act as an emergency evacuation corridor. Access routes within Lake Shastina Community Services District (District) have been identified by the District and the Lake Shastina Property Owners Association (LSPOA) along interior development roads. Additionally, the District has participated in the development of a Community Wildfire Protection Plan (CWPP) that outlines coordination activities between the local fire service agencies, including Lake Shastina (GLSFSC, 2018).

Fire Hazard Severity Zone

The project site and surrounding area are designated as being in a Wildland Hazard area, as defined by the Siskiyou County General Plan. These areas require that developments take into consideration building standards and vegetation management to reduce the threat from wildfire. The CWPP indicates that the proposed project falls within a Moderate Fire Hazard Severity Zone and a High Fire Hazard Severity Zone.

CAL FIRE has mapped areas of significant fire hazards in the state through its Fire and Resources Assessment Program (FRAP). These maps place areas of the state into different fire hazard severity zones (FHSZ) based on a hazard scoring system using subjective criteria for fuels, fire history, terrain influences, housing density, and occurrence of severe fire weather where urban conflagration could result in catastrophic losses. This classification system designates lands in three general classifications, “Moderate”, “High” and “Very High” Fire Hazard Severity Zones. The FRAP identifies the project area as a high and very high fire hazard severity zone (CAL FIRE, 2023).

As part of this mapping system, land where CAL FIRE is responsible for wildland fire protection and generally located in unincorporated areas is classified as a State Responsibility Area (SRA). Where local fire protection agencies are responsible for wildfire protection, the land is classified as a Local Responsibility Area (LRA). The project site is located within a State Responsibility Area (SRA).

Regulatory Setting

This section summarizes current federal, State, and local regulations relevant to the review of *Wildfire* for this project. Ordinances, regulations, or standards that are applicable to the environmental review of potential impacts related to wildfire hazards include the following:

California Department of Forestry and Fire Protection

CAL FIRE protects the people of California from fires, responds to emergencies, and protects and enhances forest, range, and watershed values providing social, economic, and environmental benefits to rural and urban citizens. The Office of the State Fire Marshal supports CAL FIRE’s mission by focusing on fire prevention. It provides support through a wide variety of fire safety responsibilities including by regulating buildings in which people live, congregate, or are confined; by controlling substances and products which may, in and of themselves, or by their misuse, cause injuries, death, and destruction by fire; by providing statewide direction for fire prevention in wildland areas; by regulating hazardous liquid pipelines; by reviewing regulations and building standards; and by providing training and education in fire protection methods and responsibilities.

California Fire Code

The California Fire Code (CFC) is contained within Title 24, Chapter 9 of the California Code of Regulations. Based on the International Fire Code, the CFC was created by the California Buildings Standards Commission and regulates the use, handling, and storage requirements for hazardous materials at fixed facilities. Similar to the International Fire Code, the CFC and CBC use a hazards classification system to determine the appropriate measures to incorporate to protect life and property.

California Public Resources Code

California Public Resources Code Section 4290 requires minimum fire safety standards related to defensible space that are applicable to SRA lands and lands classified and designated as VHFHSZs. California Public Resources Code Section 4291 requires a reduction of fire hazards around buildings, which requires 100 feet of vegetation management around all buildings and is the primary mechanism for conducting fire prevention activities on private property within CAL FIRE jurisdiction.

Community Wildfire Protection Plan

The Community Wildfire Protection Plan (CWPP) (2018) reflects common goals to better enable the Lake Shastina community to protect itself. This CWPP is a living document which will change over time, as projects are implemented and new priorities arise. The Greater Lake Shastina Fire Safe Council (GLSFSC) will utilize the CWPP as a means for the community to participate in wildfire protection planning for the future.

Lake Shastina Fire Evacuation Plan

The Lake Shastina Fire Department, with the assistance of the California Department of Forestry and Fire Protection and the Siskiyou County Office of Emergency Services, prepared the Wild Land Fire Evacuation Plan in the interest of public safety for the citizens of the Lake Shastina Community Services District. The evacuation plan describes potential impact areas within the Lake Shastina Community Services District, the number of people threatened, the designated evacuation routes and any critical or special facilities located within the District.

Siskiyou County Emergency Operations Plan

The Siskiyou County Emergency Operations Plan (EOP) establishes procedures for responding to various emergency situations, including regional flooding, nuclear power plant incident, volcanic activity, tsunami/seiche waves, hazardous materials incident, nuclear defense emergency, dam failure, approaching wildland fire, and seismic activity.

Impact Analysis

The following includes an analysis of environmental parameters related to *Wildfire* based on Appendix G of the State CEQA Guidelines. The discussion not only includes the areas for which there is potential for environmental impacts but also provides justification for the conclusions that either no impacts, less than significant impacts, or less than significant impacts with mitigation could occur.

If located in or near State responsibility areas or lands classified as very high fire hazard severity zones, would the project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Substantially impair an adopted emergency response plan or emergency evacuation plan?			X	
b) Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose projects occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of wildfire?			X	
c) Require installation or maintenance of associated infrastructure (such as roads, fuel sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?			X	
d) Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result, post-fire slope instability, or drainage changes?			X	

a) *Substantially impair an adopted emergency response plan or emergency evacuation plan?*

Refer to impact discussion under IX.f, above. No roadway closures are anticipated during construction activities. As a result, the proposed project would not impair implementation of any emergency response plan or emergency evaluation plan as it would not alter existing roadways, or physically interfere with existing roadway patterns. Impacts would be less than significant.

b) *Due to slope, prevailing winds, and other factors, exacerbate wildfire risks, and thereby expose projects occupants to, pollutant concentrations from a wildfire or the uncontrolled spread of wildfire?*

Due to the nature of the project and the topography of the immediate project area, there would be no significant risk of pollutant concentration exposure from a wildfire or the uncontrollable spread of a wildfire caused by a geographic slope or prevailing winds. Therefore, the likelihood of exposing adjacent areas to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire is considered minimal. Furthermore, the project would not result in additional occupants on the project site with the exception of construction workers during temporary construction activities. Thus, impacts associated with wildfires would be less than significant.

c) *Require installation or maintenance of associated infrastructure (such as roads, fuel sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment?*

The District has identified several deficiencies in the overall water treatment system including aging tanks, inadequate water storage, inadequate pressure in the southeast zone, lack of backup power, and aging fire hydrants. To remedy these deficiencies, the District proposes a combination of replacement components and new construction (well house buildings and one above ground water tank). As a result, the proposed project is considered to provide a long-term benefit to fire protection services within the District.

Project construction activities will be conducted in accordance with applicable standards to reduce the potential for the activities to impact adjacent residences from wildfire events. Additionally, construction activities would not require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment. Impacts are less than significant in this regard.

d) *Expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result, post-fire slope instability, or drainage changes?*

Construction activities would not expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes. The majority of the site is located outside of the mapped 100-year floodplain; however, there are several existing residents along the shore of Lake Shastina within Zone A, Special Flood Hazard Areas (without base flood elevation) (FEMA, 2011). There are no sheer or unstable cliffs in the immediate area. Considering these project site features and characteristics, potential future post-fire conditions are not expected to increase risks associated with runoff and erosion. Considering implementation of erosion control BMPs, potential impacts associated with runoff, post-fire slope instability, or drainage changes are considered to be less than significant.

Mitigation Measures

No mitigation measures are required.

Findings

Based upon the review of the information above, implementation of the proposed project will have a less than significant impact with respect to *Wildfire*.

Documentation and References

CAL FIRE (California Department of Forestry and Fire Protection). 2023. *Fire Hazard Severity Zones.* [Online]: https://egis.fire.ca.gov/FHSZ/. Accessed December 8, 2023.

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LSFD (Lake Shastina Fire Department). 2023. [Online]: lakeshastinafire.com/our-department. Accessed December 8, 2023.

LSFD.2003. Wild Land Fire Evacuation Plan, Lake Shastina Community Services District. August 2003.

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Siskiyou (Siskiyou County). 1972. *Siskiyou County General Plan*. 1972, as amended.

Siskiyou. 2023. *Siskiyou County Geographic Information System*. [Online]: https://www.co.siskiyou.ca.us/gis. Accessed December 8, 2023.

XXI. Mandatory Findings of Significance

Based on the analysis undertaken as part of this Initial Study, the following findings can be made:

Would the Project:	Potentially Significant Impact	Less Than Significant With Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Does the project have the potential to substantially 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 the self-sustaining levels, threaten to eliminate a plant or animal community, substantially 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?			X	
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?			X	
c) Does the project have potential environmental effects which may cause substantial adverse effects on human beings, either directly or indirectly?			X	

Impact Analysis

a) *Does the project have the potential to substantially 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 the self-sustaining levels, threaten to eliminate a plant or animal community, substantially 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?*

Evaluation of the proposed project as provided in Section IV, BIOLOGICAL RESOURCES, has shown that the activities of the proposed project do not have the potential to degrade the quality of the environment and will not substantially reduce the habitat or cause wildlife populations to drop below self-sustaining levels. Mitigation measures for biological resources have been developed to reduce potential impacts on sensitive habitats and species to less than significant levels. Refer to Mitigation Measures BIO-1, BIO-2, and BIO-3 in Section IV, BIOLOGICAL RESOURCES.

Also, based on the discussion and findings in Section V, CULTURAL RESOURCES, there is evidence to support a finding that the proposed project is not eligible for listing in the National Register of Historic Places (NRHP) or the California Register of Historic Resources (CRHR) under any significance criteria. The project is located in an area that does not appear to be sensitive for prehistoric or historic occupation and is considered to have a moderate sensitivity for surface sites. Although no archaeological deposits or features are known to occur onsite, implementation of mitigation measures will ensure that any additional archaeological deposits or features that may be discovered are fully protected during implementation of the proposed project. Refer to Mitigation Measures CR-1 and CR-2 in Section V, CULTURAL RESOURCES.

b) *Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?*

As discussed throughout this document, implementation of the proposed project has the potential to result in impacts to the environment that are individually limited, but are not cumulatively considerable, including impacts to biological and cultural resources. In addition, as discussed in Section III, AIR QUALITY, the project will contribute to a temporary cumulative air quality impacts. However, with the application of Mitigation Measure AQ-1, impacts would be less than significant.

In all instances where the project has the potential to contribute to cumulatively considerable impacts to the environment (including the resources listed above) mitigation measures have been imposed to reduce the potential effects to less than significant levels. As such, with incorporation of the mitigation measures imposed throughout this Initial Study, including compliance with local, State, and federal rules and regulations, the proposed project would not contribute to environmental effects that are individually limited, but cumulatively considerable, and impacts would be less than significant.

c) *Does the project have potential environmental effects which may cause substantial adverse effects on human beings, either directly or indirectly?*

The potential for the proposed project to result in environmental effects that could adversely affect human beings, either directly or indirectly, has been discussed throughout this document. In instances where the proposed project has the potential to result in direct or indirect adverse effects to human beings, including impacts to air quality, biological resources, and cultural resources, mitigation measures have been applied to reduce the impact to below a level of significance. In other instances, the project design and compliance with existing laws and regulations would reduce impacts of the project to less than significant levels. Therefore, the proposed project as designed, mitigated, and in compliance with existing regulatory requirements, would not have environmental effects, which will cause substantial adverse effects on human beings, either directly or indirectly. Therefore, impacts would be less than significant with mitigation incorporated.

Mitigation Measures

Mitigation Measure AQ-1

The construction and demolition contractor shall be responsible for implementing Rule 4.2 and Fugitive Dust Control Measures to reduce the potential generation of fugitive dust during the proposed construction activities. Compliance with these requirements shall be required to minimize dust generation during construction activity.

- All active construction areas (for example, parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered a minimum of two times per day during the dry season;
- Hydroseed or apply non-toxic soil stabilizers to inactive construction areas;
- Dust-generating activities shall be limited during periods of high winds (over 15 mph);
- Suspend excavation and grading activity when winds exceed 25 mph;
- All haul trucks transporting soil, sand, or other loose material, likely to give rise to airborne dust, shall be covered;
- All vehicle speeds shall be limited to 15 miles per hour within the construction area;
- Promptly remove earth or other tracked out material from paved streets onto which earth, or other material has been transported by trucking or earth-moving equipment; and
- Conduct digging, backfilling, and paving of utility trenches in such a manner as to minimize the creation of airborne dust.

Mitigation Measure BIO-1

A botanical field survey shall be conducted by a qualified biologist in the spring when special status plants known to occur in the region would be identifiable. The survey shall be conducted pursuant to applicable regulatory agency protocols and guidelines. In the unlikely event that special-status plant species are present, a suitable buffer zone(s) shall be determined by a qualified biologist in consultation with the applicable regulatory agency, and exclusionary fencing shall be placed prior to commencement of construction.

If avoidance is not possible, the District shall consult with the applicable regulatory agency to determine a satisfactory method of mitigation. Typical mitigation includes collecting and propagating seeds, and replanting the seedlings in a protected area, or transplanting the individual plants to a protected area. A detailed mitigation plan shall be submitted to the applicable regulatory agency for review and approval. The plan shall identify the mitigation site, methods to be employed to create offsetting special-status plant habitat, success criteria, monitoring requirements, remedial measures, and/or other pertinent data to ensure successful replacement of the affected plant populations. Mitigation shall be undertaken concurrently with or in advance of the start of project construction.

Mitigation Measure BIO-2

The potential for introduction and spread of noxious weeds shall be avoided/minimized by the following:

- Using only certified weed-free erosion control materials, mulch, and seed,
- Limiting any import or export of fill material to material that is known to be weed free, and
- Requiring the construction contractor to thoroughly wash all equipment at a commercial wash facility prior to entering the County. If the equipment has most recently been used within the County, cleaning is not required.

Mitigation Measure BIO-3

To avoid impacts to nesting birds, and/or raptors, protected under California Fish and Game Code Section 3503 and Section 3503.5, including their nests and eggs, one of the following shall be implemented:

- Vegetation removal and ground-disturbance activities shall occur between September 1st and January 31st when birds are not nesting; or
- If vegetation removal and ground disturbance activities occur during the nesting season, a pre-construction nesting survey shall be conducted by a qualified biologist to identify active nests in and adjacent to the project area.

Surveys shall begin prior to sunrise and continue until vegetation and nests have been thoroughly observed. The survey shall take into account acoustic impacts and line-of-sight project disturbances to determine a sufficient survey radius to maximize observations of nesting birds. A nesting bird survey report should be prepared and, at a minimum, the report should include a description of the area surveyed, date and time of the survey, ambient conditions, bird species observed, a description of any active nests observed, any evidence of breeding behaviors (e.g., courtship, carrying nest materials or food, etc.), and a description of any outstanding conditions that may have impacted the survey results (e.g., weather conditions, excess noise, presence of predators).

If an active nest is located during pre-construction surveys, a non-disturbance buffer should be established around the nest by a qualified biologist in consultation with CDFW and United States Fish and Wildlife Service to comply with Fish and Game Code Sections 3503 and 3503.5 and the Migratory Bird Treaty Act. Compliance measures may include, but are not limited to, exclusion buffers, sound-attenuation measures, seasonal work closures based on the known biology and life history of the species identified during the survey, as well as ongoing monitoring by biologists. Nesting bird surveys should be conducted no more than seven days prior to the initiation of construction. If construction activities are delayed or suspended for more than seven days after the pre-construction nesting bird survey, the site should be resurveyed.

Mitigation Measure CR-1

If cultural resources, such as chipped or ground stone, or bone are inadvertently discovered during ground-disturbance activities, work shall be stopped within 50 feet of the discovery, as required by the California Environmental Quality Act (CEQA; January 1999 Revised Guidelines, Title 14 California Code of Regulations [CCR] Section 15064.5 [f]). Work near the archaeological finds shall not resume until a professional archaeologist, who meets the Secretary of the Interior's Standards and Guidelines, has evaluated the material, and offered recommendations for further action.

Mitigation Measure CR-2

If in the event that previously unidentified evidence of human burial or human remains are discovered during project construction, work will stop at the discovery location, within 20 meters (66 feet), and any nearby area reasonably suspected to overlie human remains (Public Resources Code, Section 7050.5) the Shasta County Coroner must be informed and consulted, per State law. If the coroner determines the remains to be Native American, he or she shall contact the Native American Heritage Commission within 24 hours. The Native American Heritage Commission shall identify the person or persons it believes to be the most likely descendent. The most likely descendent will be given an opportunity to make recommendations for means of treatment of the human remains and any associated grave goods. when the commission is unable to identify a descendant or the descendants identified fail to make a recommendation, or the landowner or his or her authorized representative rejects the recommendation of the descendants and the mediation provided for in subdivision (k) of Section 5097.94, if invoked, fails to provide measures acceptable to the landowner, the landowner or his or her authorized representative shall reinter the human remains and items associated with Native American human remains with appropriate dignity on the property in a location not subject to further and future subsurface disturbance. Work in the area shall not continue until the human remains are dealt with according to the recommendations of the County Coroner, Native American Heritage Commission and/or the most likely descendent have been implemented.

Mitigation Measure HAZ-1

Prior to initiation of construction activities that would affect existing structures and associated piping, a comprehensive survey shall be completed in locations where asbestos and lead-based paint are suspected. Removal or disturbance of material with any detectable amount of asbestos or lead-based paint must be handled in accordance with OSHA regulations. All hazardous materials shall be removed by trained and authorized personnel and disposed of at a licensed facility in compliance with local, State, and federal regulations and guidelines.

Mitigation Measure HAZ-2

In the event that previously undetected asbestos or lead-containing materials are discovered during construction, activities that may affect the materials shall cease until results of additional surveys are reviewed. Alternatively, the District can assume that the materials are hazardous. Any identified hazardous materials shall be disposed of in accordance with applicable hazardous waste regulations.

Mitigation Measure N-1

The project contractor shall be responsible for complying with the following measures during construction activities to reduce potential noise impacts:

- Construction activities shall be restricted to the hours between 7:00 a.m. and 7:00 p.m. Monday through Saturday. Construction activities shall also be prohibited during evening, nights, or on Sunday.

Mitigation Measure TCR-1

Unanticipated Discovery - If any suspected TCRs are discovered during ground-disturbing construction activities, all work shall cease within at least 50 feet of the find. The District shall invite a Tribal Representative from a California Native American tribe that is traditionally and culturally affiliated with the geographic area to make recommendations about whether or not the discovery represents a TCR (PRC Section 21074) and, if so, to make recommendations for culturally appropriate treatment. The contractor shall implement any measures determined by the District to be necessary. Work at the discovery location cannot resume until the treatment has been implemented to the satisfaction of the District.

Findings

Based upon the review of the information above, implementation of the proposed project is not anticipated to have a substantial adverse effect on the environment. Therefore, there is no significant impact.

Documentation and References

Refer to section I through section XX of this Initial Study.

Section 5 – Mitigation Monitoring Program (MMP)

This section contains the proposed Mitigation and Monitoring Program (MMP) for the proposed Lake Shastina Drinking Water System Improvements project. The MMP includes a brief discussion of the legal basis for and the purpose of the program, discussion, and direction regarding complaints about noncompliance, a key to understanding the monitoring matrix, and the monitoring matrix itself.

California Public Resources Code §21081.6(a)(1) requires public agencies to adopt mitigation monitoring or reporting programs whenever the agencies adopt CEQA Findings in connection with the approval of projects requiring Environmental Impact Reports (EIRs) and whenever agencies adopt Mitigated Negative Declarations (MNDs). This requirement facilitates implementation of all mitigation measures adopted through the California Environmental Quality Act (CEQA) process.

The MMP contained herein is intended to satisfy the requirements of CEQA as they relate to the MND prepared for the proposed project. It is intended to be used by District staff, participating agencies, project contractors, and mitigation monitoring personnel during implementation of the proposed project. Mitigation is defined by State CEQA Guidelines Section 15370 as a measure that does any of the following:

- Avoids impacts altogether by not taking a certain action or parts of an action.
- Minimizes impacts by limiting the degree or magnitude of the action and its implementation.
- Rectifies impacts by repairing, rehabilitating, or restoring the impacted environment.
- Reduces or eliminates impacts over time by preservation and maintenance operations during the life of the project.
- Compensates for impacts by replacing or providing substitute resources or environments.

Table 5-1, MITIGATION MONITORING PROGRAM, below, identifies the mitigation measures proposed for the Lake Shastina Drinking Water System Improvements project. The table has four columns that are defined as follows:

- *Mitigation Measure/Condition.* Lists the mitigation measures identified within the MND for a specific impact, along with the number for each measure enumerated in the MND.

- *Timing.* Identifies at what point in time, review process, or phase the mitigation measures will be completed.

- *Enforcement/Monitoring.* References the responsible entity or any other public agency with which coordination is required to satisfy the identified mitigation measure.

- *Verification.* Provides a space to be initialed and dated by the individual designated to verify adherence to a specific mitigation measure.

Any person or agency may file a complaint asserting noncompliance with the mitigation measures associated with the proposed project. The complaint shall be directed to the District's General Manager in written form, providing specific information on the asserted violation. The District shall conduct an investigation and determine the validity of the complaint. If noncompliance with a mitigation measure has occurred, the District shall take appropriate action to remedy any violation. The complainant shall receive written confirmation indicating the results of the investigation or the final action corresponding to the particular noncompliance issue.

Table 5-1
MITIGATION MONITORING PROGRAM

Mitigation Measure / Condition	Timing / Implementation	Enforcement / Monitoring	Verification (Date & Initials)
AIR QUALITY			
Mitigation Measure AQ-1 The construction and demolition contractor shall be responsible for implementing Rule 4.2 and Fugitive Dust Control Measures to reduce the potential generation of fugitive dust during the proposed construction activities. Compliance with these requirements shall be required to minimize dust generation during construction activity. • All active construction areas (for example, parking areas, staging areas, soil piles, graded areas, and unpaved access roads) shall be watered a minimum of two times per day during the dry season; • Hydroseed or apply non-toxic soil stabilizers to inactive construction areas; • Dust-generating activities shall be limited during periods of high winds (over 15 mph); • Suspend excavation and grading activity when winds exceed 25 mph; • All haul trucks transporting soil, sand, or other loose material, likely to give rise to airborne dust, shall be covered; • All vehicle speeds shall be limited to 15 miles per hour within the construction area; • Promptly remove earth or other tracked out material from paved streets onto which earth, or other material has been transported by trucking or earth-moving equipment; and • Conduct digging, backfilling, and paving of utility trenches in such a manner as to minimize the creation of airborne dust.	During Construction	Contractor / LSCSD	
BIOLOGICAL RESOURCES			
Mitigation Measure BIO-1 A botanical field survey shall be conducted by a qualified biologist in the spring when special status plants known to occur in the region would be identifiable. The survey shall be conducted pursuant to applicable regulatory agency protocols and guidelines. In the unlikely event that special-status plant species are present, a suitable buffer zone(s) shall be determined by a qualified biologist in consultation with the applicable regulatory agency, and exclusionary fencing shall be placed prior to commencement of construction. If avoidance is not possible, the District shall consult with the applicable regulatory agency to determine a satisfactory method of mitigation. Typical mitigation includes collecting and propagating seeds, and replanting the seedlings in a protected area, or transplanting the individual plants to a protected area. A detailed mitigation plan shall be submitted to the applicable regulatory agency for review and approval. The plan shall identify the mitigation site, methods to be employed to create offsetting special-status plant habitat, success criteria, monitoring requirements, remedial measures, and/or other pertinent data to ensure successful replacement of the affected plant populations. Mitigation shall be undertaken concurrently with or in advance of the start of project construction.	Prior to Construction	LSCSD	
Mitigation Measure BIO-2 The potential for introduction and spread of noxious weeds shall be avoided/minimized by the following:	Prior to and During Construction	Contractor / LSCSD	

Table 5-1
MITIGATION MONITORING PROGRAM

Mitigation Measure / Condition	Timing / Implementation	Enforcement / Monitoring	Verification (Date & Initials)
• Using only certified weed-free erosion control materials, mulch, and seed, • Limiting any import or export of fill material to material that is known to be weed free, and • Requiring the construction contractor to thoroughly wash all equipment at a commercial wash facility prior to entering the County. If the equipment has most recently been used within the County, cleaning is not required.			
Mitigation Measure BIO-3 To avoid impacts to nesting birds, and/or raptors, protected under California Fish and Game Code Section 3503 and Section 3503.5, including their nests and eggs, one of the following shall be implemented: • Vegetation removal and ground-disturbance activities shall occur between September 1st and January 31st when birds are not nesting; or • If vegetation removal and ground disturbance activities occur during the nesting season, a pre-construction nesting survey shall be conducted by a qualified biologist to identify active nests in and adjacent to the project area. Surveys shall begin prior to sunrise and continue until vegetation and nests have been thoroughly observed. The survey shall take into account acoustic impacts and line-of-sight project disturbances to determine a sufficient survey radius to maximize observations of nesting birds. A nesting bird survey report should be prepared and, at a minimum, the report should include a description of the area surveyed, date and time of the survey, ambient conditions, bird species observed, a description of any active nests observed, any evidence of breeding behaviors (e.g., courtship, carrying nest materials or food, etc.), and a description of any outstanding conditions that may have impacted the survey results (e.g., weather conditions, excess noise, presence of predators). If an active nest is located during pre-construction surveys, a non-disturbance buffer should be established around the nest by a qualified biologist in consultation with CDFW and United States Fish and Wildlife Service to comply with Fish and Game Code Sections 3503 and 3503.5 and the Migratory Bird Treaty Act. Compliance measures may include, but are not limited to, exclusion buffers, sound-attenuation measures, seasonal work closures based on the known biology and life history of the species identified during the survey, as well as ongoing monitoring by biologists. Nesting bird surveys should be conducted no more than seven days prior to the initiation of construction. If construction activities are delayed or suspended for more than seven days after the pre-construction nesting bird survey, the site should be resurveyed.	Prior to Construction	LSCSD	
CULTURAL RESOURCES			
Mitigation Measure CR-1 If cultural resources, such as chipped or ground stone, or bone are inadvertently discovered during ground-disturbance activities, work shall be stopped within 50 feet of the discovery, as required by the California Environmental Quality Act (CEQA; January 1999 Revised Guidelines, Title 14 California Code of Regulations [CCR] Section 15064.5 [f]). Work near the archaeological finds shall not resume until a professional archaeologist, who meets the Secretary of the	During Construction	Contractor / LSCSD	

Table 5-1
MITIGATION MONITORING PROGRAM

Mitigation Measure / Condition	Timing / Implementation	Enforcement / Monitoring	Verification (Date & Initials)
Interior's Standards and Guidelines, has evaluated the material, and offered recommendations for further action.			
Mitigation Measure CR-2 If in the event that previously unidentified evidence of human burial or human remains are discovered during project construction, work will stop at the discovery location, within 20 meters (66 feet), and any nearby area reasonably suspected to overlie human remains (Public Resources Code, Section 7050.5) the Shasta County Coroner must be informed and consulted, per State law. If the coroner determines the remains to be Native American, he or she shall contact the Native American Heritage Commission within 24 hours. The Native American Heritage Commission shall identify the person or persons it believes to be the most likely descendent. The most likely descendent will be given an opportunity to make recommendations for means of treatment of the human remains and any associated grave goods. when the commission is unable to identify a descendant or the descendants identified fail to make a recommendation, or the landowner or his or her authorized representative rejects the recommendation of the descendants and the mediation provided for in subdivision (k) of Section 5097.94, if invoked, fails to provide measures acceptable to the landowner, the landowner or his or her authorized representative shall reinter the human remains and items associated with Native American human remains with appropriate dignity on the property in a location not subject to further and future subsurface disturbance. Work in the area shall not continue until the human remains are dealt with according to the recommendations of the County Coroner, Native American Heritage Commission and/or the most likely descendent have been implemented.	During Construction	Contractor / LSCSD	
HAZARDS AND HAZARDOUS MATERIALS			
Mitigation Measure HAZ-1 Prior to initiation of construction activities that would affect existing structures and associated piping, a comprehensive survey shall be completed in locations where asbestos and lead-based paint are suspected. Removal or disturbance of material with any detectable amount of asbestos or lead-based paint must be handled in accordance with OSHA regulations. All hazardous materials shall be removed by trained and authorized personnel and disposed of at a licensed facility in compliance with local, State, and federal regulations and guidelines.	Prior to and During Construction	Contractor / LSCSD	
Mitigation Measure HAZ-2 In the event that previously undetected asbestos or lead-containing materials are discovered during construction, activities that may affect the materials shall cease until results of additional surveys are reviewed. Alternatively, the District can assume that the materials are hazardous. Any identified hazardous materials shall be disposed of in accordance with applicable hazardous waste regulations.	During Construction	Contractor / LSCSD	
NOISE			
Mitigation Measure N-1 The project contractor shall be responsible for complying with the following measures during construction activities to reduce potential noise impacts:	During Construction	Contractor / LSCSD	

Table 5-1
MITIGATION MONITORING PROGRAM

Mitigation Measure / Condition	Timing / Implementation	Enforcement / Monitoring	Verification (Date & Initials)
• Construction activities shall be restricted to the hours between 7:00 a.m. and 7:00 p.m. Monday through Saturday. Construction activities shall also be prohibited during evening, nights, or on Sunday.			
TRIBAL CULTURAL RESOURCES			
Mitigation Measure TCR-1 Unanticipated Discovery - If any suspected TCRs are discovered during ground-disturbing construction activities, all work shall cease within at least 50 feet of the find. The District shall invite a Tribal Representative from a California Native American tribe that is traditionally and culturally affiliated with the geographic area to make recommendations about whether or not the discovery represents a TCR (PRC Section 21074) and, if so, to make recommendations for culturally appropriate treatment. The contractor shall implement any measures determined by the District to be necessary. Work at the discovery location cannot resume until the treatment has been implemented to the satisfaction of the District.	During Construction	Contractor / LSCSD	

Section 6 – Attachments

Attachment A
Preliminary Engineering Report

Attachment B
Air Quality & GHG Modeling Outputs

Attachment C
Biological Resources Report

Attachment D
Cultural Resources Inventory Report

Attachment A

Preliminary Engineering Report

Draft Preliminary Engineering Report

Drinking Water System Improvements

Prepared for:

Lake Shastina Community Services District

December 2023

520022.300

Phone: (530) 221-5424 **Email:** info@shn-engr.com
Web: shn-engr.com • 350 Hartnell Ave., Ste. B, Redding, CA 96002

Phone: (530) 221-5424 **Email:** info@shn-engr.com **Web:** shn-engr.com
350 Hartnell Avenue, Suite B, Redding, CA 96002-1875

Reference: 520022.300

December 20, 2023

Paula Mitchell and Rick Tompson, General Managers
Lake Shastina Community Services District
16309 Everhart Drive
Weed, CA 96094

Subject: Draft Preliminary Engineering Report for Drinking Water Planning Grant SWRCB Agreement Number D1902019, SWRCB Project Number 4710013-001P

Dear Paula Mitchell and Rick Tompson:

Please find enclosed the draft preliminary engineering report (PER) for the drinking water planning grant. Please review and provide any comments. If no changes are needed, please submit this document to the State Water Resources Control Board Division of Financial Assistance.

If you have any questions, please contact me at (541) 827-7855 or arasmussen@shn-engr.com.

Respectfully submitted,

SHN

Anders H. Rasmussen, PE
Regional Principal

AHR/SRB:lam

Enclosure: Draft Preliminary Engineering Report, Drinking Water Planning Grant
c. w/Encl.: Rodney Villa, LSCSD

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Draft Preliminary Engineering Report

Drinking Water System Improvements

Prepared for:

Lake Shastina Community Services District

Prepared by:

350 Hartnell Avenue, Suite B
Redding, CA 96002
530-221-5424

December 2023

QA/QC: AHR:___
Reference: 520022.300

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Executive Summary

SHN performed a review of the Lake Shastina Community Services District (LSCSD) drinking water system and made recommendations for improvements in the major areas shown in Table E-1.

Table E-1. System Concerns Summary
Lake Shastina Community Services District

System Concerns	Recommended Improvement
Water storage tanks are degrading	Isolate, empty, inspect, repair, recoat, and refill all tanks. Implement new/repaired cathodic protection to protect rehabilitated tank.
In the event of a power loss situation, no backup power is currently available	Install backup power generators with automatic transfer switches to maintain power to wells and booster pumps to maintain water flow in the event of a power outage, this is especially important in the event of a fire to protect district property, structures and to prevent loss of life.
No backup for the main well	Drill additional wells, to provide more water capacity and redundancy (this has yet to be finalized from test well installation and testing).
Most booster and filling pump stations do not have VFD[a] motors and cannot connect to backup power	Most booster and filling pump stations do not have VFD motors, install these motors and create connections at each pump station to accept the LSCSD's[b] portable or permanent generators.
Low pressure in southeast zone	Add a booster pump station in the southeast area and install two gate valves that will be shut to increase pressure. Install a new fire hydrant near the gate valves to function as blow-off valves, as necessary.
Manual water meter reading is time consuming	Implement new water meters that can report data to LSCSD staff from a distance, reducing person-hours spent.
Fire Hydrants and valves have exceeded design life	Replace all fire hydrants and associated valves to maintain safety for LSCSD customers.

a. VFD: variable frequency drive
b. LSCSD: Lake Shastina Community Services District

The proposed improvements total an estimated cost of $ 8,590,000. Project cost estimates for individual projects are shown in each individual section and summarized in Table 5-12. Detailed project descriptions and costs are provided in Section 7 and detailed within Appendix 3.

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List of Illustrations

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Abbreviations and Acronyms

Units of Measure

gpm	gallons per minute
hp	horsepower
kW	kilowatts
MGD	million gallons per day
psi	pounds per square inch

Additional Terms

AMI	advanced metering infrastructure
AMR	automatic meter reading
ATS	automatic transfer switch
B-#	booster pump-number/filling station-number
CEQA	California Environmental Quality Act
CWS	community water system
DFA	(SWRCB) Division of Financial Assistance
EA	each
FY	fiscal year
GWUDI	groundwater under direct influence of surface water
LF	linear foot
LS	lump sum
LSCSD	Lake Shastina Community Services District
MCL	maximum contaminant level
MTS	manual transfer switch
O&M	operations and maintenance
PER	preliminary engineering report
PS	pump station
PWS	public water system
SCADA	supervisory control and data acquisition
SDWA	Safe Drinking Water Act
SF	square foot
SWRCB	California State Water Resources Control Board
T-#	test well-number
VFD	variable frequency drive
VOCs	volatile organic compounds

1.0 Introduction

1.1 Purpose

The purpose of this preliminary engineering report (PER) is to evaluate the existing Lake Shastina Community Services District (LSCSD) drinking water system and provide recommendations for needed upgrades. The existing system consists of three production wells, four storage tanks with corresponding booster and/or filling pump stations, water meters, and a fire hydrant network.

Funding for this PER has been provided in full through a small community drinking water planning grant from the California State Water Resources Control Board (SWRCB), under SWRCB Agreement Number D1902019 and SWRCB Project Number 4710013-001P. The contents of this document do not necessarily reflect the views and policies of the foregoing, nor does mention of trade names or commercial products constitute endorsement or recommendation for use.

1.2 Scope

The scope of this project was to review the existing system and determine alternatives and recommendations for the needs identified by the LSCSD, which are the following, as described in detail in the following sections:

- Provide redundancy for Well 4.
- Rehabilitate or replace aging storage tanks.
- Increase storage capacity to alleviate strain on Tank 2.
- Complete the supervisory control and data acquisition (SCADA) system (specifically add Booster Pump Station B-57).
- Boost water pressures in the southeast portion of the service area.
- Improve billing efficiency by replacing the manual read water meters.
- Replace aging fire hydrants.
- Install backup power at critical locations.

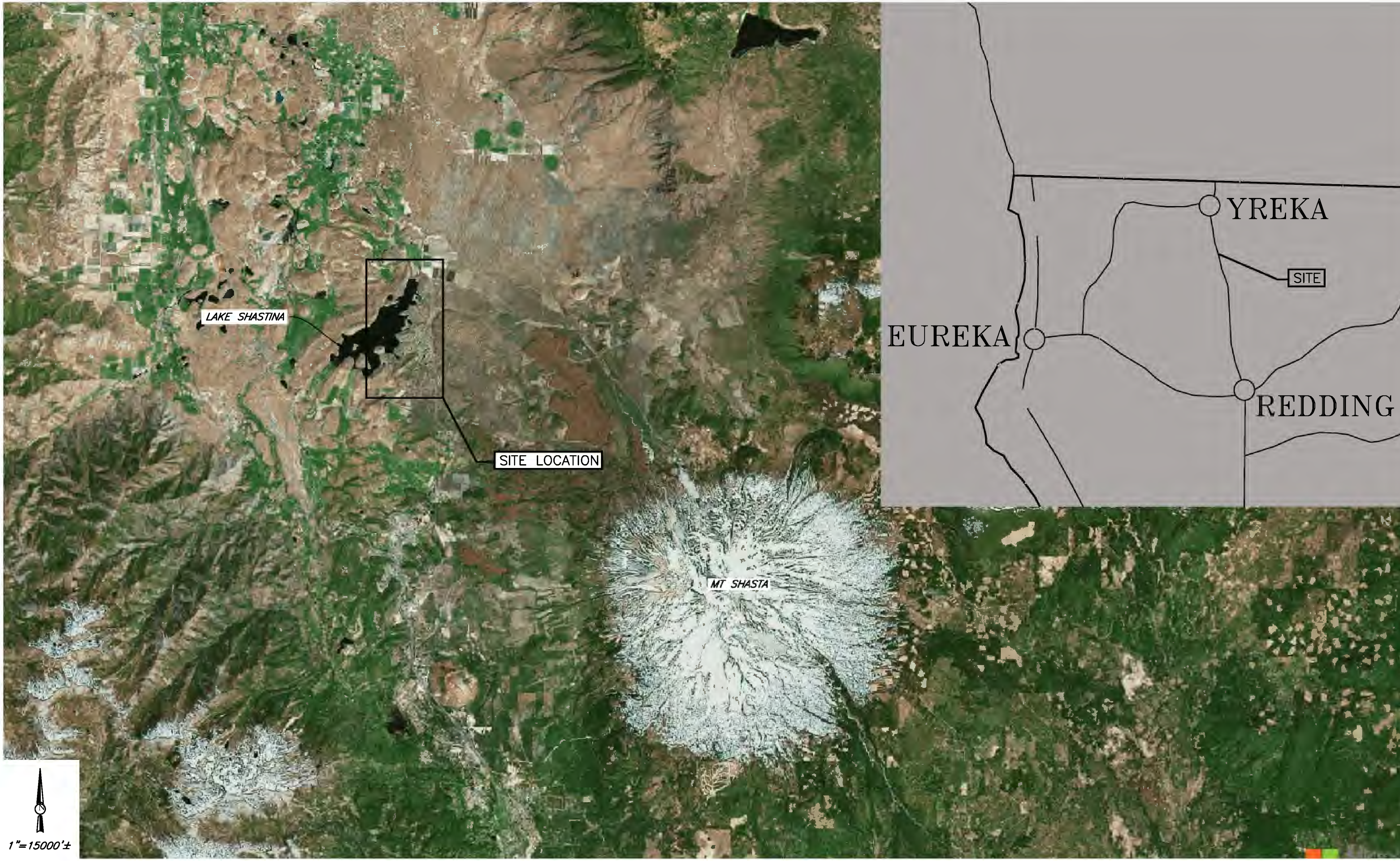
2.0 Project Planning

2.1 Location

The LSCSD is in Siskiyou County, California, just north of the City of Weed (see Figures 2-1 and 2-2).

2.2 Environmental Resources Present

The Lake Shastina community is located around Lake Shastina, California, which is a reservoir that is approximately 2.85 square miles and holds roughly 50,000 acre-feet of water. Lake Shastina supplies irrigation water to agricultural lands to the north and potable water for the City of Montague and is used for recreation. The topography is hilly with significant tree cover throughout the service area. Wildlife presents include various birds, deer, and other animals commonly found in the area. There are no



Lake Shastina CSD
Drinking Water System Improvements
Lake Shastina, CA

Project Location Map
SHN 520022

November 2023 | 520022-LSCSD-FIGS | Figure 2-1

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Lake Shastina CSD
Drinking Water System Improvements
Lake Shastina, CA

Map of Surrounding Cities
SHN 520022

Novermber 2023 | 520022-LSCSD-FIGS | Figure 2-2

P:\Redding\2020\520022 LSCSD Water\300-PER\Dwgs, SAVED: 12/8/2023 8:25 AM JTIERNEY, PLOTTED: 12/8/2023 8:41 AM, JARED TIERNEY known wetlands or cultural resources in the proposed project areas at the time of this analysis. An environmental review in accordance with the California Environmental Quality Act (CEQA) will be conducted once this PER is complete.

2.3 Population Trends

The population of Lake Shastina has remained stable since the 1980s, with a small growth rate prior to that. The most significant recent growth in population occurred in 2014 due to the Boles Fire. The fire destroyed more than 100 homes and structures in nearby Weed, California. Some of these displaced residents moved permanently to Lake Shastina. The current population of Lake Shastina is approximately 2,800. The current growth level is anticipated to be approximately ten residential units per year, based on the current trend.

2.4 Community Engagements

The LSCSD holds regular meetings of the Board of Directors; Budget/Finance Committee; Fire Department Advisory committee; Environmental Control Committee; Lake Shastina Community Foundation, Inc; the Greater Lake Shastina Fire Safe Council; and others. The District maintains 24-hour on-call service for maintenance issues. The service area for the LSCSD includes areas governed by four different property owners' associations, of which the Lake Shastina Property Owners Association is the largest.

3.0 Existing Facilities

3.1 Location Map

The project location relative to the greater area is included as Figure 2-1, with a plot plan view as Figure 3-1. Figure 3-2 is a schematic map of the water distribution system. The LSCSD service area is roughly 5 square miles, and elevations range from 2,700 feet at Well 9 to nearly 3,200 feet at the top of Zen Mountain where Tank 4 is located.

3.2 History

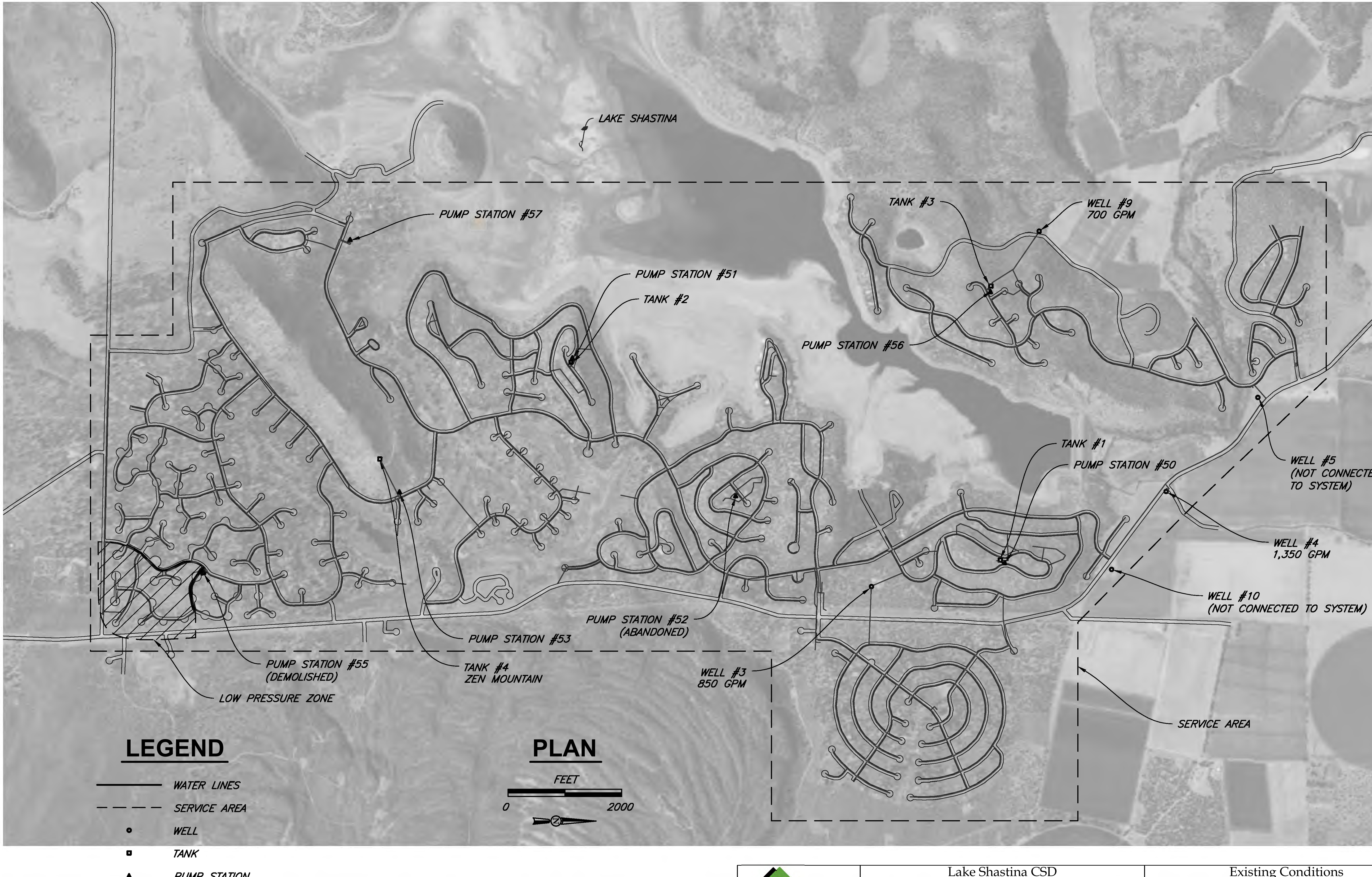
The Lake Shastina reservoir was formed with the construction of Dwinnell Dam, beginning in 1926, to serve the surrounding agricultural community. The community began as a second home recreation area in 1968, evolving into a community of families and retirees. LSCSD was formed in 1978 by the Siskiyou County Board of Supervisors after successful petitioning by the voters. The community has consistently had many of its residents' commute to other cities for employment.

3.3 System Description Summary

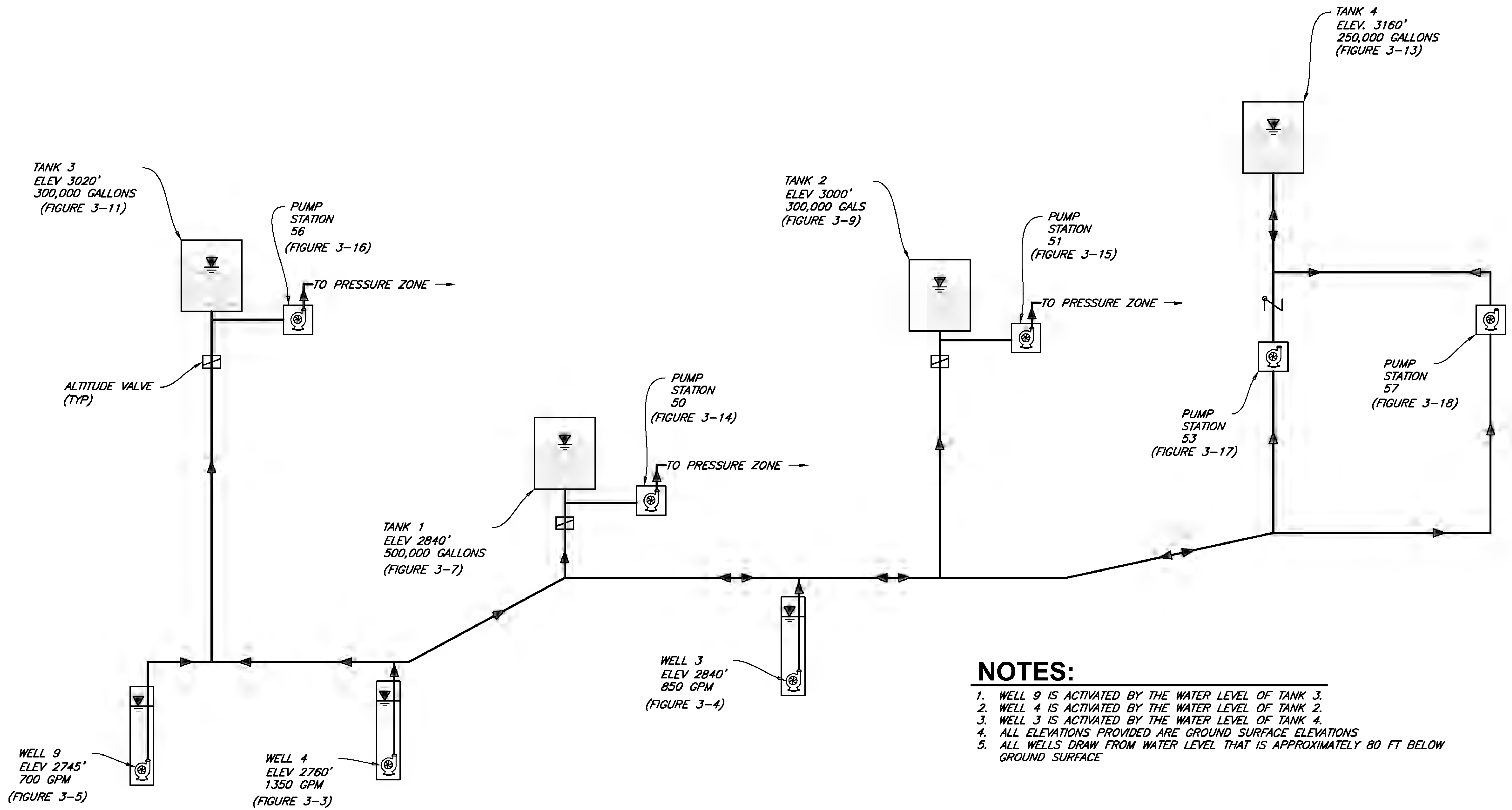
The LSCSD service area (see Figure 3-1) currently has 1,266 active residential connections and 26 active commercial connections. There are an additional 2,558 unimproved residential lots that the system will need to support once they are developed.

The LSCSD drinking water system consists of the following major elements:

- 3 production wells
- 4 storage tanks
- 3 booster pump stations providing pressure zones around tanks



SHN	Lake Shastina CSD Drinking Water System Improvements Lake Shastina, CA	Existing Conditions District SHN 520022
	November 2023 / 520022-LSCSD-FIGS	Figure 3-1



NOTES:

1. WELL 9 IS ACTIVATED BY THE WATER LEVEL OF TANK 3.
2. WELL 4 IS ACTIVATED BY THE WATER LEVEL OF TANK 2.
3. WELL 3 IS ACTIVATED BY THE WATER LEVEL OF TANK 4.
4. ALL ELEVATIONS PROVIDED ARE GROUND SURFACE ELEVATIONS
5. ALL WELLS DRAW FROM WATER LEVEL THAT IS APPROXIMATELY 80 FT BELOW GROUND SURFACE

Lake Shastina CSD Drinking Water System Improvements Lake Shastina, CA		Lake Shastina CSD Service Area Existing Conditions Schematic Plan SHN 520022
November 2023	520022-LSCSD-FIGS	Figure 3-2

- 2 booster pump stations used to fill Tank 4
- 1,292 water meters
- 319 fire hydrants
- Emergency Power
- Supervisory Control and Data Acquisition (SCADA)
- Distribution System

Locations of the wells, tanks, and pump stations are shown in Figure 3-1. The system requires the booster pump stations due to some homes being level with the storage tanks (Tanks 1, 2, and 3 with corresponding Booster Pump Stations B-50, B-51, and B-56, respectively). Tank filling booster stations are used when the tank is significantly higher than the distribution system, so the water requires more energy to reach the water level of the tank (Tank 4 and its corresponding Booster Stations B-53 and B-57).

The current average winter level water flow demand is 0.26 million gallons per day (MGD), and the average summer water flow demand is 1.50 MGD. The reason the average winter weather flow is so much lower is due to two main factors: 1) "snowbird" residences where the occupants are gone during the winter season, and 2) lower outdoor usage such as lawn irrigation.

There have been no recent violations or enforcement actions related to the LSCSD drinking water system, although there are occasional complaints from customers in the southeast of the district service area due to low water pressure.

3.4 Condition of Existing Facilities

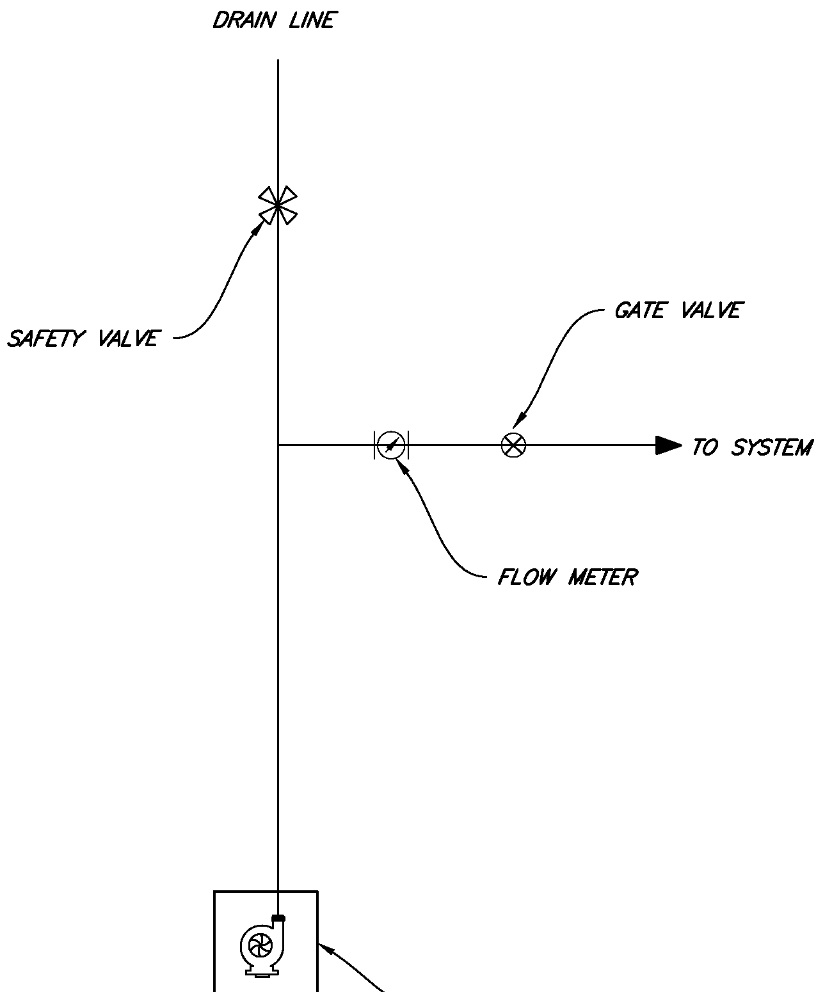
3.4.1 Production Wells

3.4.1.1 Well 4

Well 4 (Photograph 3.1) is the highest producing well, at 1,350 gallons per minute (gpm), and is the most important to the system. If this well ceases to function, especially during the summer months, customers could be forced to conserve, or be completely without water service. The consequences depend on where the customer is in the system, how much storage is available when the well goes down, and how long the well is offline. Figure 3-3 shows a piping schematic for this well.

Photograph 3.1 Well #4 Well House

Well 4 has a grade elevation of 2,760 feet above sea level and has a 200 horsepower (hp) pump to withdraw the water from the underground aquifer. The average water level is roughly 80 feet below ground surface. This well has the capability of connecting to the LSCSD's mobile generator, but there is no permanent electrical backup supply. Overall, this well is in operable condition having undergone mechanical repairs and electrical motor upgrades after an unplanned shutdown. However, with this being the most important well to the system, it is imperative to have a redundant/backup well in case Well 4 ever needs to be taken offline for service, especially during the summer months.



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SHN	Lake Shastina CSD Water Planning Study Lake Shastina, California	Well #4 Existing Piping Schematic SHN 520022
November 2023	520022-LSCSD-FIGS	Figure 3-3

3.4.1.2 Well 3

Photograph 3.2 Well #3 Well House

Well 3 (Photograph 3.2), which is the second most important well within the production system and is the primary winter well, produces an average of 850 gpm. Well 3 is situated 2,840 feet above sea level and is located centrally within the system, at the LSCSD maintenance yard (location shown in Figure 3-1). Well 3 has a 150-hp vertical motor that pumps the water located from 80 feet below ground. This well has a permanent generator in case of emergency. Overall, this well is in operable condition having undergone mechanical repairs and electrical motor upgrades after being shut down due to mechanical issues. Well 3 does not have adequate yield to meet summer water needs if Well 4 were to go offline. Figure 3-4 shows a piping schematic.

3.4.1.3 Well 9

Photograph 3.3 Well #9 Well House

Well 9 (Photograph 3.3) is in the northwestern section of the Lake Shastina water system, as shown on Figure 3-2. It was constructed to serve the Rancho Hills subdivision. It is currently used to supplement Well 4 and to boost the water levels within Tank 3. Well 9 provides an average of 700 gpm to the system.

Well 9 has a 100-hp, 700-gpm turbine pump, drawing water from 80 feet below the ground surface, and the elevation of the pump is roughly 2,745 feet. This well does not have electrical connections for the LSCSD mobile generator, and there is no permanent electrical backup supply to keep this well running in the event of an electrical outage. Figure 3-5 shows a piping schematic for this well.

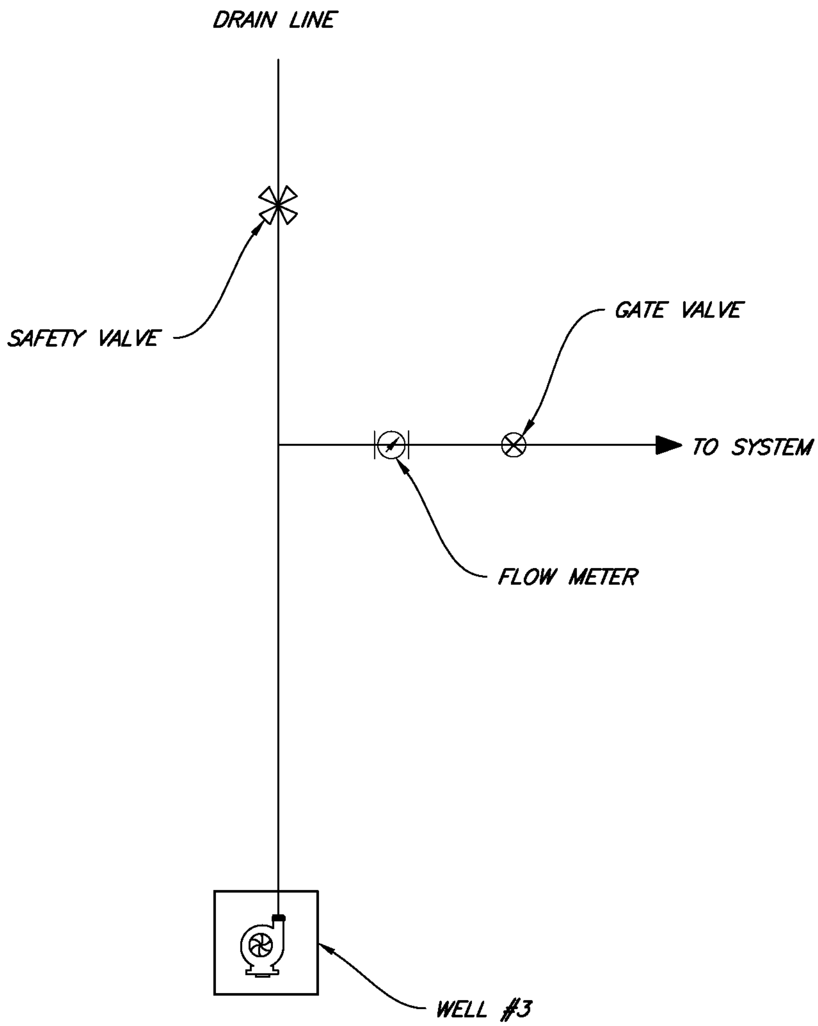
3.4.1.4 Additional System Deficiencies

The LSCSD has insufficient redundancy with its wells. In October 2016, Well 4, the highest producing well, became inoperable due to needed maintenance. During that time, the customers experienced lower water flow and pressures and reduced storage supply when Well 3 shut down as well, which forced the smallest and most remote well, Well 9, to be used exclusively. Thankfully, this down time happened outside of the summer months, when rationing or running out of water completely could have occurred.

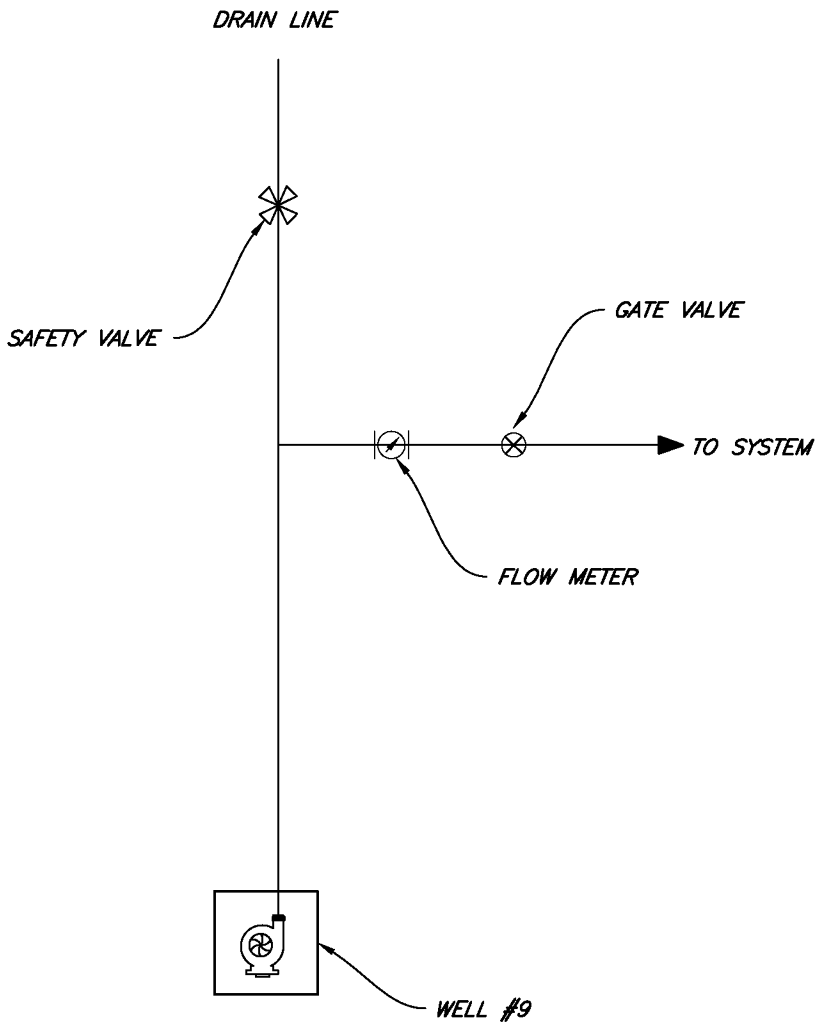
3.4.2 Storage System

3.4.2.1 Tank 1–Juniper Tank

Tank 1 (Photograph 3.4 on the next page) is the largest tank in the district at 500,000 gallons. It is a cylindrical welded-steel tank that was erected in 1971. This tank is located between Juniper Peak Road and Windmill Drive as shown on Figure 3-6. The elevation of the base of the tank is approximately 2,840 feet, and the external tank dimensions are 56 feet in diameter and 28 feet in height. A piping schematic drawing of Tank 1 is shown on Figure 3-7.



	Lake Shastina CSD Water Planning Study Lake Shastina, California	Well #3 Existing Piping Schematic SHN 520022
November 2023	520022-LSCSD-FIGS	Figure 3-4



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Lake Shastina CSD Water Planning Study Lake Shastina, California		Well #9 Existing Piping Schematic SHN 520022
November 2023	520022-LSCSD-FIGS	Figure 3-5

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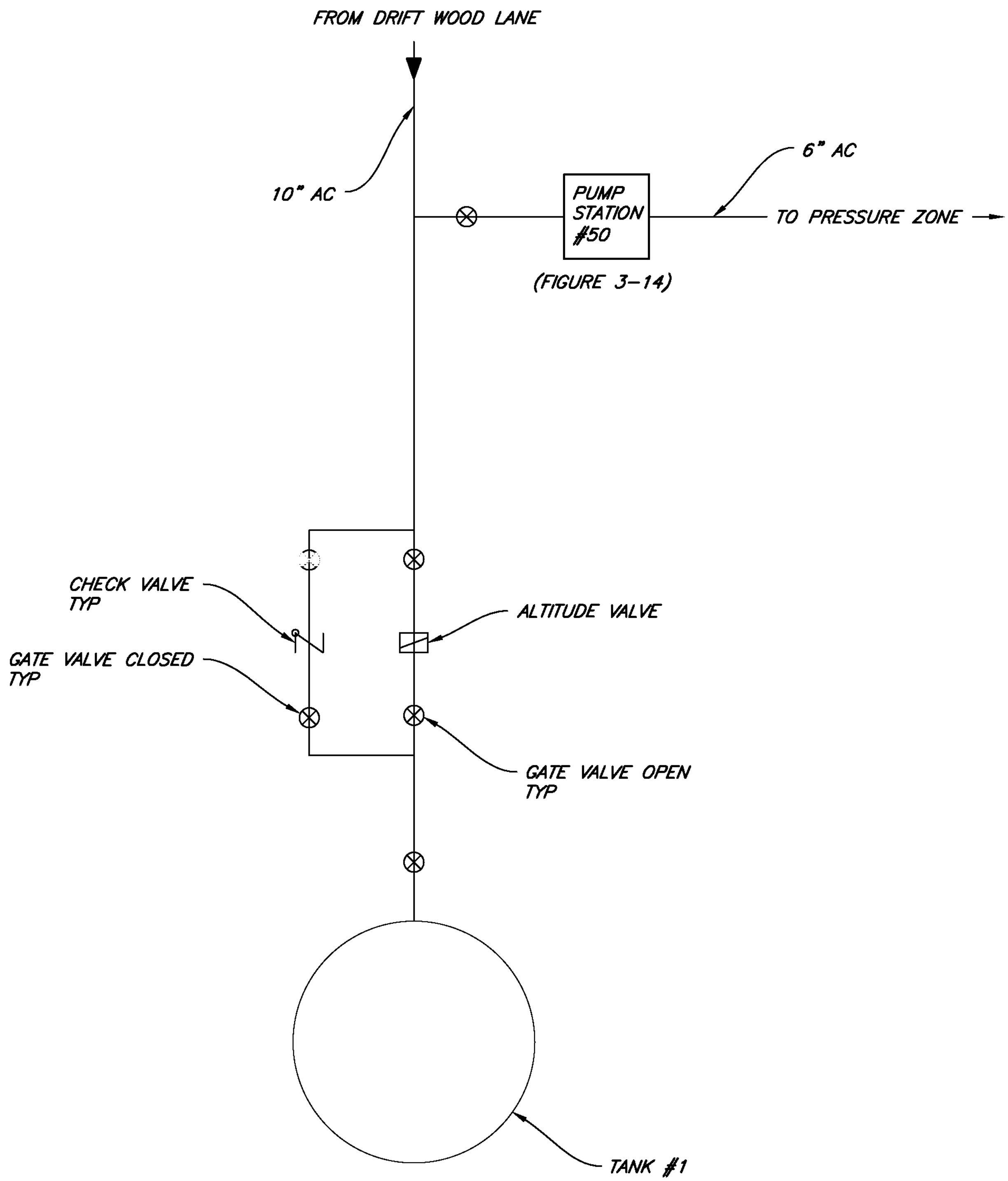
SHN	Lake Shastina CSD Drinking Water System Improvements Lake Shastina, California	Tank #1 Site Map SHN 520022
	Novermber 2023 — 520022-LSCSD-FIGS	Figure 3-6



SHN	Lake Shastina CSD Drinking Water System Improvements Lake Shastina, California	Tank #1 Piping Schematic SHN 520022
November 2023	520022-LSCSD-FIGS	Figure 3-7

An inspection performed in April 2017 (Appendix 1) had the following findings:

- The interior coating is at the end of its service life as evidenced by significant blistering and corrosion.
- Sediment depth is ¼ inch inside the tank.
- Entry hatch gasket is not sealing and has corrosion on the underside of the lid.
- The exterior coating has minor rust spots on the roof, ladder, and handrails and corrosion in low spots on the roof.
- The exterior shell is in good condition.

Photograph 3.4 Juniper Tank (Tank 1) showing manual tank level gauge.

The inspection report made the following recommendations to address the deficiencies:

- Sandblast and recoat the interior coating.
- Replace the entry hatch gasket.
- Touch up the exterior coating.

Tank 1 includes an altitude valve, which prevents overfilling. Operational information is described in Section 3.4.7.

3.4.2.2 Tank 2–Stag Tank

Erected in 1971, Tank 2 (Photograph 3.5) is a 300,000-gallon cylindrical welded-steel tank that has external dimensions of 24 feet tall by 47 feet in diameter.

This tank's location is between Stag Mountain Road and Stag Street (Figure 3-8). The base elevation of the tank is approximately 3,000 feet. A piping schematic for this tank is shown on Figure 3-9.

Photograph 3.5 Stag Tank (Tank 2).

An inspection performed in April 2017 (Appendix 1) had the following findings:

- The interior coating is at the end of its service life as evidenced by significant blistering and corrosion.
- Sediment depth is ¼ inch inside the tank.
- Entry hatch gasket is partly missing.
- The exterior coating is heavily oxidized and is thinning out.
- Cathodic plates are in place with no corrosion.

Lake Shastina CSD Drinking Water System Improvements Lake Shastina, California	Tank #2 Site Map SHN 520022	
Novermber 2023	520022-LSCSD-FIGS	Figure 3-8

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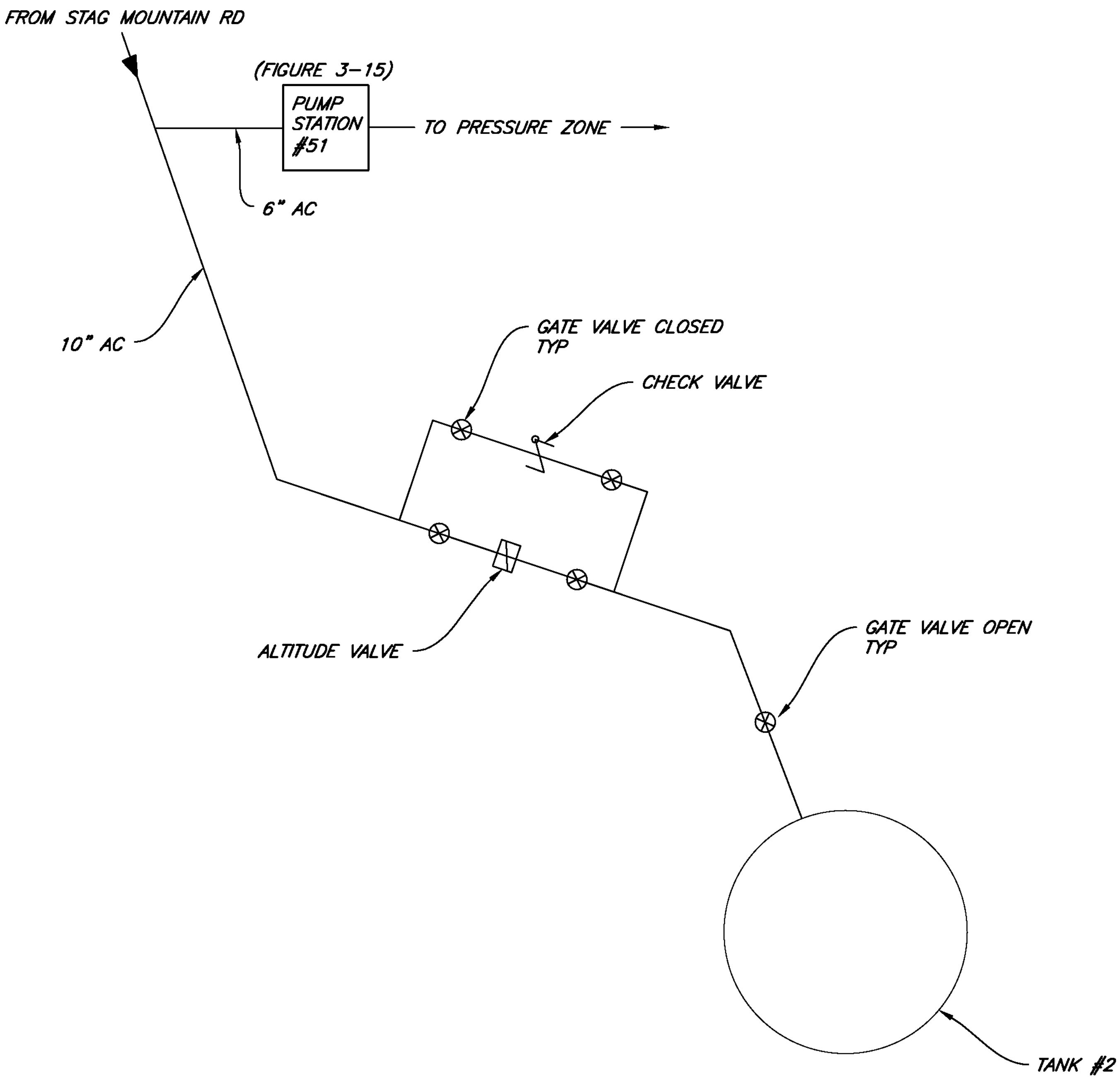


Lake Shastina CSD Drinking Water System Improvements Lake Shastina, California	Tank #2 Piping Schematic SHN 520022	
November 2023	520022-LSCSD-FIGS	Figure 3-9

The inspection report made the following recommendations to address the deficiencies:

- Sandblast and recoat the interior coating.
- Replace the entry hatch gasket.
- Touch up the exterior coating in areas with nicks and scratches.

Tank 2 includes an altitude valve that prevents overfilling. Operational information is described in Section 3.4.7.

The LSCSD has expressed concern that Tank 2 does not have sufficient storage capacity. During high use periods in summer and when Tank 4 calls for water, the water level in Tank 2 drops quickly, indicating that the system draws significantly from Tank 2. These quick drops in water level can present challenges with providing fire flows in and around Tank 2.

3.4.2.3 Tank 3–Rancho Tank

Erected in 1974, Tank 3 (Photograph 3.6) is a 300,000-gallon cylindrical welded-steel tank that has external dimensions of 24 feet tall and 47 feet in diameter. This tank' is at the corner of Stone Crest Drive and Eagle Rest Court, in the Rancho Hills subdivision (see Figure 3-10 for location). Figure 3-11 shows the piping schematic for this tank. The base elevation of this tank is 3,020 feet.

Photograph 3.6 Rancho Tank (Tank 3).

An inspection performed in April 2017 (Appendix 1) had the following findings:

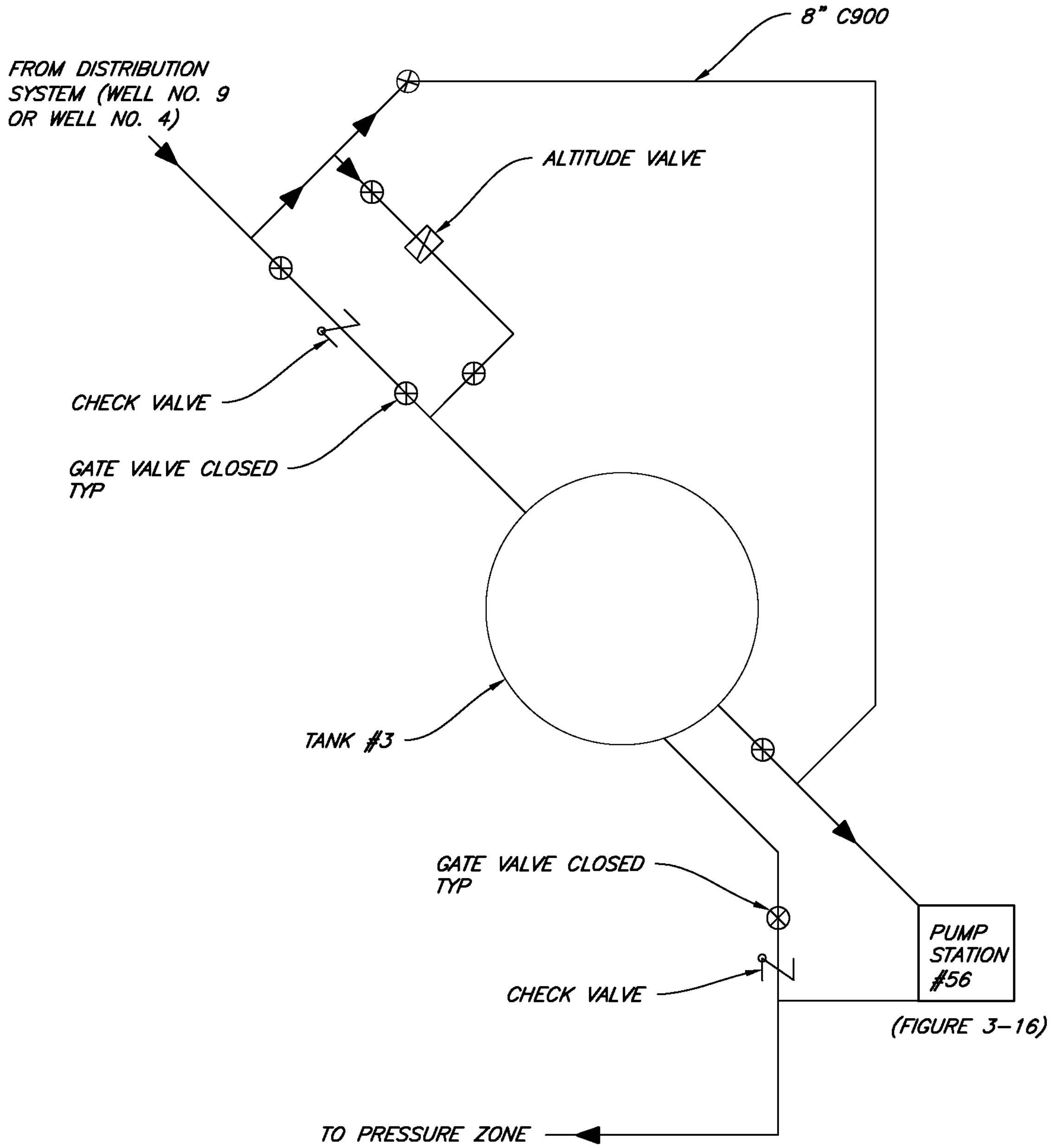
- The interior coating is at the end of its service life as evidenced by significant blistering and corrosion.
- Sediment depth is ¼ inch inside the tank.
- Entry hatch gasket is not sealing.
- The exterior coating on the roof is thin with primer exposed and indications of corrosion starting to form,
- There is minor rust on the ladder.
- The exterior shell is in good condition.

The inspection report made the following recommendations to address the deficiencies:

- Sandblast and recoat the interior coating.
- Replace the entry hatch gasket.
- Place a new topcoat on the exterior roof.

Tank 3 includes an altitude valve to prevent overfilling. Operational information is described in Section 3.4.7.


(E) TANK #3
(E) PUMP STATION #56
Eagle Rest Ct
Eagle Rest Ct
Stone Crest Dr
Stone Crest Dr



SHN

Lake Shastina CSD
Drinking Water System Improvements
Lake Shastina, California

Tank #3
Piping Schematic
SHN 520022

November 2023 | 520022-LSCSD-FIGS

Figure 3-11

3.4.2.4 Tank 4–Zen Mountain Tank

Erected in 1977, Tank 4 (Photograph 3.7) is a 250,000-gallon cylindrical welded-steel tank with external dimensions of 30 feet in height and 38 feet in diameter. It is located at the top of Zen Mountain (Figure 3-12). Figure 3-13 shows the piping schematic for this tank. The closest street is Tennis Court, which also is the beginning of the access road to this tank. The base elevation of this tank is approximately 3,160 feet.


Photograph 3.7 Zen Mountain Tank (Tank

Photograph 3.7 Zen Mountain Tank (Tank 4).

An inspection performed in April 2017 (Appendix 1) had the following findings:

- The interior coating is at the end of its service life as evidenced by significant blistering and corrosion.
- Sediment depth is 1/8 inch inside the tank.
- Various exterior areas exhibit minor rusting and nicks and scratches around the roof entry hatch, shell, ladder, and overflow pipe.
- The exterior shell has many areas that have already been recoated and these locations are holding up with no corrosion present.
- Coating is peeling around the edges of the manway entries.
- The manual level indicator has water in the interior float and is losing buoyancy.

The inspection report made the following recommendations to address the deficiencies:

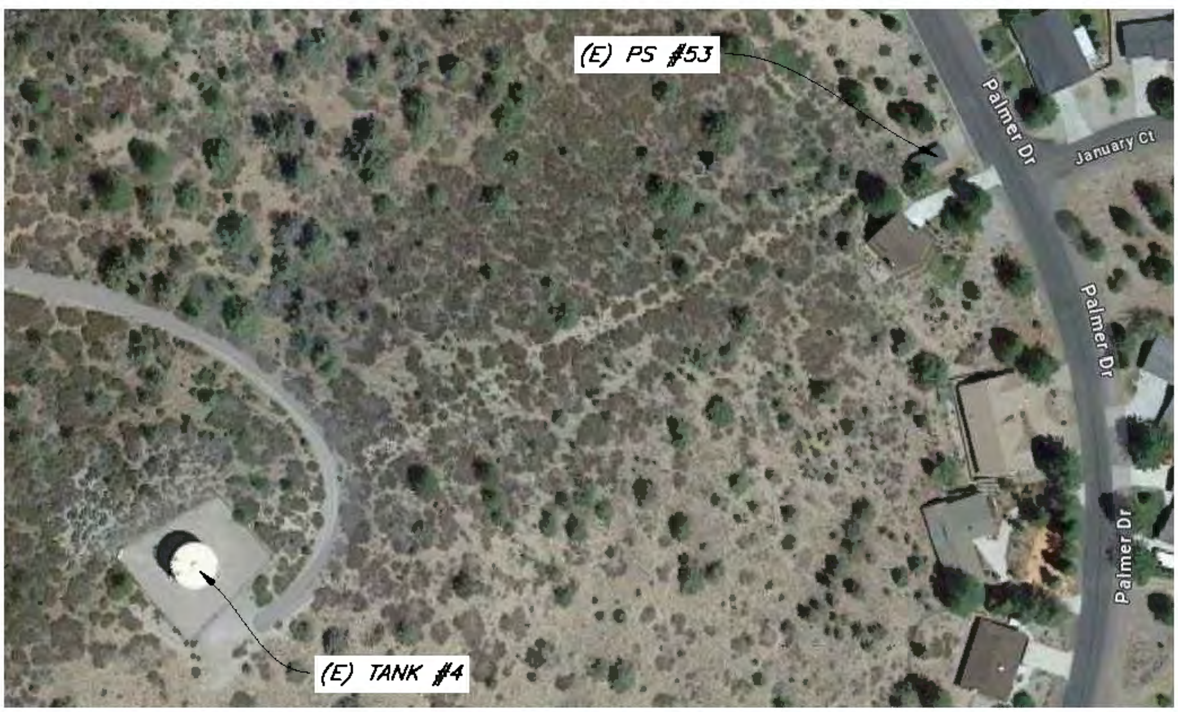
- Sandblast and recoat the interior coating.
- Replace the entry hatch gasket.
- Replace the interior float for the level indicator.
- Touch up the exterior coating.

This tank is the southernmost and highest tank and, therefore, the furthest away from the production wells. Booster Pump Stations B-53 and B-57 provide additional pressure to fill Tank 4. Tank 4 does not have an altitude valve and has historically been subject to overfilling. However, overfilling incidents have been reduced by tying B-53 to the SCADA system and placing B-57 on a timer (see Section 3.4.4.4 for additional operational information).

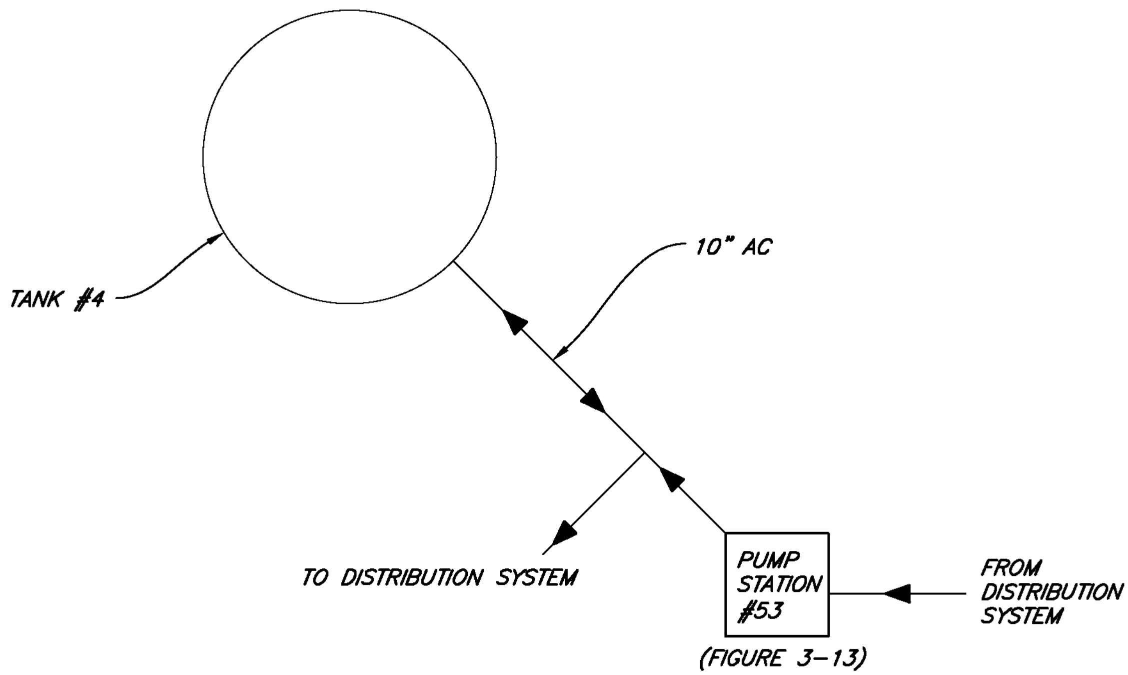
3.4.3 Booster Pump Stations

3.4.3.1 General

Three of the five booster pump stations in the LSCSD service area are used to provide adequate pressure to the residences located at similar elevations to their corresponding water tanks because the static pressure that would be provided from the tanks is below allowable pressure minimums. Each booster station has pressure tanks and two small pony pumps in addition to a larger pump. The pony pumps pressurize the system for minor demands, and the larger pump activates when the demand is higher than what the pony pumps can provide. The pressure tanks serve two purposes: 1) to provide steady pressure before the pony pumps turn on to pressurize the system and 2) to prevent damage



SHN	Lake Shastina CSD Drinking Water System Improvements Lake Shastina, California		Tank #4 Site Map SHN 520022
	Novermber 2023	520022-LSCSD-FIGS	Figure 3-12



Lake Shastina CSD
Drinking Water System Improvements
Lake Shastina, California

Tank #4
Piping Schematic
SHN 520022

November 2023 | 520022-LSCSD-FIGS | Figure 3-13 from surging or water hammer effects. Two pump stations are used solely to pump water to Tank 4, to overcome the height differential between the tank and the rest of the distribution system, due to this tank being higher than the distribution system (see Figure 3-2 and Section 5.4.3.4, below).

According to the LSCSD, all pump stations have variable frequency drives (VFDs) on the pumps, most of which have been installed in the last few years.


Photograph 3.8 Booster Pump Station B-50

3.4.3.2 Station B-50

Booster Pump Station B-50 (Photograph 3.8) is located adjacent to Tank 1 and provides a local pressure zone where the homes surrounding the tank are at approximately the same elevation as Tank 1. The location is shown in Figure 3-1 and the piping schematic is shown on Figure 3-14. This pump station consists of two 45-gpm pony pumps, one 300-gpm pump, and four 75-gallon pressure tanks. This pump station is in fair condition.


Photograph 3.9 Booster Pump Station B-51

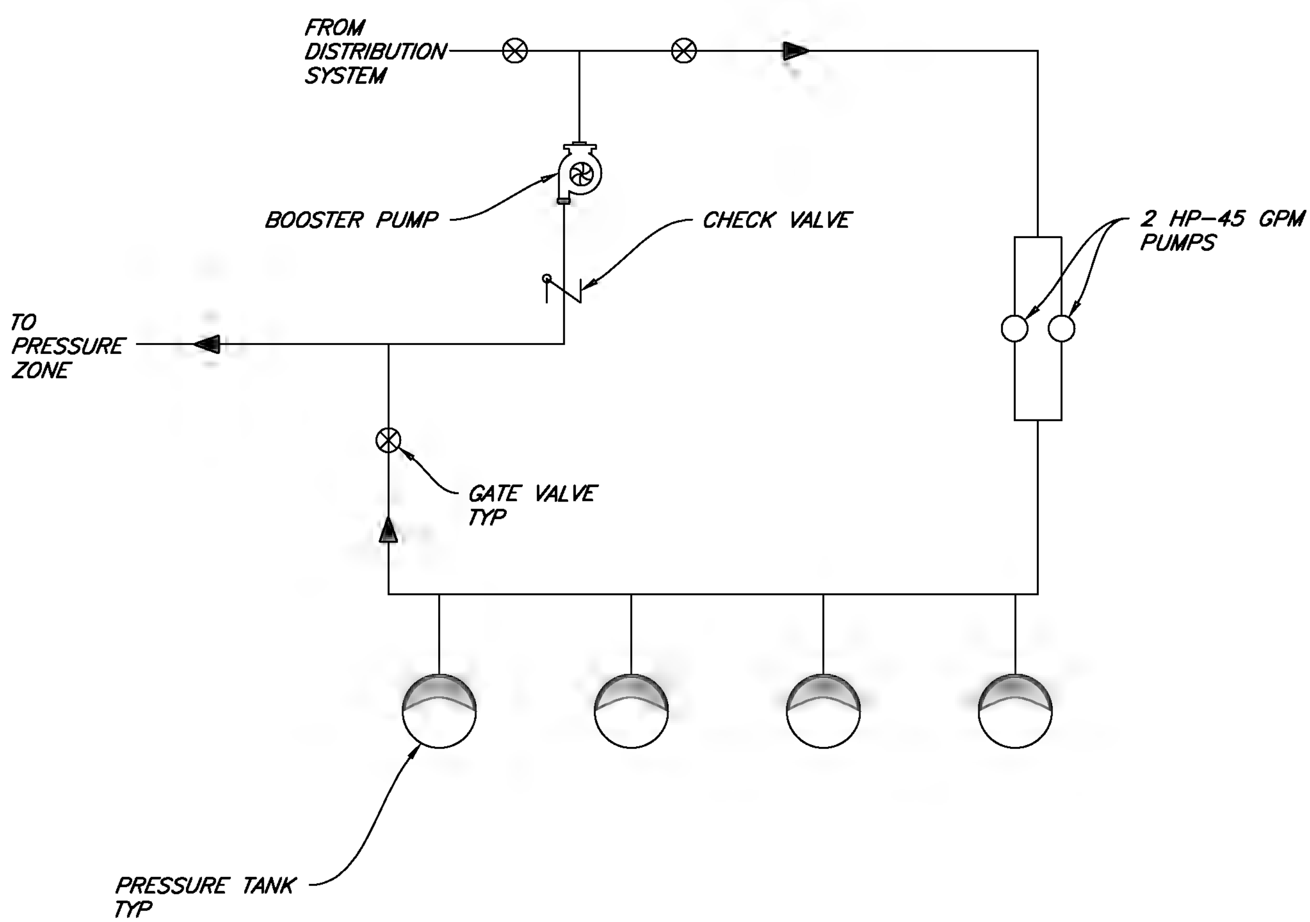
3.4.3.3 Station B-51

Booster Pump Station B-51 (Photograph 3.9) is located adjacent to Tank 2 and provides a local pressure zone where the homes surrounding the tank are at approximately the same elevation as Tank 2. The location is shown on Figure 3-1 and the piping schematic is shown on Figure 3-15. This pump station consists of two 45-gpm pony pumps, one 250-gpm pump, and three 75-gallon pressure tanks. This pump station is in fair condition.

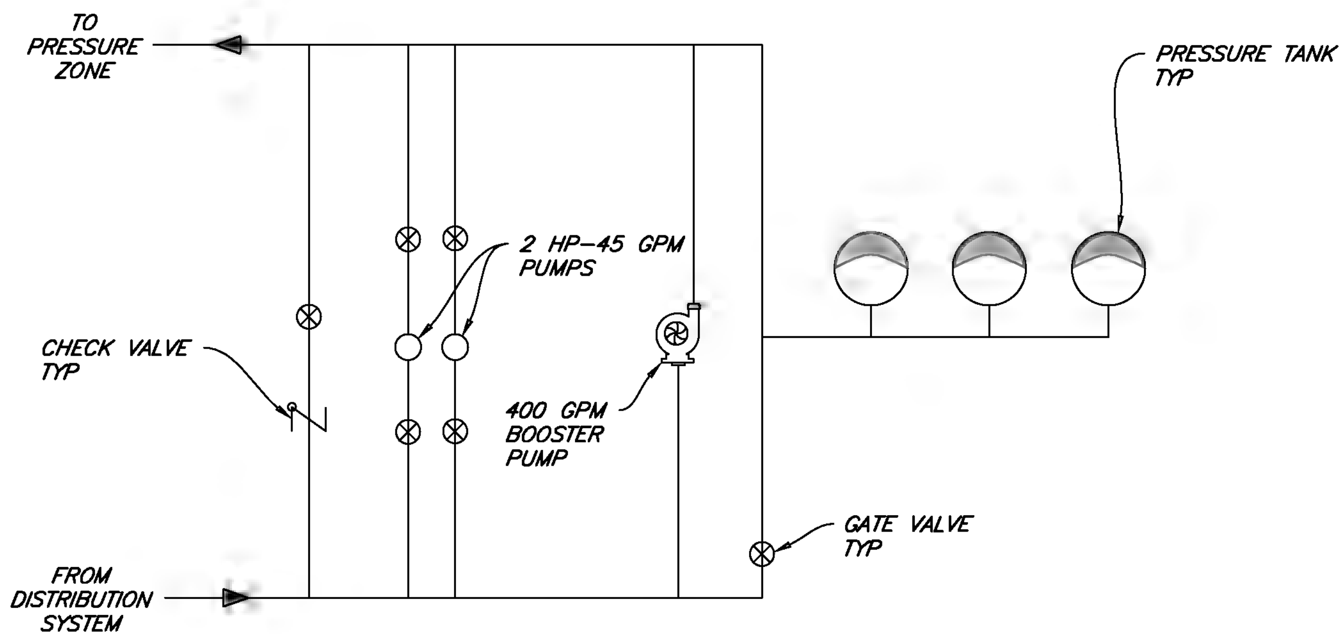

Photograph 3.10 Booster Pump Station B-56

3.4.3.4 Station B-56

Booster Pump Station B-56 (Photograph 3.10) is located adjacent to Tank 3 and provides a local pressure zone where the homes surrounding the tank are at approximately the same elevation as Tank 3. The location is shown on Figure 3-1 and the piping schematic is shown on Figure 3-16. This pump station consists of two 45-gpm pony pumps, one 400-gpm pump, and three 75-gallon pressure tanks. This pump station is in fair condition.



Lake Shastina CSD Drinking Water System Improvements Lake Shastina, California		Booster Pump Station #50 Existing Piping Schematic SHN 520022
Novermber 2023	520022-LSCSD-FIGS	Figure 3-14



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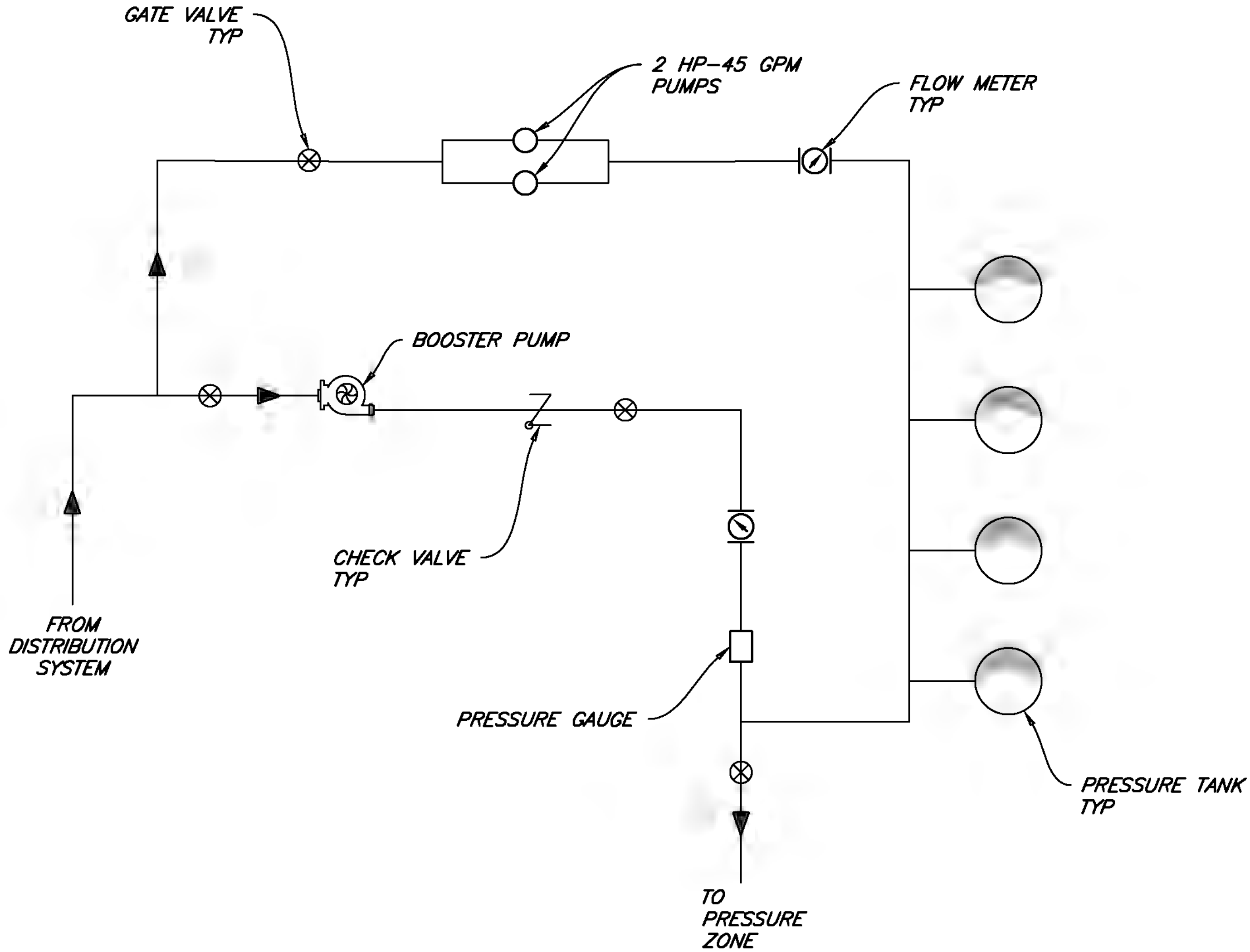
	Novermber 2023 / 520022-LSCSD-FIGS	Figure 3-15



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SHN	Lake Shastina CSD Drinking Water System Improvements Lake Shastina, California	Booster Pump Station #56 Piping Schematic SHN 520022
	Novermber 2023 / 520022-LSCSD-FIGS	Figure 3-16

3.4.3.5 Station B-53

Booster Pump Station B-53 (Photograph 3.11) pumps water from the distribution system up to Tank 4, located approximately 200 feet in elevation above B-53, as well as to the southern distribution system. Figure 3-1 shows the location of this station, and Figure 3-17 shows the piping schematic.

The pump station consists of two pumps with VFDs in parallel, a 20-hp 250-gpm pump and a 50-hp, 500-gpm pump. Operational information is described in Section 3.4.7. This pump station is in good condition.

Photograph 3.11 Booster Station B-53

3.4.3.6 Station B-57

Pump Station B-57 (Photograph 3.12) provides an alternate means to fill Tank 4. It is located along Lakeshore Drive near the intersection with Cottonwood Drive (Figure 3-1). This station is also used to ensure that the water in the western side of Zen Mountain is not allowed to become stagnant. B-57 is not connected to the SCADA system, but is set to activate on a timer between the hours of 3 a.m. to 7 a.m. However, because of this, Tank 4 has been overfilled in the past. To minimize overfilling events, the water level of Tank 4 which is tied to the SCADA system is monitored closely. This station is in operable condition; however, it can be improved by tying the station into the SCADA system and removing the reliance on a timer to activate the pump. A schematic drawing of the pump and piping for this station in presented on Figure 3-18.

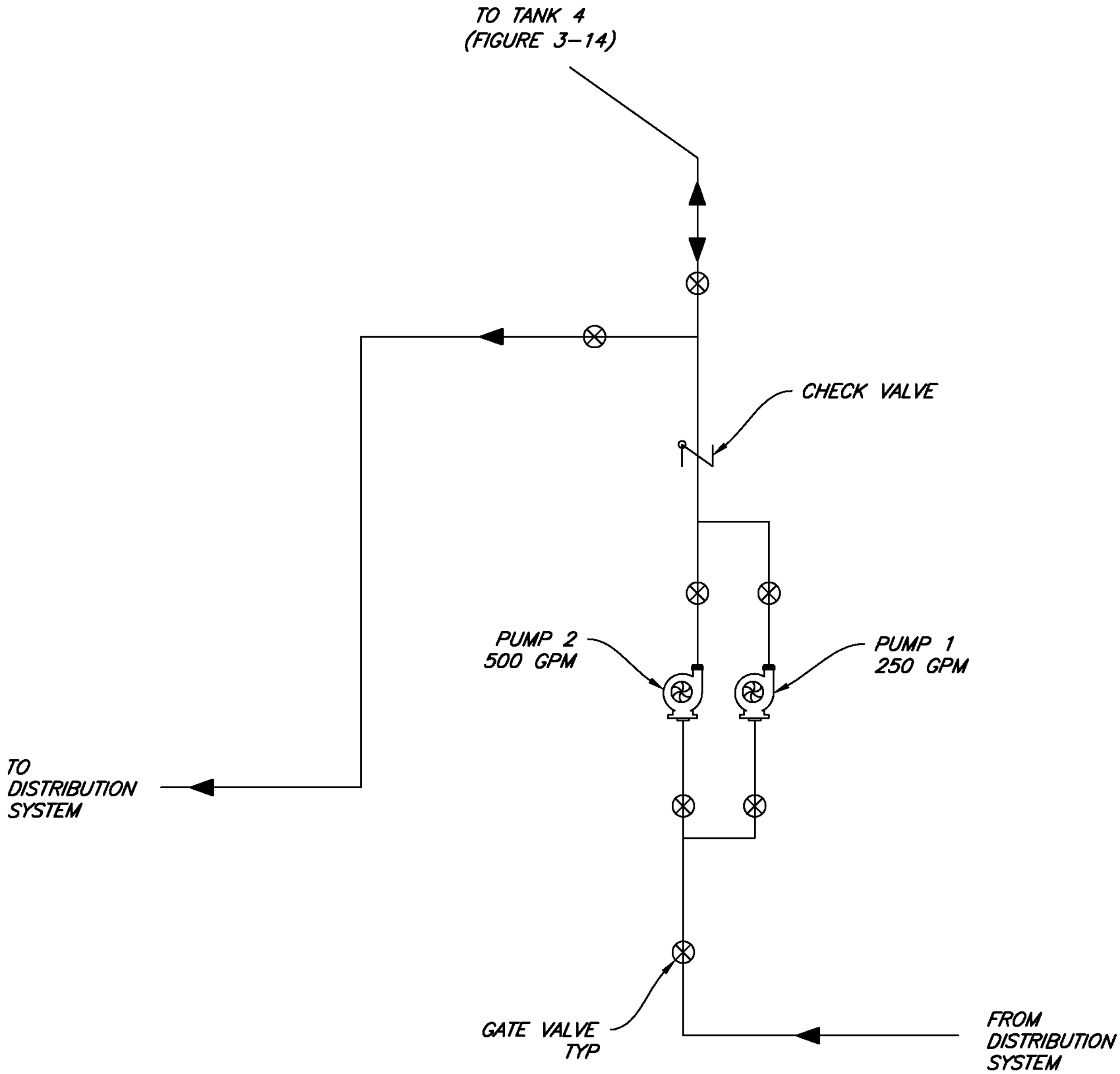
Photograph 3.12 Filling Station B-57

3.4.4 Water Meters

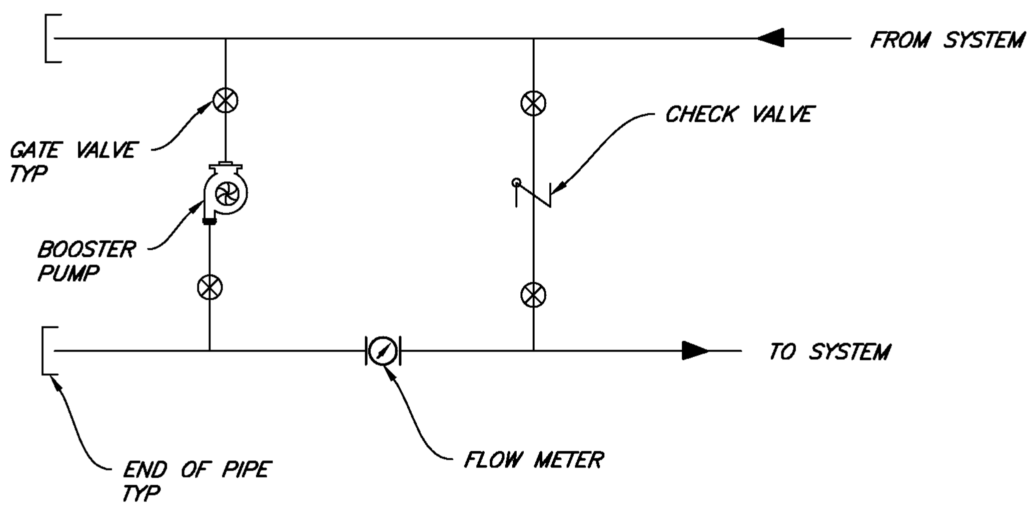
The LSCSD has two types of meters: 1) system meters and 2) customer meters. The system meters, which primarily provide volumetric data for reporting purposes, are in good condition. The customer meters, which number 1,292, need replacement.

The customer meters are nearing the end of their useful life. Further, LSCSD staff manually read each meter quarterly for the purpose of billing. LSCSD employees currently spend approximately 128 person-hours (estimated 4 people working 8 hours a day for

Photograph 3.13 Typical Water Meter
Note: LSCSD is using this type of manual read meter.



Lake Shastina CSD Drinking Water System Improvements Lake Shastina, California		Booster Pump Station #53 Piping Schematic SHN 520022
Novermber 2023	520022-LSCSD-FIGS	Figure 3-17



SHN	Lake Shastina CSD Drinking Water System Improvements Lake Shastina, California	Filling Pump Station #57 Piping Schematic SHN 520022
Novermber 2023	520022-LSCSD-FIGS	Figure 3-18

4 days) manually reading the water meters for quarterly water bills. This method of meter reading is time consuming and costly to the district and its users. The quarterly billing makes it difficult to detect potential leaks in a timely fashion.

3.4.5 Fire Hydrants

There are 319 fire hydrants in the LSCSD service area. Many of these hydrants are the same ones installed when the water system was constructed in the late 1960s and early 1970s, making them well over 50 years old. LSCSD staff have been exercising the hydrant valves and have found some to be stuck or broken. LSCSD staff have been replacing four to five hydrants annually, and 20 hydrants have been replaced so far. The LSCSD is matching the old hydrant type with new to keep maintenance and operations for the hydrants as similar as possible. At this rate, though, it will take the LSCSD between 60 and 75 years to complete the replacements.

Photograph 3.14 Typical Lake Shastina Fire Hydrant

3.4.6 Emergency Power

The one permanent backup power generator inside the entire service area is found at Well 3; however, it is 11 years old and needs replacement. There is a portable power generation unit that can be taken to a well or booster pump that is set up to accept this type of power. This arrangement, though, places the LSCSD in danger of being unable to provide backup power in the event of a power outage. If such a power outage were to occur in tandem with a fire in or near the district, the LSCSD could face serious liability for either loss of property or life by not being able to supply fire water during this scenario.

Currently there is no permanent generator for any well or pump station in the LSCSD drinking water system other than Well 3. Well 4 can accept a portable generator in an emergency but Pump Station B-57 and Well 9 do not have proper connections for backup power. With its many pump stations unable to accept back up power, including the booster pump stations, and limited LSCSD staff, there is risk for service interruptions in the event of a power outage.

Without retrofits, a power outage would prevent most customers from receiving adequate or any water supply. This would also drop the water pressure throughout the service area, especially in areas served by booster pumps, requiring potentially a boil water notice. Due to the lack of backup power or acceptable connections, this would pose a severe problem in the event of a fire and/or loss of power to provide fire water to suppress even a small fire within the LSCSD service area.

3.4.7 SCADA System and Operational Logic

The LSCSD recently selected a supervisory control and data acquisition (SCADA) system for its drinking water system and requested an evaluation for use with the wastewater system. The selected system for the drinking water system is the XiO Cloud Based SCADA, created by XiO, Inc. (www.xiowatersystems.com). This SCADA system is currently in place for the drinking water system for the LSCSD. Figure 3-19 shows a screenshot of the current SCADA schematic.

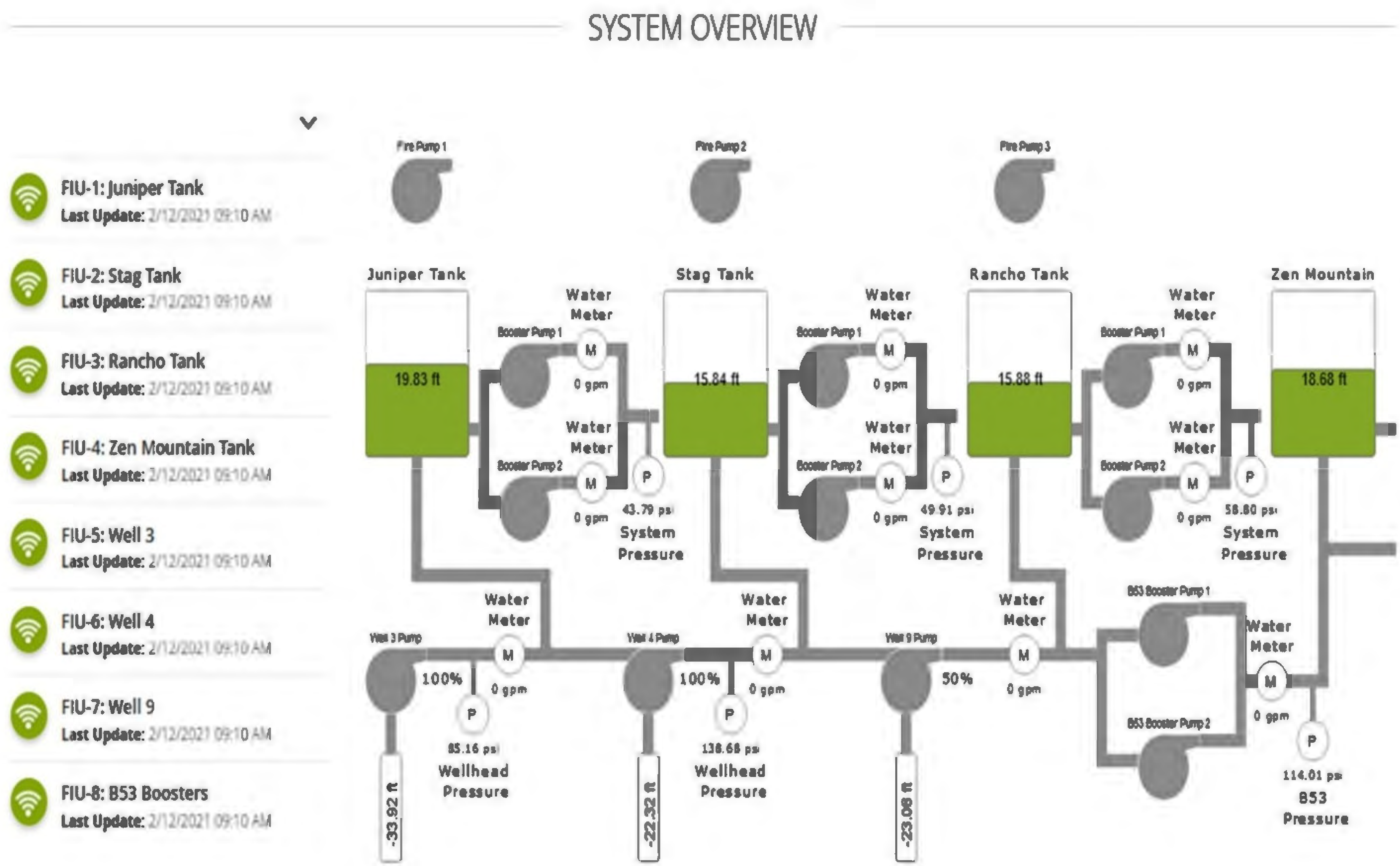


Figure 3-19 Example Setup of SCADA System for LSCSD
(Re-printed with permission from the LSCSD SCADA system)

The XiO SCADA system provides unlimited historical data storage. XiO operates geographically distributed and redundant database servers to keep the data safe from catastrophic events such as natural disasters or potential cyber-attacks. The use of XiO Cloud Control Center for system data storage will allow only authorized system operators with secure login credentials to access the data using a smartphone, tablet, or computer.

The SCADA system provides the following:

- Water level in each tank;
- On/off status of all well pumps and booster pumps, except the B-57 booster pump station;
- Water pressure at areas with pressure monitors;
- Programmable logic for start/stop for well pumps and booster pumps (except B-57) using inputs from the SCADA system such as tank water level, or pressure;
- Records of historical data for most inputs, such as tank water tank level, pump flow, and pressures.

When the water level in Tanks 1, 2, or 3 drops below the defined setpoints, a call for water is sent through the SCADA system and Well 3 turns on. If Well 3 cannot keep up with demand, then Well 4 turns on. However, during the summer, the operational logic is reversed and Well 4 turns on first, then Well 3. When the water level in Tank 4 drops below the defined setpoint, Booster Pump Station B-57 turns on and draws water from the system, namely Tank 2 (the nearest tank). This creates additional water demand on Tank 2 (see discussion in Section 3.4.2.3).

Well 9 is manually operated to allow groundwater levels around Well 4 to recover.

3.4.8 Distribution System

The distribution system consists of piping, valves, and service connections, along with other features (such as water meters and pump stations) discussed in other sections. The existing pipe network and valves are in good condition based upon the indirect evidence of lack of problems, such as leaks, stuck valves, and so on.

3.5 Financial Status of Existing Facilities

The LSCSD currently has no outstanding debt regarding its drinking water system. Financial reports for the past five years are provided in Appendix 2.

3.6 Water/Energy Audits

As part of this work, SHN prepared an energy management study to review historical usage within the water system. The memo can be found in Appendix 3. The LSCSD periodically has reviewed its electrical usage. Each pump station has an individual meter and can be reviewed for any inconsistencies. Based on review of recent electrical usage, the LSCSD has found no unusual power usage at any of the wells or pump stations.

The energy management study recommended variable frequency drives (VFDs); however, the LSCSD has already installed VFDs at all of its pumps and pump stations, so no further recommendations with respect to energy use are made.

No water audits have been performed. With the recommended project of new water meters (see Section 6.9) and monthly billing, leaks could be detected in a timelier fashion.

4.0 Need for Project

4.1 Problem Description

4.1.1 General

The deficiencies identified in Section 3 for the LSCSD water system were ranked according to categories used by SWRCB Division of Financial Assistance (DFA) to prioritize funding. The SWRCB-DFA funding categories are described below with examples of deficiencies for each category. Generally, projects that address issues only in categories A, B, or C are eligible for grant funding through the State. The LSCSD's system deficiencies are summarized in Table 4-1. These deficiencies have been grouped such that the solutions to each are likely to be discrete subprojects that can be analyzed independently and bid separately.

Table 4-1. Water System Deficiencies
Lake Shastina Community Services District

Deficiency	Category[a]	Proposed Solution(s)
Lack of Well 4 Redundancy	C	New production well New well house and connection to distribution system
Aging Tanks	C	Refurbish tanks
Inadequate Water Storage	C	Install new 300,000-gallon tank
Inadequate Pressure in Southeast Zone	C	Install new booster pump station
Lack of Backup Power	C	Install stationary backup power at existing sites without backup power
Aging Fire Hydrants	C	Replace fire hydrants
Incomplete SCADA[b] System	D	Install SCADA at pump station B-57
Manual Read Water Meters	D	Replace water meters

a. Funding priority category as described in Section 4.1.2.
b. SCADA: Supervisory Control and Data Acquisition

4.1.2 SWRCB Priority Categories

The SWRCB-DFA funds projects based on priority categories. Generally, these categories are ordered based on violation history, risk to public health, risk of shortages, system reliability, risk to infrastructure, and so on.

The categories are presented below with example deficiencies for each category:

- **Category A: Immediate Health Risk**
  - Documented waterborne disease outbreaks attributable to the water system
  - Water systems under a court order to correct Safe Drinking Water Act (SDWA) violations or to correct water outage problems
  - Total coliform Maximum Contaminant Level (MCL) violations 8 attributable to active sources contaminated with coliform bacteria (for example., fecal, E. coli, or total coliform)
  - Severe domestic water supply outage(s) posing an imminent threat to public health and safety
  - The distribution of water containing nitrates/nitrites or perchlorate in excess of the MCL.

- **Category B: Untreated or At-Risk Sources**
  - Surface water or groundwater under direct influence of surface water (GWUDI) sources that are untreated, not filtered, or have other filtration treatment deficiencies that violate federal or state regulations
  - Non-GWUDI groundwater sources that are contaminated with fecal coliform or E. coli and are inadequately treated
  - Uncovered distribution reservoirs

- **Category C: Compliance or Shortage Problems**
  - Water quantity problems caused by source capacity, or water delivery capability that is insufficient to meet existing demand
  - The distribution of water containing chemical or radiological contamination in violation of a state or federal primary drinking water standard (other than nitrate/nitrite or perchlorate)
  - Total Coliform Rule violations for reasons other than source contamination

- **Category D: Inadequate Reliability**
  - Non-metered service connections, or defective water meters
  - community water systems (CWSs) and public water systems (PWSs) owned by public schools, with a single source and no backup supply
  - Distribution reservoirs with non-rigid covers in active use
    - Disinfection facilities that lack needed reliability features, such as chlorine analyzers or alarms
    - Violations of the Waterworks Standards related to disinfection

- **Category E: Secondary Risks**
  - The distribution of water that exceeds secondary drinking water standards
  - The distribution of water in excess of a published chemical notification level

  - The distribution of water that has exceeded a primary drinking water standard in one or more samples but has not violated a running average standard
  - A standby groundwater source that exceeds a primary drinking water standard
  - Violations of the Waterworks Standards (other than those already covered above)

- **Category F: Other Projects**
  - Deficiencies attributable to the water system that address present or prevent future violations of health-based standards (other than those already covered above)

4.1.3 LSCSD System Deficiencies

The LSCSD water system deficiencies to be addressed by this PER are summarized in this section. Additional details can be found in Section 3. Table 4-1 (page 14, above) summarizes the deficiencies and lists the associated proposed solutions and SWRCB funding priority category.

Well 4 is the main production well and the other wells in the system do not produce as much water as Well 4. Without full redundancy, if Well 4 is offline, significantly less water would be produced, which could result in curtailment of water use within the service district.

The four water tanks are more than 50 years old and, based on inspections performed in 2017, need cleaning and recoating due to corrosion. The cathodic protection systems are well beyond their useful lives and need to be replaced. The tanks still have their original interior and exterior coatings.

During high use periods, Tank 2 has been nearly depleted. Due to the system configuration, Tank 2 cycles through more water than the other tanks. If the water level in Tank 2 were to fall below a minimum level, reduced or even negative pressures would be possible within portions of the distribution system. The system does not have adequate storage in this part of the service area.

The southeast portion of the LSCSD service area does not have adequate system pressure. There have been two consequences of this. First, some customers have complained about the inadequate water pressure. Second, the LSCSD allows local wildfire crews to fill fire trucks from fire hydrants in this zone; with inadequate pressure, the fire trucks have often gone within the residential area to fill from other higher-pressure fire hydrants, causing traffic concerns.

The water system lacks adequate backup power except at Well 3. In the event of an extended power outage, water supply and pressures may be inadequate thereby causing a disruption in water service.

Most of the system's fire hydrants are the ones that were originally installed and are beyond their useful lives. This is exhibited by stuck valves, which can lead to inadequate fire-fighting ability.

While the LSCSD has recently installed a SCADA system for system monitoring and control, pump station B-57 was not included. Pump station B-57 requires manual operation, and Tank 4 has overflowed as a result of inadequate monitoring the system.

Most of the water meters are original and are well past their useful life. These meters are manually read, causing a significant strain on personnel due to the high level of effort needed. In addition, handwritten records of water use can be subject to error, leading to incorrect billing.

4.2 Reasonable Growth

The individual projects are being developed to provide upgrades for existing uses. The future anticipated growth within the community is for previously approved zoning designations for residential and commercial properties that are currently parceled but undeveloped.

The proposed projects address existing infrastructure at existing capacity levels and are not growth related. However, the upgrades to the existing system are expected to be able to accommodate anticipated growth within the 20-year planning horizon.

4.3 Consolidation Analysis

The closest public water systems to the LSCSD are the City of Weed to the south (approximately six miles) and the Grenada Sanitary District to the northwest (approximately 14 miles), as shown in Figure 2-2. Due to the distance from the LSCSD service area to both water systems, consolidation is not a feasible option. Furthermore, consolidation would address only the Well 4 deficiency. It is unknown if the City of Weed's system has available capacity, but it is likely that the Grenada system has insufficient capacity to provide the needed 1,350-gpm in the event that Well 4 is not operating.

No further evaluation of consolidation was performed for this PER.

5.0 Alternatives Analysis

5.1 General

Since each deficiency and solution listed in Table 4-1 (page 14, above) is generally independent of the other deficiencies, each deficiency is generally addressed independently with individual alternatives. Two or more alternatives were evaluated for each deficiency. The following sections summarize the evaluation process for each project.

The evaluation process incorporated consideration of how to address state planning priorities as described in the California Government Code Section 65041.1, which states the following:

> "a) To promote infill development and equity by rehabilitating, maintaining, and improving existing infrastructure that supports infill development and appropriate reuse and redevelopment of previously developed, underutilized land that is presently served by transit, streets, water, sewer, and other essential services, particularly in underserved areas, and to preserving cultural and historic resources.
>
> b) To protect environmental and agricultural resources by protecting, preserving, and enhancing the state's most valuable natural resources, including working landscapes such as farm, range, and forest lands; natural lands such as wetlands, watersheds, wildlife habitats, and other wildlands; recreation lands such as parks, trails, greenbelts, and other open space; and landscapes with locally unique features and areas identified by the state as deserving special protection.

c) To encourage efficient development patterns by ensuring that any infrastructure associated with development, other than infill development, supports new development that does all of the following:

    i. Uses land efficiently.

    ii. Is built adjacent to existing developed areas to the extent consistent with the priorities specified pursuant to subdivision (b)

    iii. Is located in an area appropriately planned for growth.

    iv. Is served by adequate transportation and other essential utilities and services.

    v. Minimizes ongoing costs to taxpayers."

Consideration was also given to how each alternative provides opportunity for water and energy efficiency. Given that none of the alternatives use additional process water to function, there was no need for any analysis related to water efficiency. Regarding energy efficiency, only those projects that require operational power are relevant, including the pump station, well house upgrades, new wells, and the additional water storage. Energy efficiency is discussed in the respective sections below.

5.2 Well 4 Redundancy

5.2.1 Description

5.2.1.1 Alternative 1: New Well

In 2019, the LSCSD drilled a new production well (Well 10) to the southeast of Well 4 along Big Springs Road. However, this well produced only 300 gpm, which is less than anticipated and needed (1,350 gpm). Additional locations, including a deeper well near Well 10, are contemplated.

The LSCSD is currently evaluating three locations for a backup production well to Well 4. These locations are as follows, in order of preference:

1. Test Well T-11, off Big Springs Road near Well 10
2. Test Well T-12, between Big Springs Road and Mountain Wood Drive, near Well 5
3. Test Well T-13, off Lake Shore Drive near Booster Pump Station B-57

Test well locations are shown on Figure 5-1. Test wells have been drilled and according to the Test Well Report by SHN (Appendix 3), Test Wells T-11 and T-12 are the recommended locations for a production well. Until a production well is drilled and yield verified this alternative has been analyzed based on conservative assumptions and well yield of 1,350 gpm.

This section describes the potential layouts of above-ground infrastructure and connection to the distribution system for each location. Once a specific well location, or locations, has been finalized, this PER will be updated or amended. Regardless of the ultimate location, the new production well will consist of the following elements:

- Production well
- Vertical turbine pump with a VFD, capable of 1,350 gpm
- Pump house
- Standby generator

- Security fencing
- Piping to connect to the nearest location of the distribution system

5.2.1.2 Alternative 2: Consolidation/Emergency Intertie

As discussed in Section 4.3, consolidation with a neighboring district, or even a mutual aid emergency intertie is not feasible due to the distance to the nearest water systems, so no further evaluation of this alternative was performed.

5.2.2 Design Criteria

Preliminary design criteria include the following:

- 1,350 gpm
- 480-volt, 3-phase power
- Enclosed pump house
- Backup power

Additional design criteria will be determined after the location of the proposed production well is finalized.

5.2.3 Environmental Impacts

Refer to the CEQA documents that will be prepared as part of this planning project.

5.2.4 Land Requirements

The LSCSD owns the land at each proposed test well location. Depending on the proposed location of the recommended well, easements may be required for piping from the well to the distribution system.

5.2.5 Construction and Site Considerations

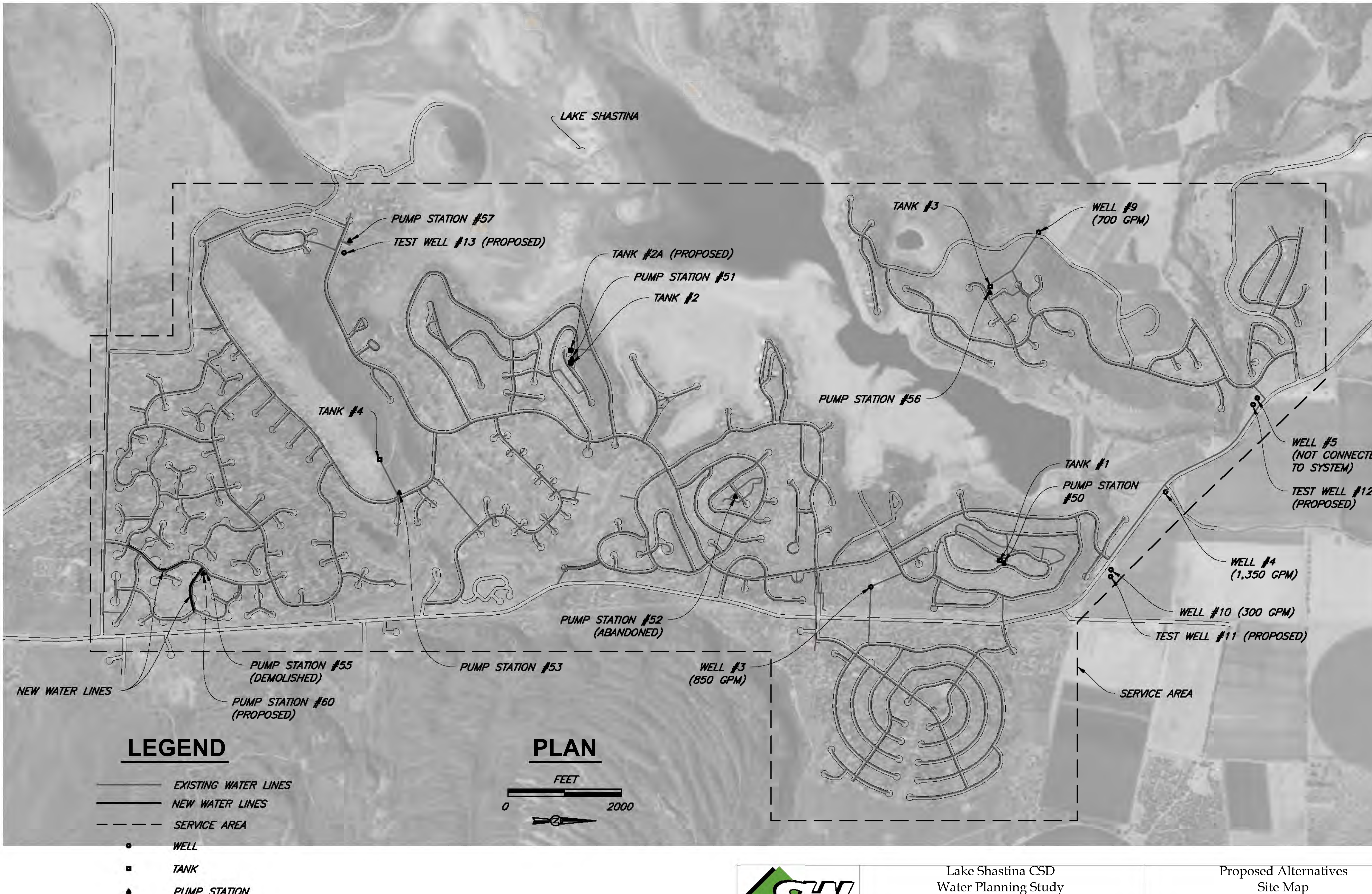
None of the three proposed well locations has unusual or atypical construction or site challenges. At the T-11 site, connection to the distribution system would require crossing Big Springs Road, a highly trafficked county road.

5.2.6 Cost Estimate

A generalized cost estimate for a new well, which is the only practical alternative, is presented in Table 5-1 (on the next page). For the purposes of developing budgetary estimates, a conservative estimate has been assumed.

Table 5-1. New Well Cost Estimate
Lake Shastina Community Services District

Item	Description	Units	Quantity	Unit Cost	Total Cost
1	Well Drilling	LS[a]	1	$150,000	$150,000
2	Well Pump	EA[b]	1	$15,000	$15,000
3	Well House	SF[c]	300	$250	$75,0000
4	Standby Generator w/ATS[d]	LS	1	$100,000	$100,000
5	New Power Connection	LS	1	$30,000	$30,000



Lake Shastina CSD Water Planning Study Lake Shastina, CA		Proposed Alternatives Site Map SHN 520022
November 2023	520022-LSCSD-FIGS	Figure 5-1

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Table 5-1. New Well Cost Estimate
Lake Shastina Community Services District

Item	Description	Units	Quantity	Unit Cost	Total Cost
6	Sitework	LS	1	$25,000	$25,000
7	Piping to Distribution System	LF[e]	250	$100	$25,000
8	Mobilization (8%)	LS	1	$34,000	$34,000
				Subtotal	$454,000
				Contingency (30%)	$137,000
				Construction Subtotal	$591,000
				Engineering (20%)	$119,000
				Project Total	**$847,000**

a. LS: lump sum
b. EA: each
c. SF: square foot
d. ATS: automatic transfer switch
e. LF: linear foot

Other monetary factors that can influence which alternative is selected include operations and maintenance (O&M) costs, present worth cost, and life cycle costs. None of these factors influenced which alternative was selected for this deficiency.

5.2.7 Advantages and Disadvantages

The advantage of a new well is redundancy to Well 4 and water supply security. There are no disadvantages to this alternative.

5.2.8 Alternative Evaluation and Selection

The only alternative to solving this deficiency is to install a new well with associated infrastructure.

5.3 Aging Tanks

5.3.1 Description

5.3.1.1 Alternative 1: Refurbish Existing Tanks

The most typical and cost-effective alternative for steel tanks with deteriorating coatings is to clean the tank and recoat a tank, on the interior, exterior, or both, presuming there are no significant structural issues with the tank (refer to Figure 5-1 for tank locations). Recoating the interior and exterior protects the steel from deterioration due to corrosion, and, thereby, protects the structural integrity of the tank.

The specific refurbishment recommended for each of the four tanks is based on the recommendations of the 2017 inspections, as described in Section 3 and summarized in Table 5-2:

- Remove accumulated sediment (all tanks).
- Sandblast and recoat the interior (all tanks).
- Replace entry hatch gasket (all tanks).
- Touch up exterior coating (all tanks).
- Recoat low spots on exterior roof (Tank 1).
- Recoat entire exterior roof (Tank 3).
- Replace interior float of level indicator (Tank 4)

Hydraulic modeling of the water system using Bentley's WaterCAD software indicated that Tanks 1, 2, and 3 can be taken offline during low use periods without impacting service to customers. Taking Tank 4 offline, because it is in a separate pressure zone, will require a temporary pressure system.

While the 2017 inspection recommendations generally recommended only touch-up painting on the tank exteriors, it may be prudent to recoat the entire tank exterior. This will be determined during the final design phase after lead and adhesion testing results are obtained. A bid alternate to recoat the entire exterior instead of just touch-up may be included in bid documents to evaluate actual costs.

In light of potentially recoating the entire tank exteriors, and given that the tanks still have their original coating, the existing exterior coating would be tested for lead. The proposed paints would be placed in test areas to check for adhesion on top of the existing paint. Removing the existing paint would only be necessary if the proposed coating does not properly adhere to the existing coating. If the existing coating contains lead and needs to be removed, significant additional costs would be incurred since paint removal would need to take place within an enclosed area to contain all removed lead. For the purposes of this alternative, no lead paint removal is assumed.

Once cleaned, each tank will undergo a complete sandblasting procedure to remove any rust and coatings to allow for a thorough inspection to determine whether structural or other metal improvements are needed to completely refurbish each tank. Afterward, a completely new coating system will be installed.

5.3.1.2 Alternative 2: Replace Existing Tanks

Another option for the LSCSD is to replace the existing water tanks instead of rehabilitating them. This option offers the benefit of providing new infrastructure to the system that will keep maintenance costs to a minimum. However, capital costs will be substantially higher than refurbishing the existing tanks, therefore this option was eliminated from consideration.

5.3.2 Design Criteria

Specific design criteria will be determined during final design.

5.3.3 Environmental Impacts

Refer to the CEQA documents being prepared as part of this project.

5.3.4 Land Requirements

Given that nothing new is anticipated to be added to the existing tank infrastructure, there will be no new land requirement associated with the tank improvements.

5.3.5 Construction and Site Considerations

Due to the age of the existing tanks, there is a possibility that the interior and/or exterior of each tank could contain lead paint. Therefore, testing will be required to determine if lead paint is present. If lead paint is found, some form of remediation may need to take place before repairs are completed. If lead paint is found in an area that does not need to be removed, verify that an overlay will be possible without first removing the lead.

5.3.6 Cost Estimate

Cost estimates for tank rehabilitation and replacement are provided in Table 5-2.

Table 5-2. Tank Rehabilitation Cost Estimate for Tanks 1, 3, and 4
Lake Shastina Community Services District

Item	Description	Units	Quantity	Unit Cost	Total Cost
1	Tank Recoating	LS[a]	4	$220,000	$880,000
2	Mobilization (8%)	LS	1	$71,000	$71,000
				Subtotal	$951,000
				Contingency (30%)	$286,000
				Construction Subtotal	$1,237,000
				Engineering (20%)	$248,000
				Project Total	**$1,771,000**

a. LS: lump sum

5.3.7 Advantages and Disadvantages

The advantage of tank rehabilitation versus replacement is cost. Recoating a tank that is generally in good condition is significantly less costly than a new tank as shown in the previous section. There are no substantial disadvantages to the rehabilitation alternative.

5.3.8 Alternative Evaluation and Selection

Based on cost considerations, tank rehabilitation was selected as the preferred alternative.

5.4 Inadequate Water Storage

5.4.1 Description

5.4.1.1 General

During high demand periods, the greatest strain on the storage system is at Tank 2. Alternatives to address this deficiency entails additional storage at or near Tank 2.

5.4.1.2 Alternative 1: Replace Tank 2 with Larger Tank

This alternative entails replacing the existing Tank 2 with a new, larger tank, increasing the storage capacity from 300,000 gallons to 500,000 gallons. The new tank would have the same footprint as the existing tank but be taller and be constructed of welded steel.

5.4.1.3 Alternative 2: Add a New Tank to the System

Under this alternative, Tank 2 is refurbished, and a new tank of similar size (300,000 gallons) would be constructed on an adjacent parcel (see Figure 5-2).

5.4.2 Design Criteria

General design criteria are as follows:

- 300,000 gallons storage
- Welded steel construction
- Same elevation as Tank 2
- Connected to the SCADA system

The tank can be installed either in series or parallel with Tank 2. This will be determined during final design. If the new tank is placed in parallel with Tank 2, an altitude valve will be needed for the new tank. A proposed piping schematic is shown on Figure 5-3.

5.4.3 Environmental Impacts

Refer to the CEQA documents being prepared as part of this project.

5.4.4 Land Requirements

Under Alternative 1, given that the replacement tank will occupy the same location as the existing tank, no additional land would be required. Under Alternative 2, additional land is needed to accommodate the new tank because there is insufficient land at the Tank 2 site. The most reasonable solution is for the LSCSD to purchase a nearby parcel, which would be a lot located across the adjacent road to the west. The closest lot is 0.47 acres in size, which will provide ample space.

5.4.5 Construction and Site Considerations

A geotechnical investigation will be needed for the foundation of the new tank. Minor grading will be required to be able to set the new tank at the same elevation as Tank 2.

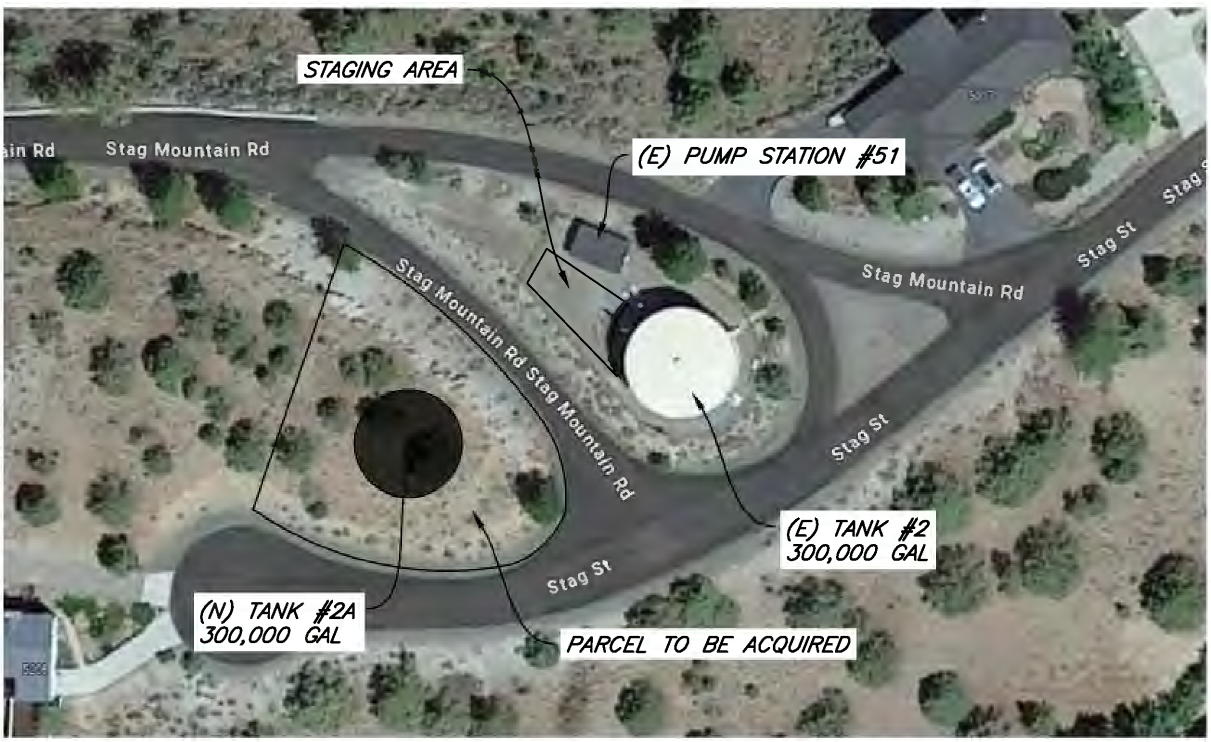
5.4.6 Cost Estimate

Cost estimates for Tank 2 replacement with a larger tank (Alternative 1) are provided in Table 5-3.

Table 5-3. Tank 2 Replacement Cost Estimate (Alternative 1: Replace with Larger Tank)
Lake Shastina Community Services District

Item	Description	Units	Quantity	Unit Cost	Total Cost
1	Tank 2 Demolition	LS[a]	1	$50,000	$50,000
2	Replace Tank Foundation	LS	1	$60,000	$60,000
3	New Welded Steel Tank (500,000 gallon)	LS	1	$500,000	$500,000
4	Mobilization (8%)	LS	1	$49,000	$49,000
				Subtotal	$649,000
				Contingency (30%)	$198,000
				Construction Subtotal	$857,000
				Engineering (20%)	$172,000
				Project Total	**$1,227,000**

a. LS: lump sum



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Lake Shastina CSD Drinking Water System Improvements Lake Shastina, California		Proposed Alternatives Tank 2 & Tank 2A Site Map SHN 520022
Novermber 2023	520022-LSCSD-FIGS	Figure 5-2

Cost estimates for erecting an additional tank (Alternative 2) are provided in Table 5-4.

Table 5-4. Tank 2 Replacement Cost Estimate (Alternative 2: Erect Additional Tank) Lake Shastina Community Services District

Item	Description	Units	Quantity	Unit Cost	Total Cost
1	New Foundation	LS[a]	1	$60,000	$60,000
2	New Welded Steel Tank (300,000 gallon)	LS	1	$300,000	$300,000
3	Sitework	LS	1	$50,000	$50,000
4	Mobilization (8%)	LS	1	$33,0000	$33,000
				Subtotal	$443,000
				Contingency (30%)	$133,000
				Construction Subtotal	$576,000
				Acquire Adjacent Lot	$10,000
				Engineering (20%)	$116,000
				Project Total	**$702,000**

a. LS: lump sum

5.4.7 Advantages and Disadvantages

The advantage of Alternative 1 is that no additional land is needed for Alternative 1, while Alternative 2 provides a significant advantage by reducing the down time of Tank 2. If the new tank is constructed before Tank 2 is taken offline for refurbishing, there will be no down time for this storage and will allow for Tank 2 refurbishing to take place even during high water use periods. The disadvantages for Alternative 1 is a significant down time while Tank 2 is demolished and replaced.

5.4.8 Alternative Evaluation and Selection

Minimizing down time provides an overriding advantage for Alternative 2. Therefore, Alterative 2 was selected as the preferred alternative.

5.5 Inadequate Pressure in Southeast Zone

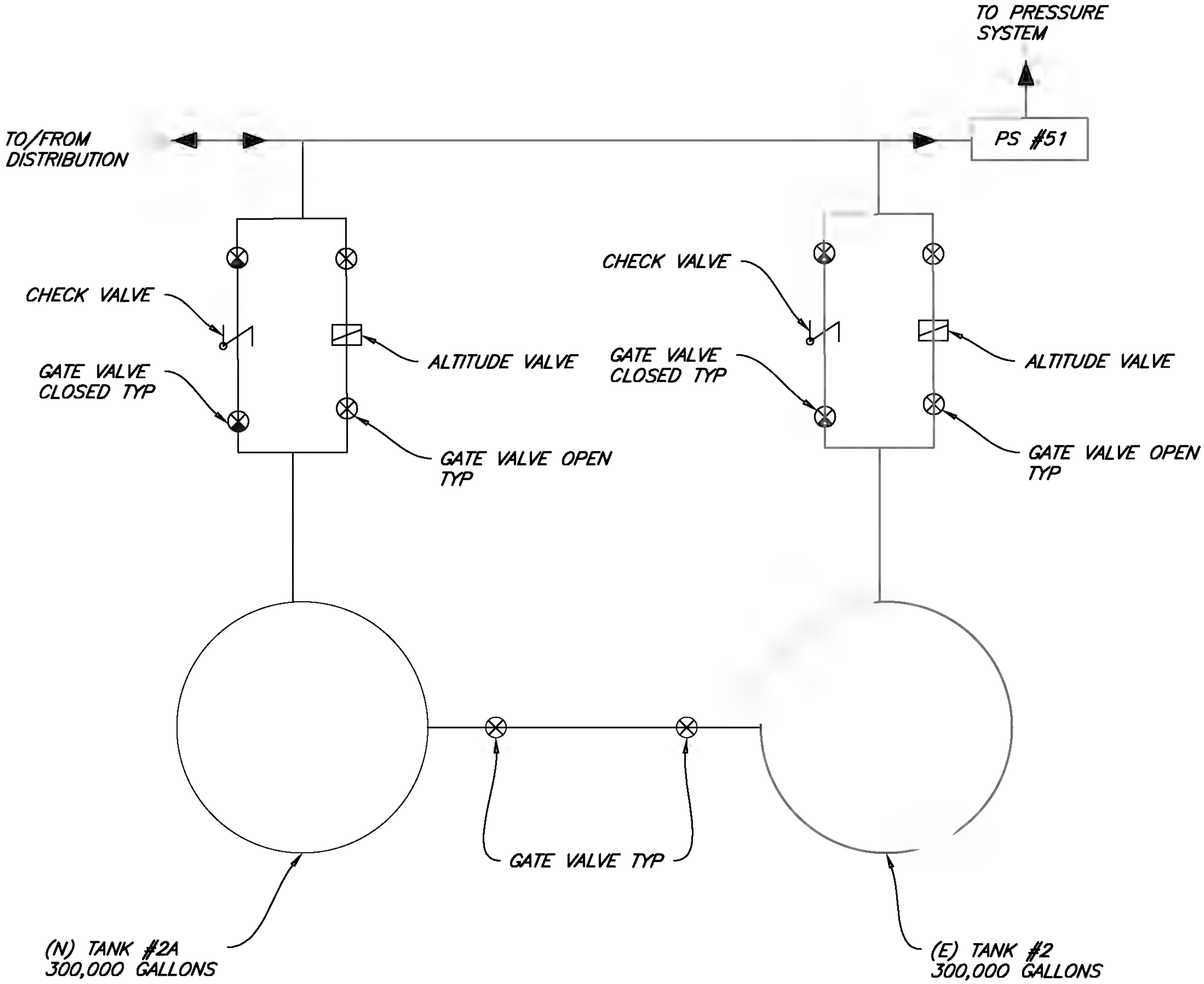
5.5.1 Description

5.5.1.1 Alternative 1: Install a New Booster Pump

To provide adequate system pressures in the southern area, additional energy must be supplied to the system. This can be accomplished by installing an additional booster pump or water tank at a higher elevation, or both simultaneously. Figure 5-4 shows the proposed location for this new booster pump station, which is at the site of a former booster pump station at the corner of Elk Trail Road and Cottontail Drive. Figure 5-5 shows the piping schematic for this new booster pump station.

5.5.1.2 Alternative 2: Install a New Tank

In order to provide adequate pressure in this zone with a tank, the elevation of the tank needs to be about 100 feet higher than the highest house in this zone. An elevated tank of this height is not practical. There are no nearby locations with enough elevation for a ground level tank. Therefore, a tank alternative was dismissed.



SHN	Lake Shastina CSD Drinking Water System Improvements Lake Shastina, California	Tank 2 & Tank 2A Piping Schematic SHN 520022
	Novermber 2023 520022-LSCSD-FIGS	Figure 5-3

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5.5.2 Design Criteria

Detailed design criteria will be established during final design. General design criteria are as follows:

- Minimum of 40 pounds per square inch (psi) within the new pressure zone
- Duplex pump for fire and high-use flow and one pump for low flow
- Backup power

5.5.3 Environmental Impacts

Refer to the CEQA documents being prepared as part of this project.

5.5.4 Land Requirements

The parcel where the previous booster pump station was located will need to be acquired. The LSCSD cannot find record of any easement on that property. Further, additional space will be required to accommodate the new booster pump station and associated backup power.

5.5.5 Construction and Site Considerations

Soils in the LSCSD service area can vary. During previous LSCSD projects, rocky soil has been encountered. However, there are no major construction problems anticipated. There will be minor traffic interruptions during excavation in roadways.

5.5.6 Cost Estimate

Cost estimates for Booster Pump Station B-60 is provided in Table 5-5.

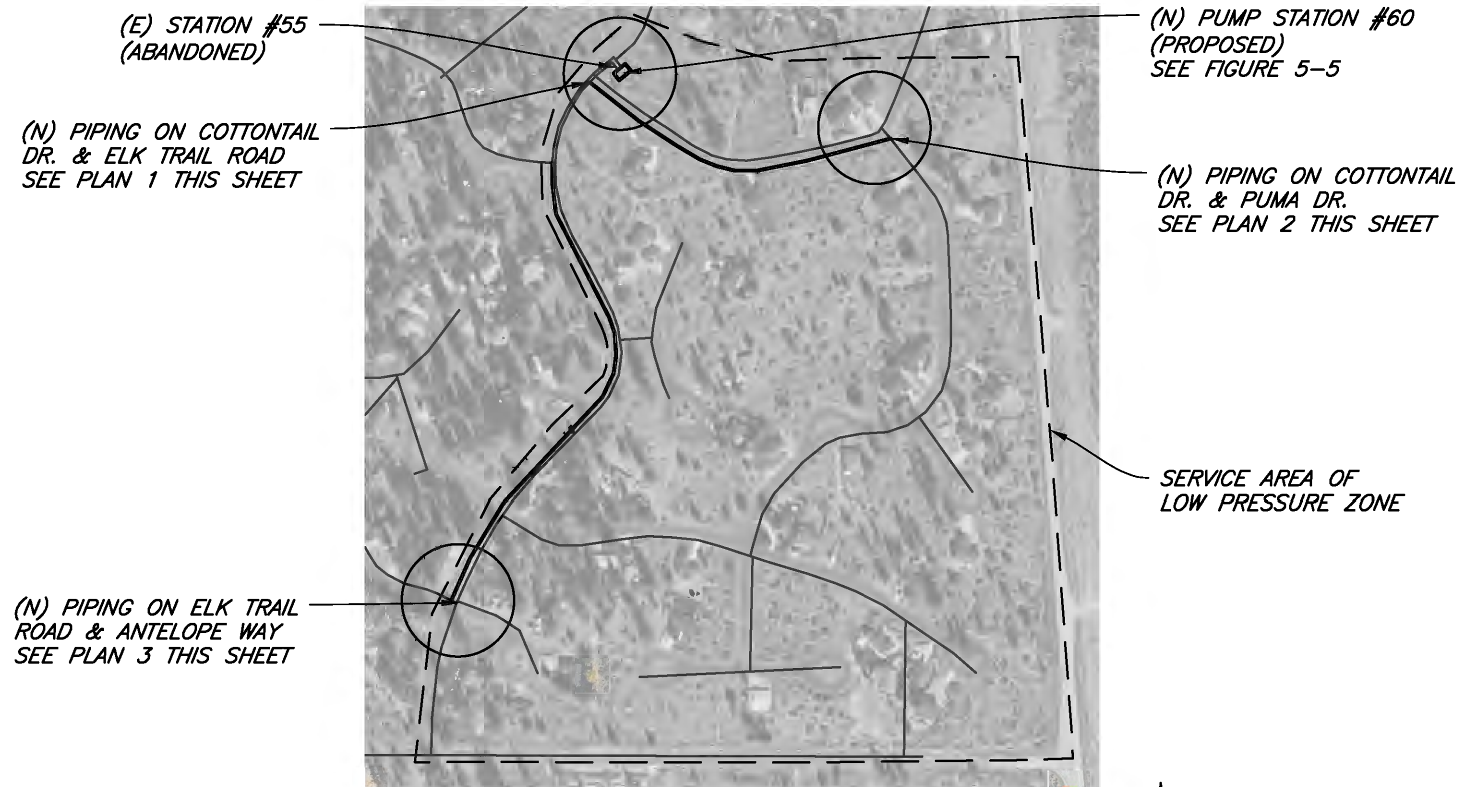
Table 5-5. New Booster Pump Station B-60
Lake Shastina Community Services District

Item	Description	Units	Quantity	Unit Cost	Total Cost
1	Pump Station Building	SF[a]	300	$250	$75,000
2	New Booster Pumps	LS[b]	1	$75,000	$75,000
3	Backup Generator (ATS)[c]	LF[d]	1	$40,000	$40,000
4	New Power service	LS	1	$30,000	$30,000
5	Sitework	LS	1	$25,000	$25,000
6	New Distribution Piping	LF	50	$100	$5,000
7	Mobilization (8%)	LS	1	$20,000	$20,000
				Subtotal	$270,000
				Contingency (30%)	$81,000
				Acquire Lot	$10,000
				Engineering (20%)	$71,000
				Project Total	**$432,000**

a. SF: square foot
b. LS: lump sum
c. ATS: automatic transfer switch
d. LF: linear foot

5.5.7 Advantages and Disadvantages

The only feasible alternative able to address this deficiency is to install a pump station and reestablish the previous pressure zone. There are no disadvantages to this alternative.

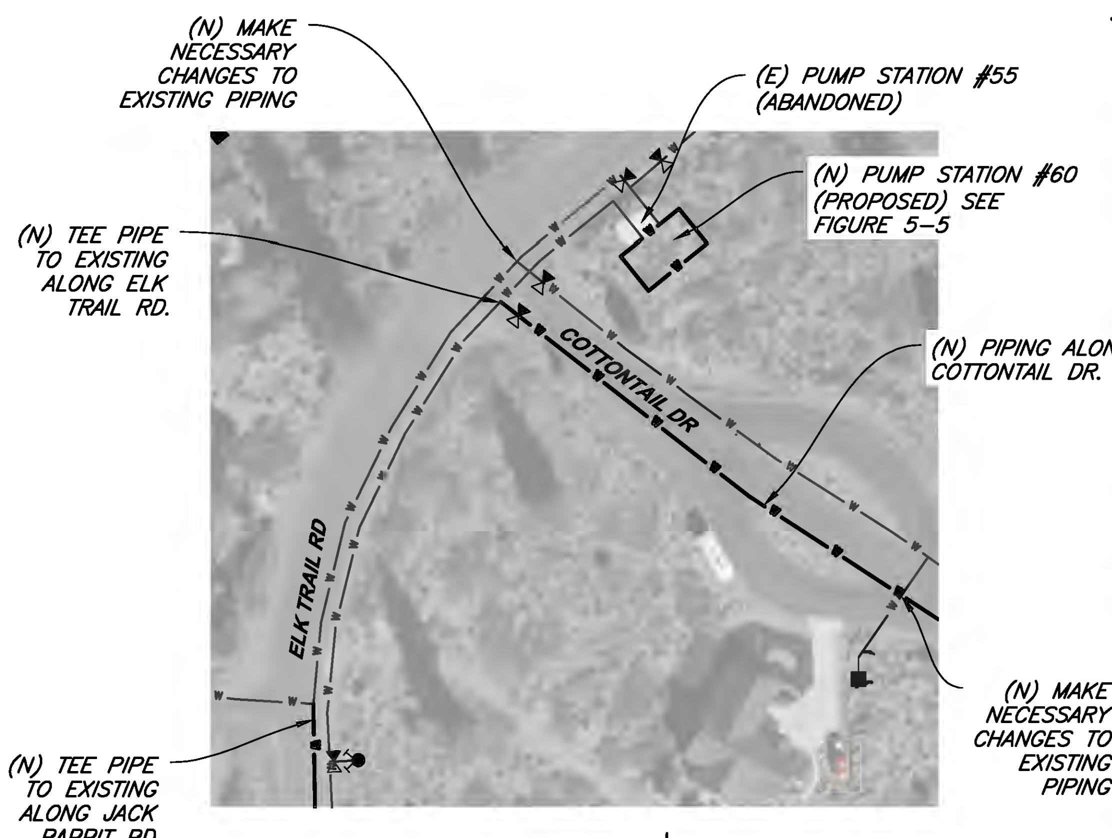


PLAN OF LOW PRESSURE ZONE

1" = 500'

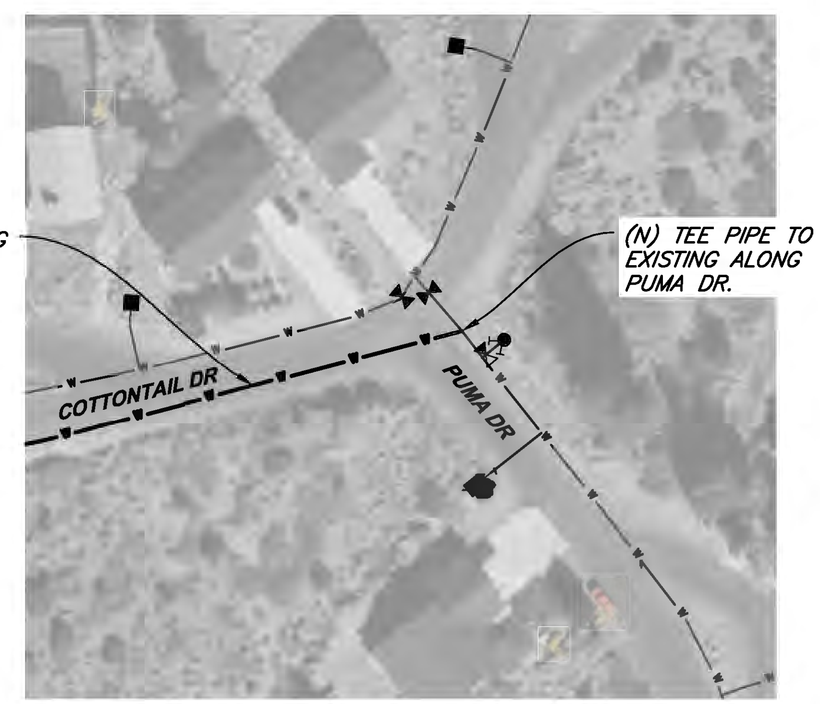
LEGEND

EXISTING WATER LINES
NEW WATER LINES
SERVICE AREA



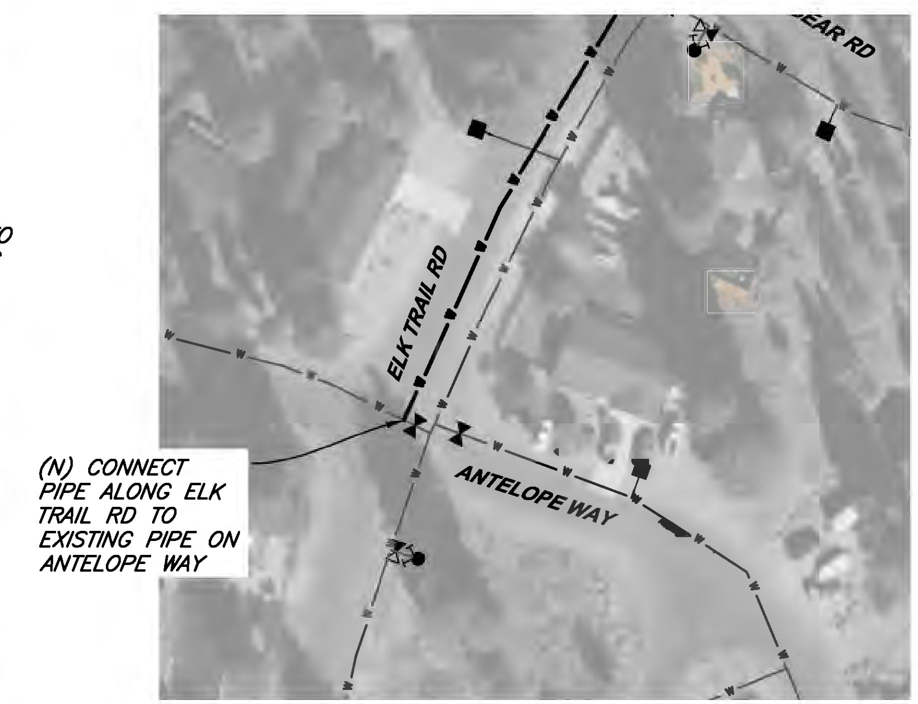
PLAN 1

1" = 100'



PLAN 2

1" = 100'



PLAN 3

1" = 100'

SHN	Lake Shastina CSD Water Planning Study Lake Shastina, CA	Proposed Alternatives Low Pressure Zone SHN 520022
November 2023	520022-LSCSD-FIGS	Figure 5-4

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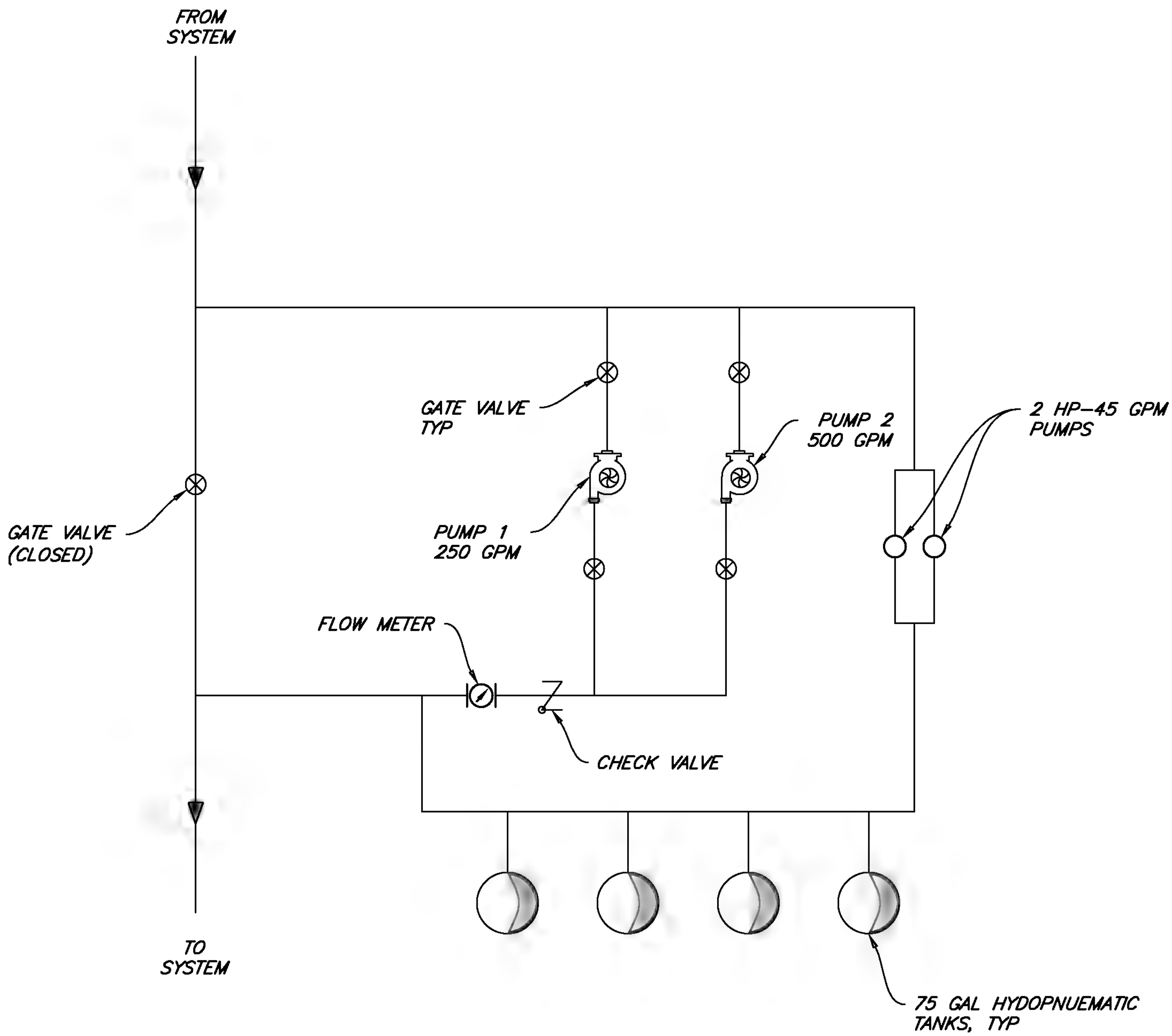


Lake Shastina CSD
Water Planning Study
Lake Shastina, California

Proposed Station #60
Piping Schematic
SHN 520022

Novermber 2023 | 520022-LSCSD-FIGS | Figure 5-5

5.5.8 Alternative Evaluation and Selection

The selected alternative is to reestablish the former pressure zone with a new booster pump station.

5.6 Lack of Backup Power

5.6.1 Description

5.6.1.1 General

This alternatives analysis applies only to existing sites without backup power. Backup power at new facilities, such as the new well and new booster pump station, is accounted for as part of those projects.

5.6.1.2 Alternative 1: Install Permanent Standby Generators

A permanent standby generator would be mounted on a concrete pad and have a self-contained fuel storage tank at each well (except Well 3) and each of the booster pump stations. Either an automatic transfer switch (ATS) or manual transfer switch (MTS) would be located by the electrical panels and, in the event of a power outage, would automatically switch the power source from the power company to the generator, which would automatically be started.

5.6.1.3 Alternative 2: Install Portable Generators with Hookups

An alternative standby power solution is to bring a trailer-mounted portable generator to the pump station(s) and well houses. The portable generator would be plugged into a receptacle and would supply power to the pump station. An operator would then manually switch the power source from the power company to the generator using an MTS.

5.6.2 Design Criteria

Specific design criteria will be developed during final design, including the following:

- Determine whether an automatic transfer switch or a more cost-effective manual transfer switch is sufficient.
- Determine generator size.

5.6.3 Environmental Impacts

Refer to the CEQA documents being prepared as part of this project.

5.6.4 Land Requirements

There is sufficient space at each location for a backup generator, except at station B-53, which will require a portion of the adjacent undeveloped parcel to the north, which may result in the LSCSD acquiring the entire parcel.

5.6.5 Construction and Site Considerations

No potential construction problems are anticipated. The only site consideration is at station B-53, which will require additional land, as discussed in the previous section.

5.6.6 Cost Estimate

Cost estimates are provided for permanent standby generators in Table 5-6 and summarized in Section 5.6.1.2 In general, non-monetary factors determined the recommendations presented in Section 7, this is further discussed within Section 6.

Table 5-6. Permanent Generators (Alternative 1)
Lake Shastina Community Services District

Item	Description	Units	Quantity	Unit Cost	Total Cost
1	Well 4 Generator w/ATS[a]	EA[b]	1	$100,000	$100,000
2	Well 9 Generator w/ATS	EA	1	$50,000	$50,000
3	B-50, B-51, B-53, & B-56 Generators w/ATS	EA	4	$40,000	$160,000
4	Sitework	EA	6	$15,000	$60,000
5	Mobilization (8%)	LS	1	$32,000	$32,000
				Subtotal	$432,000
				Contingency (30%)	$130,000
				Construction Subtotal	$562,000
				Engineering (20%)	$113,000
				Task Total	**$805,000**

a. ATS: an automatic transfer switch
b. EA: each
c. LS: lump sum

Cost estimates are provided for portable generators in Table 5-7 and summarized in Section 5.6.1.3

Table 5-7. Portable Generators (Alternative 2)
Lake Shastina Community Services District

Item	Description	Units	Quantity	Unit Cost	Total Cost
1	Generator Hookup	EA[a]	3	$1,500	$4,500
2	Manual Transfer Switch	EA	3	$800	$2,400
3	Generator For Pump Stations (50 kW)[b]	EA	2	$40,000	$40,000
4	Generator for Well 4 (144 kW)	EA	1	$100,000	$100,000
5	Mobilization (8%)	LS[c]	1	$7,000	$7,000
				Subtotal	$193,900
				Contingency (30%)	$59,000
				Construction Subtotal	$252,900
				Engineering (20%)	$51,000
				Project Total	**$363,000**

a. EA: each
b. kW: kilowatt
c. LS: lump sum

5.6.7 Advantages and Disadvantages

Both alternatives provide advantages in that they minimize the probability of service disruption in a power outage or other event, and in the event of a fire with power outage, would still allow water to be delivered to firefighting equipment. Permanent backup generators would provide better risk reduction to a service disruption resulting from a power outage. Although the permanent alternative has significantly higher capital cost, the temporary alternative would likely overstress limited resources in staff and mobile generators to respond to a power outage. LSCSD public works staff members oversee both the water and wastewater systems.

5.6.8 Alternative Evaluation and Selection

Temporary mobile generators were determined generally not to be feasible due to difficulty in getting to all the pump stations and wells with limited personnel and limited number of mobile generators, which could severely impact fire-fighting ability.

5.7 Aging Fire Hydrants

5.7.1 Description

5.7.1.1 Alternative 1: Replace Aging Fire Hydrants

The existing hydrants would all be replaced at once to provide better fire protection for the community.

5.7.1.2 Alternative 2: Do Nothing

Each fire hydrant has its valve exercised annually. However, with the age of the existing fire hydrants being well beyond their useful life, the possibility of having a stuck valve is a significant possibility, which could result in the fire department's inability to fight a fire. For this reason, a do-nothing alternative was not considered.

5.7.2 Design Criteria

Each fire hydrant would be replaced with a make and model acceptable to the LSCSD. The piping between the fire hydrant and the valve in the road would be replaced as well. The LSCSD does not have a standard detail for fire hydrant construction, so an acceptable detail from a nearby jurisdiction would be used as a basis for the design criteria.

5.7.3 Environmental Impacts

Refer to the CEQA documents being prepared as part of this project.

5.7.4 Land Requirements

No land requirements are expected for this part of this subproject.

5.7.5 Construction and Site Considerations

No potential construction problems or site considerations are expected.

5.7.6 Cost Estimates

Cost estimates are provided for fire hydrant replacement in Table 5-8 (on the next page) and summarized in Section 7. In general, non-monetary factors determined the recommendations presented in Section 7, this is further discussed within Section 6.

Table 5-8. Replace Fire Hydrants
Lake Shastina Community Services District

Item	Description	Units	Quantity	Unit Cost	Total Cost
1	Replace Fire Hydrants	EA[a]	319	$6,000	$1,914,000
2	Mobilization (8%)	LS[b]	1	$154,000	$154,000
				Subtotal	$2,068,000
				Contingency (30%)	$621,000
				Construction Subtotal	$2,689,000
				Engineering (20%)	$269,000
				Project Total	**$3,579,000**

a. EA: each
b. LS: lump sum

5.7.7 Advantages and Disadvantages

The advantage of replacing the fire hydrants is that it provides greater security with respect to water supply for firefighting. There are no disadvantages to replacing the existing fire hydrants.

5.7.8 Alternative Evaluation and Selection

Replacing the fire hydrants, excepting the 20 that have been replaced in recent years, was selected as the preferred alternative.

5.8 Incomplete SCADA System

5.8.1 Description

5.8.1.1 Alternative 1: Tying Station B-57 into SCADA

Station B-57 is currently activated and deactivated on a timer and is not connected to the SCADA system. Tying B-57 into the SCADA system would allow more flexibility in the operation of both B-53 and a more reliable and stable B-57 operation. Not only does B-57 activate to pump water into Tank 4, but it also allows for circulation of water within the area of B-57 to keep the water from becoming stagnant in this part of the distribution system.

It should be noted that this alternative applies only to B-57. All new facilities, such as a new well or new booster pump station, will incorporate SCADA as part of their respective projects.

5.8.1.2 Alternative 2: Do Nothing

Doing nothing would continue the existing timed operation of Station B-57, with the potential risk of overfilling Tank 4 remaining.

5.8.2 Design Criteria

The LSCSD would contact XiO to have them expand the existing SCADA system to include B-57.

5.8.3 Environmental Impacts

Refer to the CEQA documents being prepared as part of this project.

5.8.4 Land Requirements
No additional land is needed.

5.8.5 Construction and Site Considerations
There are no construction considerations for this subproject. The only site consideration is to make sure there is adequate ability to community between the base SCADA system and B-57. Depending on the system, it may require line-of-sight with another receiver.

5.8.6 Cost Estimate
The cost estimate to add B-57 to the SCADA system is provided in Table 5-9. In general, non-monetary factors, as discussed within Section 6, determined the recommendations presented in Section 7 (Not verified).

Table 5-9. Add B-57 to SCADA[a] System
Lake Shastina Community Services District

Item	Description	Units	Quantity	Unit Cost	Total Cost
1	Install Hardware	LS[b]	1	$10,000	$10,000
2	Update SCADA Programming	LS	1	$5,000	$5,000
3	Mobilization (8%)	LS	1	$2,000	$2,000
				Subtotal	$17,000
				Contingency (30%)	$6,000
				Construction Subtotal	$23,000
				Engineering (20%)	$5,000
				Project Total	**$34,000**

a. SCADA: Supervisory Control and Data Acquisition
b. LS: lump sum

5.8.7 Advantages and Disadvantages
The advantage to incorporating B-57 into the SCADA system is to allow it to shut off when Tank 4 reaches a set water level. The current timer setting does not prevent Tank 4 from overfilling.

5.8.8 Alternative Evaluation and Selection
Based on operational considerations and risk of overfilling Tank 4, the preferred alternative is to incorporate Station B-57 into the existing SCADA system,

5.9 Manual Read Water Meters

5.9.1 Description
5.9.1.1 Alternative 1: Install Automatic Meter Reading System
The automatic meter reading (AMR) system requires changing the meter register to an AMR register that transmits a radio signal along short intervals with unique identifying information and meter usage information. This signal is projected a short distance and is picked up by a receiver in a vehicle driven by a LSCSD employee. The water usage data is displayed and stored on a tablet and the information is then uploaded to the billing system at the district offices. The AMR system would allow for a LSCSD employee to perform the monthly meter reading in a matter of hours rather than days.

An AMR system would significantly decrease the number of hours required to read the meters as compared to the current system and would allow the LSCSD to transition from a quarterly to a monthly billing cycle. AMR does not provide some of the advanced functionality that the AMI system provides but it does achieve the LSCSD's goal of a significantly lower cost. An AMR system may also have the capability of migrating to an AMI system later without replacing the meters (see Section 5.9.1.2).

5.9.1.2 Alternative 2: Install Advanced Metering Infrastructure System

The advanced metering infrastructure (AMI) system requires a new register that sends a signal either through a cellphone network or signal-repeaters to a local hub that updates water usage continuously. The AMI system would further decrease the required time for meter reading while providing additional functionality not available through the AMR system.

The AMI system allows additional functions (such as water usage alerts and more in-depth water usage analysis) than the AMR system. AMI also allows the possibility of implementing a remote valve shutoff system in the future and provides person-hour savings over the AMR system because it does not require an employee to drive around the service area gathering usage data. This additional functionality and person-hour savings is achieved at higher implementation and maintenance cost than the AMR system.

5.9.2 Design Criteria

There are three main AMI and AMR system manufacturers available: Sensus, Badger, and Neptune. All three producers offer similar functionality at relatively similar costs. At the planning level of this report, it is not necessary to perform a cost benefit analysis between the providers as the products and costs are comparable. A determination will need to be made during the design/procurement phase as to which system to implement. The LSCSD currently has and prefers Badger meters.

The proposed meters are anticipated to fit within existing meter boxes. Only current service connections would get the new water meters. When undeveloped properties are developed, a new water meter would be installed.

5.9.3 Environmental Impacts

Refer to the CEQA documents being prepared as part of this project.

5.9.4 Land Requirements

No additional land is required.

5.9.5 Construction and Site Considerations

There are no construction or site considerations.

5.9.6 Cost Estimate

Cost estimates for water meter installation are provided in Table 5-10 and Table 5-11 (on the next page) and summarized in Section 7. In general, non-monetary factors, as discussed within Section 6, determined the recommendations presented in Section 7.

Table 5-10. Install AMR[a] Meters (Alternative 1)
Lake Shastina Community Services District

Item	Description	Units	Quantity	Unit Cost	Total Cost
1	AMR Meter	EA[b]	1,292	$200	$258,400
2	Orion Mobile Endpoint	EA	1,292	$100	$129,200
3	Tablet Cost	EA	1	$7,000	$7,000
4	Set-up Fee	LS[c]	1	$5,000	$5,000
				Subtotal	$399,600
				Contingency (10%)	$40,000
				Construction Subtotal	$399,600
				Engineering (5%)	$20,000
				Project Total	**$420,000**

a. AMR: Automatic Meter Reading
b. EA: each
c. LS: lump sum

Table 5-11. Install AMI[a] Meters (Alternative 2)
Lake Shastina Community Services District

Item	Description	Units	Quantity	Unit Cost	Total Cost
1	AMI Meter	EA	1292	$250	$323,000
2	Central Computer Station & Software	LS	1	$20,000	$20,000
3	Set-up Fee	LS	1	$5,000	$5,000
				Subtotal	$348,000
				Contingency (10%)	$35,000
				Construction Subtotal	$383,000
				Engineering (5%)	$20,000
				Project Total	**$438,000**

a. AMI: Advanced Metering Infrastructure
b. EA: each
c. LS: lump sum

5.9.7 Advantages and Disadvantages

The advantage of both systems is a reduction in staff time to read meters. However, the cost of the AMI system is much greater than the AMR system, and the incremental additional cost may not provide a commensurate benefit to the LSCSD.

5.9.8 Alternative Evaluation and Selection

Based on feedback from the LSCSD staff, Alternative 1, AMR meters, is the preferred alternative.

6.0 Selected Project

6.1 Overview

For each of the deficiencies listed in Table 4-1 (page 14), a single alternative was selected based on the analysis discussed in Section 5. The selected alternatives are listed below:

- Project 1: Install a new backup production well with pump house, backup power, and connection to the distribution system.
- Project 2: Refurbish all four existing tanks.

- Project 3: Install a new 300,000-gallon tank near Tank 2.
- Project 4: Install a new booster pump station and reinstate a former pressure zone.
- Project 5: Install stationary backup power.
- Project 6: Replace fire hydrants.
- Project 7: Install SCADA at Booster Pump Station B-57.
- Project 8: Replace water meters.

Generally, each alternative is treated as a separate project, due to how each may be bid as well as funded. The only exception would be that Projects 2 and 3 might be bid together since both will require the same type of contractor.

Each project is described in the following sections and includes discussion on the following topics, as applicable:

- Project description
- Schematic and map of proposed facilities
- Justification
- O&M challenges
- Consistency with local/county planning
- Inclusion of green and resilient components
- Land acquisition needs

6.2 Project 1: New Production Well

6.2.1 Project Description

A new production well with a yield of approximately 1,350 gpm will be located at either the T-11 or T-12 test well sites (see Figure 5-1). The project will consist of the following elements:

- Production well
- Vertical turbine pump with a VFD, capable of 1,350 gpm
- Pump house
- Standby generator
- Security fencing
- Piping to connect to the nearest location of the distribution system

The project cost is anticipated to be $847,000 as shown in Table 5-1.

6.2.2 Project Schematic and Map

Since the exact location of the well will not be known until it is drilled and tested for yield, a preliminary layout of the well and associated infrastructure, including connection with the distribution system, will be prepared after the production well is drilled. Conceptually, the layout will be similar to Well 4 (Figure 3-3).

6.2.3 Justification

As discussed in Section 3, the LSCSD lacks sufficient backup to Well 4, which is the main production well.

6.2.4 O&M Challenges

Operations and maintenance are expected to be typical for this project, with no unusual challenges anticipated.

6.2.5 Consistency with Local/County Planning

This project is consistent with local and county planning.

6.2.6 Inclusion of Green and Resilient Components

The well pump will include a variable frequency drive (VFD) to reduce energy consumption.

6.2.7 Land Acquisition Needs

No new land is needed for the well and well house. Easements will be needed for the piping from the well to the connection point with the existing distribution system.

6.2.8 Estimated Useful Life

The estimated useful life of the new well is 75-100 years. The well pump has a typical useful life of 20 years. All other major items would have a useful life of 30-50 years.

6.3 Project 2: Refurbish Tanks

6.3.1 Project Description

All four existing tanks will be refurbished, which will include the following elements:

- Remove accumulated sediment (all tanks).
- Sandblast and recoat the interior (all tanks).
- Replace entry hatch gasket (all tanks).
- Touch up exterior coating (all tanks).
- Recoat low spots on exterior roof (Tank 1).
- Recoat entire exterior roof (Tank3).
- Replace interior float of level indicator (Tank 4).

6.3.2 Project Schematic and Map

The tank location sites are shown on Figures 3-6, 3-8, 3-10, and 3-12. Contractor staging areas will be within the fence area at each tank.

6.3.3 Justification

The existing tanks are showing signs of corrosion. Refurbishing the tanks is the least cost option.

6.3.4 O&M Challenges

Operations and maintenance are expected to be typical for this project, with no changes to existing practices.

6.3.5 Consistency with Local/County Planning
This project is consistent with local and county planning.

6.3.6 Inclusion of Green and Resilient Components
Durable paints with low volatile organic compounds (VOCs) will be specified if possible.

6.3.7 Land Acquisition Needs
No additional land is needed for this project.

6.3.8 Estimated Useful Life
The estimated useful life would be at least 50 years before recoating would be needed.

6.4 Project 3: New Tank

6.4.1 Project Description
A new 300,000-gallon water storage tank will be located near Tank 2 on a nearby parcel. Both Tank 2 and the new tank will be hydraulicly connected but be able to be isolated from one another and the distribution system in case one tank is taken out of service. The new tank is anticipated to be constructed of welded steel to match the existing tank types.

6.4.2 Project Schematic and Map
A preliminary site plan is shown in Figure 5-2. A preliminary piping schematic is presented in Figure 5-3.

6.4.3 Justification
As discussed in Sections 3 and 5, additional storage at the Tank 2 location is needed to prevent the water level in Tank 2 from dropping below minimum levels.

6.4.4 O&M Challenges
Operations and maintenance are expected to be typical for this project, with no unusual challenges anticipated.

6.4.5 Consistency with Local/County Planning
This project is consistent with local and county planning.

6.4.6 Inclusion of Green and Resilient Components
Durable paints with low VOCs will be specified if possible.

6.4.7 Land Acquisition Needs
An adjacent parcel of land would be needed for this project given that there is not sufficient space next to the existing Tank 2. The nearest parcel is 0.47 acres in size.

6.4.8 Estimated Useful Life

The estimated useful life of the new tank is at least 50 years.

6.5 Project 4: New Booster Pump Station

6.5.1 Project Description

A new booster pump station will be located at the site of a former pump station at the corner of Elk Trail Road and Cottontail Drive. A former pressure zone will be reinstated, which will require changes in piping in the distribution area along Elk Trail Road and Cottontail Drive. Detailed design criteria will be established during final design. General design criteria are as follows:

- Minimum of 40 psi within the new pressure zone
- Duplex pump for fire and high use flow and one pump for low flow
- Backup power

6.5.2 Project Schematic and Map

A project map and schematic are presented in Figures 5-4 and 5-5, respectively.

6.5.3 Justification

There is no other alternative for supplying adequate pressure to the southeast area.

6.5.4 O&M Challenges

Operations and maintenance are expected to be typical for this project, with no unusual challenges anticipated.

6.5.5 Consistency with Local/County Planning

This project is consistent with local and county planning.

6.5.6 Inclusion of Green and Resilient Components

Green materials for the pump station enclosure will be evaluated during final design.

6.5.7 Land Acquisition Needs

The parcel where the former pump station was located will need to be acquired. It is uncertain whether the LSCSD had an easement for the previous pump station. The new facility will need an additional area than what was previously used to accommodate backup power and maintenance access.

6.5.8 Estimated Useful Life

The estimated useful life of the new booster pump station is 30-50 years, apart from the pumps, which may require replacement after 20 years.

6.6 Project 5: Backup Power

6.6.1 Project Description

A permanent standby generator would be mounted on a concrete pad and have a self-contained fuel storage tank at each well (except Well 3, which already has backup power) and each of the existing booster pump stations (B-50, B-51, B-53, and B-57). Either an automatic transfer switch (ATS) or manual transfer switch (MTS) would be located by the electrical panels and, in the event of a power outage, would automatically switch the power source from the power company to the generator, which would automatically be started.

6.6.2 Project Schematic and Map

Refer to Figure 5-1 for the locations of the wells and booster pump stations that will be getting backup power.

6.6.3 Justification

There is currently no backup power for many of the existing water system facilities, and there are insufficient staff and mobile generators to provide adequate backup power in the event of a power outage.

6.6.4 O&M Challenges

Operations and maintenance are expected to be typical for this project, with no unusual challenges anticipated.

6.6.5 Consistency with Local/County Planning

This project is consistent with local and county planning.

6.6.6 Inclusion of Green and Resilient Components

Green alternative backup power sources will be considered during final design.

6.6.7 Land Acquisition Needs

No land acquisition is needed for this project except at B-53, where the adjacent lot would be acquired to provide sufficient space for a generator.

6.6.8 Estimated Useful Life

Backup generators have an estimated useful life of 25-40 years, depending on how well they are maintained.

6.7 Project 6: Replace Fire Hydrants

6.7.1 Project Description

Replace all aging fire hydrants up to the existing valve.

6.7.2 Project Schematic and Map
The fire hydrants are located throughout the service area shown in Figure 3-1.

6.7.3 Justification
The existing fire hydrants are exercised annually, but it has been determined that the valves could be prone to be stuck in the event of a fire, which could exacerbate fire damage to structures.

6.7.4 O&M Challenges
Operations and maintenance are expected to be typical for this project, with no unusual challenges anticipated.

6.7.5 Consistency with Local/County Planning
This project is consistent with local and county planning.

6.7.6 Inclusion of Green and Resilient Components
There are no special green or resilient components anticipated for this project.

6.7.7 Land Acquisition Needs
No additional land is needed for this project.

6.7.8 Estimated Useful Life
The new fire hydrants are estimated to have a useful life of at least 50 years.

6.8 Project 7: Install SCADA at B-57

6.8.1 Project Description
A SCADA controller with communications antenna would be installed at pump station B-57 and tie into the existing XiO SCADA system. The SCADA system would be programmed such that B-57 would turn on when needed (as backup to B-53) and turn off when the water level in Tank 4 reaches the high set point.

6.8.2 Project Schematic and Map
The location of B-57 can be found on Figure 5-1.

6.8.3 Justification
This project would prevent wasted water in that B-57 would turn off before Tank 4 overflows.

6.8.4 O&M Challenges
Operations and maintenance are expected to be typical for this project, with no unusual challenges anticipated.

6.8.5 Consistency with Local/County Planning
This project is consistent with local and county planning.

6.8.6 Inclusion of Green and Resilient Components
There are no special green or resilient components anticipated for this project.

6.8.7 Land Acquisition Needs
No additional land is needed for this project.

6.8.8 Estimated Useful Life
The estimated useful life of the SCADA for B-57 is 10-20 years.

6.9 Project 8: Replace Water Meters

6.9.1 Project Description
Water meters would be replaced with automatic meter reading (AMR) meters. These meters would be read remotely using a handheld device located in proximity to the meter. Only existing meters would be replaced. New connections would be required to install an approved AMR meter.

6.9.2 Project Schematic and Map
Water meters are located at each developed property within the service area shown in Figure 3-1.

6.9.3 Justification
This would significantly reduce the staff time needed to read meters, which are currently read manually, thereby saving operational costs.

6.9.4 O&M Challenges
Operations and maintenance are expected to be typical for this project, with no unusual challenges anticipated.

6.9.5 Consistency with Local/County Planning
This project is consistent with local and county planning.

6.9.6 Inclusion of Green and Resilient Components
The reduction of vehicle idling time at each meter over current procedures will be a significant reduction in fossil fuel use.

6.9.7 Land Acquisition Needs
No additional land is needed for this project.

6.9.8 Estimated Useful Life

The new water meters are anticipated to have a useful life of 20 years.

7.0 Cost Estimate for Selected Project

Detailed cost estimates for each project were presented in Section 5. Table7-1 summarizes the project costs for each individual project defined in Section 6.

Table 7-1. Summary of Recommended Projects
Lake Shastina Community Services District

Project	Project Totals
New Production Well	$847,000
Tank Rehab	$1,771,000
New Tank 2A (Alternative 2)	$702,000
New Booster Pump Station	$432,000
Permanent Generators (Alternative 1)	$805,000
Replace Fire Hydrants	$3,579,000
Add B-57 to SCADA[a]	$34,000
Install AMR[b] Meters (Alternative 1)	$420,000

a. SCADA: Supervisory Control and Data Acquisition
b. AMR: Automatic Meter Reading

8.0 Proposed Schedule

A proposed schedule is presented in Table 8-1

Table 8-1. Proposed Project Schedule
Lake Shastina Community Services District

Project	FY[a] 24-25	FY 25-26	FY 26-27	FY 27-28	FY 28-29
New Wall	Design	Construction			
Tank Rehab	Design			Construction	
New Tank 2A	Design			Construction	
New Booster PS[b]	Design		Construction		
Permanent Generators	Design	Construction			
Replace Fire Hydrants					Design Construction
SCADA[c] Improvements with B-57			Design Construction		
Replace Meters with AMR[d]					Design Construction

a. FY: fiscal year
b. PS: pump station
c. SCADA: Supervisory Control and Data Acquisition
d. AMR: Automatic Meter Reading

9.0 Overall Project Map

Figure 5-1 shows the overall LSCSD map and located each project, apart from fire hydrants and water meters.

10.0 Response to Climate Change

10.1 Vulnerability

Specific climate change effects that would be expected in this area are not well understood at this time. However, effects that have been blamed on climate change and that could influence the LSCSD water system include drought and wildfires.

Drought could have the effect of lowering the water table. Wildfires could damage various infrastructure elements that are above ground.

10.2 Adaptation

Adaptation measures include the following:

- Drought: water conservation during drought periods
- Wildfire: removal of trees adjacent to infrastructure to create a "clear zone" to reduce fire risk

10.3 Mitigation

During the recent drought period, none of the LSCSD wells went dry or was unable to produce water at the anticipated rate. This would indicate that the existing wells are sufficiently deep to be able to draw from the aquifer and that the water table did not significantly drop. The mitigation measure to this effect would be to drill the backup production well sufficiently deep to reduce the effects of a lowered water table.

As stated in Section 6.9.6, water meter replacement is in and of itself a mitigation measure to reduce greenhouse gas emissions by reducing vehicle idling while reading meters.

11.0 Permits

Permits that are required for the individual projects will be obtained closer to the time of construction. Anticipated permits include the following:

- Well drilling permit
- Well house building permit
- Booster Pump Station building permit
- Electrical permits for backup generators

12.0 Reference Cited

California Environmental Protection Agency. (March 2014). "California Government Code Section 65041.1: State Planning Priorities." Accessed at: Section 65041.1 - State planning priorities, Cal. Gov. Code § 65041.1 | Casetext Search + Citator

Tank Inspection Reports (2017)

1

Tank 1 Report 1A

Lake Shastina Community Services District
Field Report

25-Apr-17

Underwater Cleaning & Inspection
500,000 Gallon
Tank 1
Potable Water Storage Tank

Submitted To:

Lake Shastina Community Services District
Robert Moser
16320 Everhart Dr.
Weed, CA 96094

Phone: 530-938-3281

Submitted By:

Potable Divers Inc.
PO Box 474
Vernal, UT 84078-0474

Phone: (866) 789-3483
Fax: (866) 913-4905
E-mail david@potabledivers.com

David Harvey Dive Supervisor

EXTERIOR ROOF

Safety Rail					
Satisfactory		Fair	X	N	
Coating		Good needs touch up			
Welds		Good			
Corrosion		Y	X	N	
Coating					
Satisfactory		Y	X	N	
Oxidized		Y	X	N	
Pitting		Y		N	X
Delamination		Y		N	X
Corrosion	<2%	Y	X	N	
Seams/Welds		Good			
Low Spots		Y	X	N	
Cathodic Protection Plates		Good			

Conclusion/Discrepancies: A few low spots around the outer edges
Coating is oxidized but in good condition needs minor touch up work
around the outer edges in the low areas and a few spots near the center
Hand railing also needs minor touch up work

ACCESS HATCH

Satisfactory	Fair	X	N		
Coating					
Corrosion	Y	X	N		
Proper Design	Y	X	N		
Locked	Y	X	N		
Gasket	Y	X	N		
Hinge	Good				
Hatch Size	2.5	FT	X	2.5	FT

Conclusion/Discrepancies Needs new gasket
present one is not sealing
Corrosion on the underside of the lid

VENTS

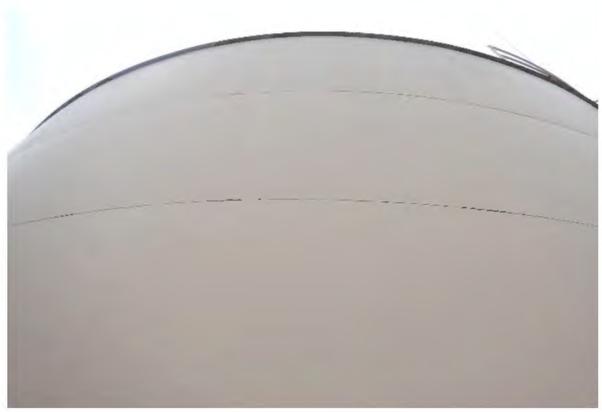
Satisfactory		Y	X	N	
Coating					
Corrosion	%	Y		N	X
Proper Design		Y	X	N	
Screens		Y	X	N	
Sealed Edges & Seams		Y	X	N	
Cap/Cover		Y	X	N	

Conclusion/Discrepancies Screen in place and
well secured Vent is in good condition
no problematic concerns

EXTERIOR SHELL

Rings					
Chime	Good				
2nd Weld Ring	Good				
3rd Weld Ring	Good				
4th Weld Ring	Good				
5th Weld Ring	Good				
Ring(s) 5 in all	Good				
Wall to Roof Seam	Good				
Coating					
Satisfactory	Y	X	N		
Oxidized	Y	X	N		
Pitting	Y		N	X	
Delamination	Y		N	X	
Corrosion	Y		N	X	
Conclusion/Discrepancies	Coating is oxidized				

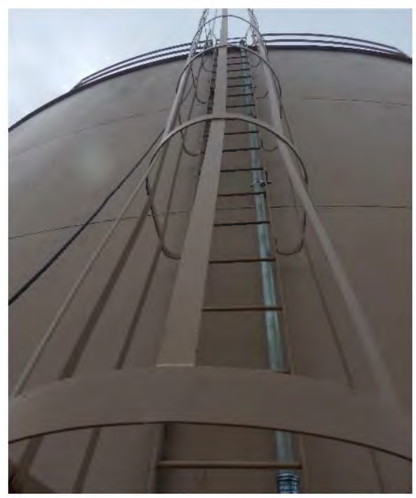
but holding up well no discrepancies noted



EXTERIOR LADDER

Construction	Coated Steel			
Satisfactory	Y	X	N	
Coating				
Satisfactory	Y	X	N	
Oxidized	Y	X	N	
Pitting	Y		N	X
Delamination	Y		N	X
Corrosion 2%	Y	X	N	
Welds/Joints	Good			
Supports	Good			
Safety Cage/Climb	Y	X	N	
Conclusion/Discrepancies	Ladder, cage and			

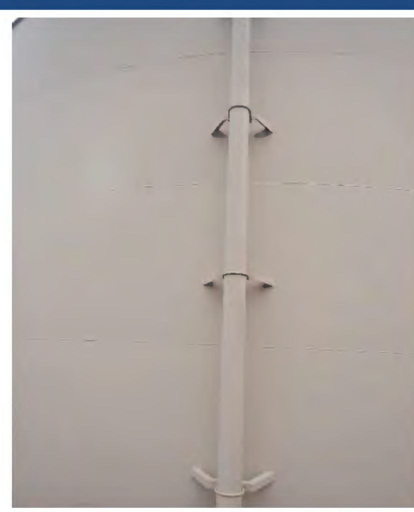
braces all in working condition, minor rust noted



OVERFLOW STRUCTURE

Coating				
Satisfactory	Y	X	N	
Oxidized	Y	X	N	
Pitting	Y		N	X
Delamination	Y		N	X
Corrosion 10%	Y	X	N	
Welds/Joints	Good			
Supports	Good			
Screens	Y		N	
Attachments	In ground			
Foundation	Good			
Conclusion/Discrepancies	Pipe and braces are in			

good condition with minor rust that needs
touched up on the back side of the pipe



FOUNDATION

Concrete Slab/Ring Retention

	Y		N	
Satisfactory	Y		N	
Cracking	Y		N	X
Spalling	Y		N	X
Exposed Aggregate	Y		N	X
Erosion Undermining	Y		N	X

Seismic Restraints None

	Y		N	
Corrosion	Y		N	
Tight	Y		N	

Conclusion/Discrepancies Retention ring in place and in good condition no undermining or erosion noted overall satisfactory

MANWAY ENTRIES

Coating

		Y		N	
Satisfactory		Y	X	N	
Oxidized		Y	X	N	
Pitting		Y		N	X
Delamination		Y		N	X
Corrosion	<1%	Y	X	N	

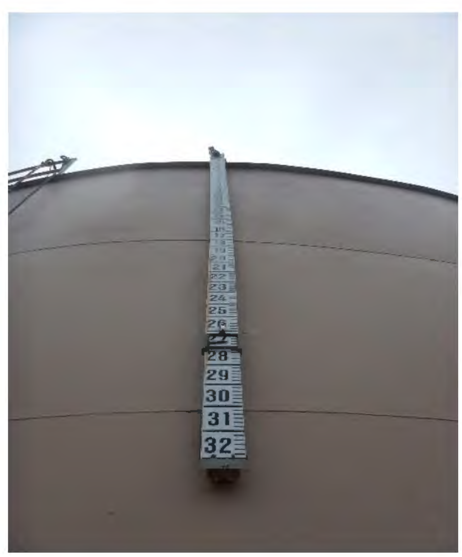
Welds/Joints Fair

Conclusion/Discrepancies Both man ways are in satisfactory condition with no discrepancies

MANUAL LEVEL INDICATOR

		Y		N	
Float		Y	X	N	
Guide Wires		Y	X	N	
Guide Wire Anchors		Y	X	N	
Cable / Hardware		Y	X	N	
Corrosion	%	Y		N	X
Operation		Y	X	N	

Conclusion/Discrepancies: Indicator appears to be in good condition

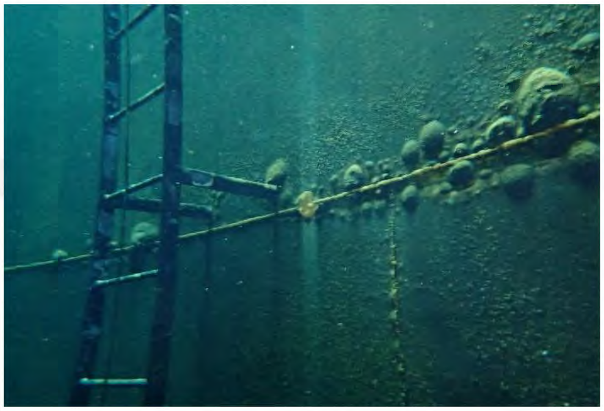


INTERIOR ROOF

Coating						
Satisfactory		Y		N	X	
Blistering		Y		N	X	
Cracking		Y		N	X	
Peeling		Y		N	X	
Holidays		Y		N	X	
Corrosion	30%	Y	X	N		
Seams/Welds		Fair				
Trusses		Fair				
Gussets		Fair				
Coating						
Blistering		Y		N	X	
Cracking		Y		N	X	
Peeling		Y		N	X	
Holidays		Y		N	X	
Corrosion	5%	Y	X	N		
Vent Penetration		Good				
Roof Hatch		Fair				

Conclusion/Discrepancies: Surface corrosion covers the plates, minor corrosion on the trusses and hardware. Coating is at the end of its service life and needs redone

INTERIOR SHELL



Coating						
Satisfactory		Y		N	X	
Blistering		Y	X	N		
Cracking		Y	X	N		
Peeling		Y		N	X	
Holidays		Y		N	X	
Pitting		Y		N	X	
Corrosion	15%	Y	X	N		
Seams/Welds		Poor heavily blistered				
Rings						
Chime		Fair				
2nd Weld Ring		Poor heavily blistered				
3rd Weld Ring		Poor heavily blistered				
4th Weld Ring		Fair				
5th Weld Ring		Fair				
Ring(s)	5 in all	Fair				
Wall to Roof Seam		Fair				
Baffle/Support Walls		None				

Conclusion/Discrepancies: Weld seams are heavily blistered with corrosion present above the water line corrosion and cracking more extensive

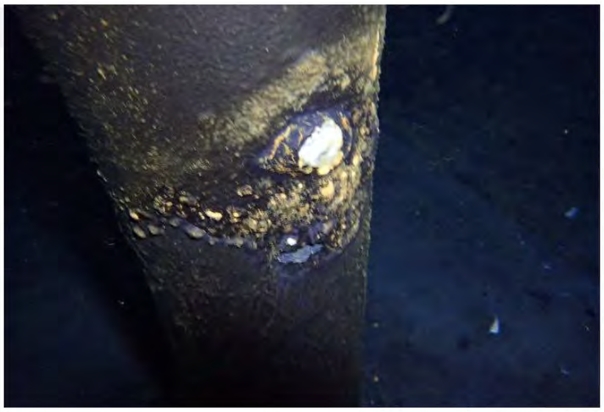
SUPPORT COLUMNS

Coating

Satisfactory		Y		N	X
Blistering		Y	X	N	
Cracking		Y	X	N	
Peeling		Y		N	X
Holidays		Y		N	X
Pitting		Y		N	X
Corrosion	10%	Y	X	N	
Seams/Welds		Fair			

Floor/Base Plates	Fair
Construction	Coated steel
Conclusion/Discrepancies:	Blistering and surface

corrosion noted from exposed steel. Coating has failed sandblast and recoat



FLOOR

Coating

Satisfactory		Fair	X	N	
Blistering		Y	X	N	
Cracking		Y		N	X
Peeling		Y		N	X
Holidays		Y		N	X
Pitting		Y		N	X
Corrosion	3%	Y	X	N	
Seams/Welds		Fair			

Conclusion/Discrepancies: Majority if the coating is in good shape with no major discrepancies
A few sporadic spots of corrosion / bare steel

Sediment Depth	1/4 of an inch

MANWAY ENTRIES

Coating

Satisfactory		Y		N	X
Blistering		Y	X	N	
Cracking		Y		N	X
Peeling		Y		N	X
Holidays		Y		N	X
Pitting		Y		N	X
Corrosion	10%	Y	X	N	
Seams/Welds		Fair			

Conclusion/Discrepancies: Blistering and surface corrosion noted around the outer edges and interior of the doorway extension

LADDER

Construction		Coated Steel			
Satisfactory		Fair	X	N	
Coating					
Satisfactory		Y		N	X
Blistering		Y	X	N	
Cracking		Y	X	N	
Peeling		Y		N	X
Holidays		Y		N	X
Pitting		Y		N	X
Corrosion	3%	Y	X	N	
Seams/Welds		Fair			
Safety Cage/Climb		Y		N	X

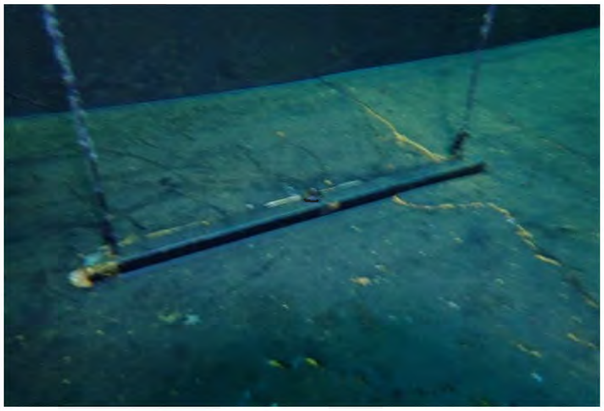
Conclusion/Discrepancies: Coating has failed blistering and bare steel present. Little to no corrosion present

OVERFLOW

Coating					
Satisfactory		Y	X	N	
Blistering		Y		N	X
Cracking		Y		N	X
Peeling		Y		N	X
Holidays		Y		N	X
Pitting		Y		N	X
Corrosion	%	Y		N	X
Seams/Welds		Good			

Conclusion/Discrepancies: funnel and welds are in good condition

MANUAL LEVEL INDICATOR



Float		Y	X	N	
Guide Wires		Y	X	N	
Guide Wire Anchors		Y	X	N	
Cable / Hardware		Y	X	N	
Corrosion	1%	Y	X	N	
Operation		Y	X	N	

Conclusion/Discrepancies: Minor corrosion on the floor anchor otherwise in good condition

APPURTENANCES

Influent

Coating

Satisfactory		Fair	X	N	
Blistering		Y	X	N	
Cracking		Y		N	X
Peeling		Y		N	X
Holidays		Y		N	X
Pitting		Y		N	X
Corrosion	5%	Y	X	N	
Seams/Welds		Fair			

Conclusion/Discrepancies: Blistering and corrosion noted around the top edge of the pipe

Effluent

Coating

Satisfactory		Y		N	X
Blistering		Y	X	N	
Cracking		Y	X	N	
Peeling		Y		N	X
Holidays		Y		N	X
Pitting		Y		N	X
Corrosion	5%	Y	X	N	
Seams/Welds		Fair			

Conclusion/Discrepancies: Blistering and corrosion noted around the weld seam

Drain

Coating

Satisfactory		Y	X	N	
Blistering		Y		N	X
Cracking		Y		N	X
Peeling		Y		N	X
Holidays		Y		N	X
Pitting		Y		N	X
Corrosion	5%	Y	X	N	
Seams/Welds		Fair			

Conclusion/Discrepancies: Corrosion on the interior of the pipe. Welds and coating are intact and in good condition

Conclusion

Based on the results of this underwater inspection and the cleaning which took place, it appears this tank is in operational condition and should continue to provide a reliable water storage capacity for potable water use with and after proper maintenance.
Interior coating is at the end of its service life, the tank needs to be sandblasted and recoated in the near future.

Recommendations

PDI concurs with the recommendations of AWWA that all potable water reservoirs or storage tanks be cleaned and inspected at least every five years and in some cases, depending upon source waters, type and quantities of sediment, and presence (or lack thereof) of cathodic protection systems, more frequently.
The following recommendations are made to provide continued, uninterrupted service of your water storage tank:

1. Your tank should be inspected and cleaned every five years, as suggested by the AWWA. Routine inspections and cleanings provide ample time to perform remedial repairs to abnormalities discovered before having a chance to become problematic.
2. The entry hatch needs a new gasket put in place as the current one is not sealing
3. The exterior roof needs touch up work done around the outer edges, the low spots have minor surface corrosion present
4. The interior coating on the floor, shell, and roof, in addition to all the appurtenances need to be sandblasted and recoated as the coating has exceeded its useful service life. Blisters, and corrosion are present with some bare steel exposed as well. Sandblast and recoat the interior in the near future.

Tank 2 Report 1B

POTABLE DIVERS INC.

866-789-3483

Lake Shastina Community Services District
Field Report

25-Apr-17

Underwater Cleaning & Inspection
300,000 Gallon
Tank 2
Potable Water Storage Tank

Submitted To:

Lake Shastina Community Services District
Robert Moser
16320 Everhart Dr.
Weed, CA 96094

Phone: 530-938-3281

Submitted By:

Potable Divers Inc.
PO Box 474
Vernal, UT 84078-0474

Phone: (866) 789-3483
Fax: (866) 913-4905
E-mail david@potabledivers.com

David Harvey Dive Supervisor

EXTERIOR ROOF

Safety Rail				
Satisfactory	Y	X	N	
Coating	Oxidized and thin			
Welds	Good			
Corrosion	Y		N	X
Coating				
Satisfactory	Fair	X	N	
Oxidized	Y	X	N	
Pitting	Y		N	X
Delamination	Y		N	X
Corrosion	Y		N	X
Seams/Welds	Good			
Low Spots	Y	X	N	
Cathodic Protection Plates	Sealed and in place			

Conclusion/Discrepancies: Coating is thin and oxidized primer still intact corrosion very minimal. A few low spots around the outer edges with surface water staining noted Cathodic plates are in place and well secured with no corrosion

ACCESS HATCH

Satisfactory	Fair	X	N	
Coating				
Corrosion	Y	X	N	
Proper Design	Y	X	N	
Locked	Y	X	N	
Gasket	Y	X	N	
Hinge	Good			
Hatch Size	2 FT	X	2 FT	

Conclusion/Discrepancies Three sides have gasket in place, minor corrosion on the underside of the lid

VENTS

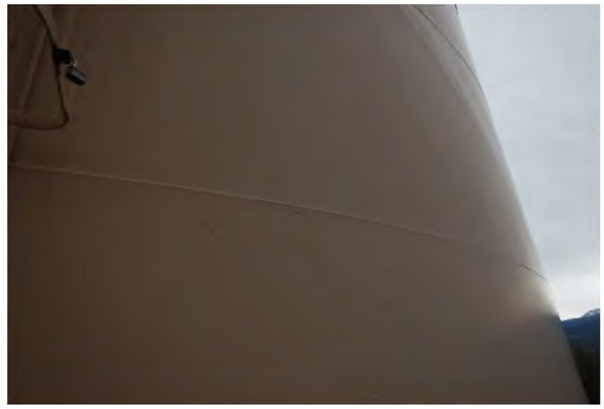
Satisfactory	Y	X	N	
Coating				
Corrosion	<2% Y	X	N	
Proper Design	Y	X	N	
Screens	Y	X	N	
Sealed Edges & Seams	Y	X	N	
Cap/Cover	Y	X	N	

Conclusion/Discrepancies Vent is in good condition with proper 24 gauge screen in place minor rust staining from the humidity escaping from the vent

EXTERIOR SHELL

Rings					
Chime		Good			
2nd Weld Ring		Good			
3rd Weld Ring		Good			
4th Weld Ring		Good			
5th Weld Ring					
Ring(s)	4 in all	Good			
Wall to Roof Seam		Good			
Coating					
Satisfactory		Y	X	N	
Oxidized		Y	X	N	
Pitting		Y		N	X
Delamination		Y		N	X
Corrosion	<2%	Y	X	N	

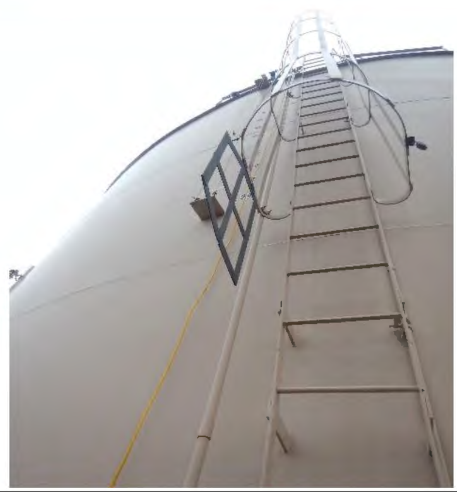
Conclusion/Discrepancies Minor nicks and scratches, no coating adhesion problems shell is in satisfactory condition



EXTERIOR LADDER

Construction		Coated Steel			
Satisfactory		Y	X	N	
Coating					
Satisfactory		Y	X	N	
Oxidized		Y	X	N	
Pitting		Y		N	X
Delamination		Y		N	X
Corrosion	<2%	Y	X	N	
Welds/Joints		Good			
Supports		Good			
Safety Cage/Climb		Y	X	N	

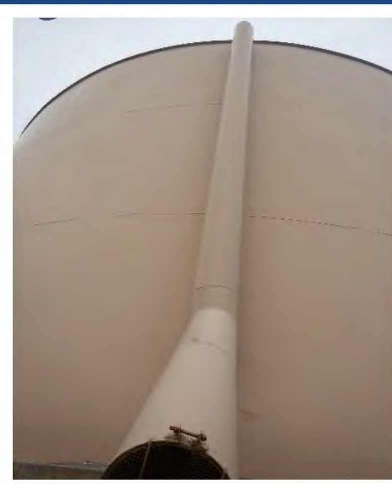
Conclusion/Discrepancies Ladder, cage and hardware satisfactory minor nicks and scratches



OVERFLOW STRUCTURE

Coating					
Satisfactory		Y	X	N	
Oxidized		Y	X	N	
Pitting		Y		N	X
Delamination		Y		N	X
Corrosion	%	Y		N	X
Welds/Joints		Good			
Supports		Good			
Screens		Y	X	N	
Attachments		Piped to ground			
Foundation		Good			

Conclusion/Discrepancies Coating on pipe is thin primer peaking through, overall satisfactory



FOUNDATION

Concrete Slab/Ring Retention

Satisfactory	Y	X	N	
Cracking	Y	X	N	
Spalling	Y		N	X
Exposed Aggregate	Y		N	X
Erosion Undermining	Y		N	X

Seismic Restraints None

Corrosion	Y		N	
Tight	Y		N	

Conclusion/Discrepancies Minor superficial cracking noted commonly found no concerns

MANWAY ENTRIES

Coating

Satisfactory		Y	X	N	
Oxidized		Y	X	N	
Pitting		Y		N	X
Delamination		Y		N	X
Corrosion	<2%	Y	X	N	
Welds/Joints		Good			

Conclusion/Discrepancies Minor spots of rust around the interior of the door. Otherwise in good condition

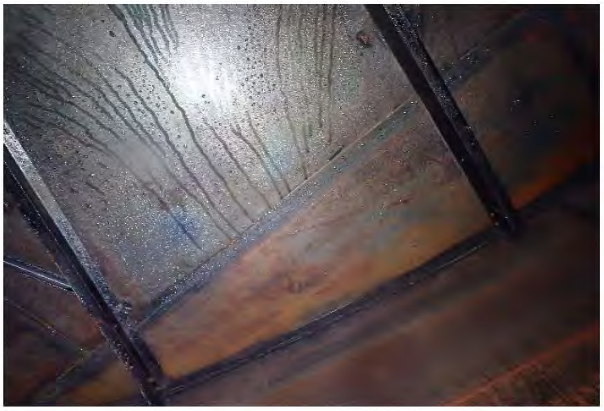
MANUAL LEVEL INDICATOR

Float		Y	X	N	
Guide Wires		Y	X	N	
Guide Wire Anchors		Y	X	N	
Cable / Hardware		Y	X	N	
Corrosion	%	Y		N	X
Operation		Y	X	N	

Conclusion/Discrepancies: All hardware is present and appears to be working properly

INTERIOR ROOF

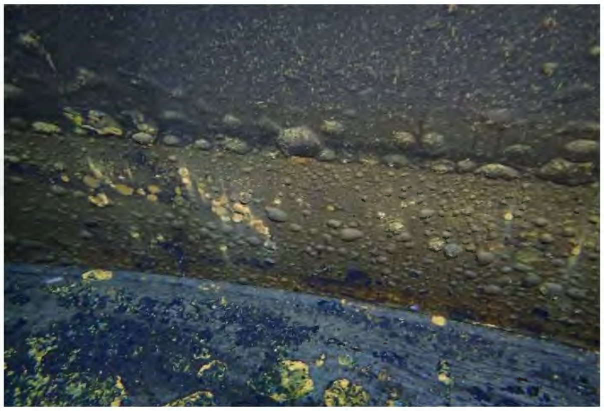
Coating					
Satisfactory	Fair	X	N		
Blistering	Y		N	X	
Cracking	Y		N	X	
Peeling	Y		N	X	
Holidays	Y	X	N		
Corrosion 15%	Y	X	N		
Seams/Welds	Fair				
Trusses	Fair				
Gussets	Fair				
Coating					
Blistering	Y		N	X	
Cracking	Y		N	X	
Peeling	Y		N	X	
Holidays	Y	X	N		
Corrosion 10%	Y	X	N		
Vent Penetration	Good				
Roof Hatch	Good				



Conclusion/Discrepancies: More corrosion than typically found or expected. Corrosion forms due to the high humidity.

INTERIOR SHELL

Coating					
Satisfactory	Y		N	X	
Blistering	Y	X	N		
Cracking	Y	X	N		
Peeling	Y	X	N		
Holidays	Y		N	X	
Pitting	Y		N	X	
Corrosion 20%	Y	X	N		
Seams/Welds	Poor				
Rings					
Chime	Poor				
2nd Weld Ring	Poor				
3rd Weld Ring	Poor				
4th Weld Ring	Poor				
5th Weld Ring					
Ring(s) 4 in all	Poor-fair				
Wall to Roof Seam	Fair				
Baffle/Support Walls	None				



Conclusion/Discrepancies: Coating is severely blistered, numerous areas of bare steel; corrosion has begun, no pitting currently present

SUPPORT COLUMNS

Coating					
Satisfactory		Y		N	X
Blistering		Y	X	N	
Cracking		Y		N	X
Peeling		Y		N	X
Holidays		Y		N	X
Pitting		Y	X	N	
Corrosion	15%	Y	X	N	
Seams/Welds		Fair			
Floor/Base Plates		Fair			
Construction		Coated steel			
Conclusion/Discrepancies:		Coating has failed			

corrosion is present with slight pitting

FLOOR

Coating					
Satisfactory		Y		N	X
Blistering		Y	X	N	
Cracking		Y	X	N	
Peeling		Y		N	X
Holidays		Y		N	X
Pitting		Y		N	X
Corrosion	<5%	Y	X	N	
Seams/Welds		Fair			
Conclusion/Discrepancies:		Coating is blistered			

a few areas of bare steel with minor corrosion starting

Sediment Depth 1/4 of an inch

MANWAY ENTRIES

Coating				
Satisfactory	Y		N	X
Blistering	Y	X	N	
Cracking	Y		N	X
Peeling	Y		N	X
Holidays	Y		N	X
Pitting	Y		N	X
Corrosion	Y	X	N	
Seams/Welds	Fair			
Conclusion/Discrepancies:	Coating has failed			

corrosion and blistering around outer edges

LADDER

Construction		Coated Steel				
Satisfactory		Y	X	N		
Coating						
Satisfactory		Y		N	X	
Blistering		Y	X	N		
Cracking		Y	X	N		
Peeling		Y		N	X	
Holidays		Y		N	X	
Pitting		Y	X	N		
Corrosion	15%	Y	X	N		
Seams/Welds		Fair				
Safety Cage/Climb		Y		N	X	

Conclusion/Discrepancies: Coating is failing severe blistering with minor corrosion noted.

OVERFLOW

Coating					
Satisfactory		Y	X	N	
Blistering		Y		N	X
Cracking		Y		N	X
Peeling		Y		N	X
Holidays		Y		N	X
Pitting		Y		N	X
Corrosion	%	Y		N	X
Seams/Welds		Good			

Conclusion/Discrepancies: Overflow pipe and welds appeared to be satisfactory

MANUAL LEVEL INDICATOR

Float		Y	X	N	
Guide Wires		Y	X	N	
Guide Wire Anchors		Y	X	N	
Cable / Hardware		Y	X	N	
Corrosion	%	Y		N	X
Operation		Y	X	N	

Conclusion/Discrepancies: Float and hardware were found to be in satisfactory condition

APPURTENANCES

Influent

Common in out

Coating				
Satisfactory	Fair	X	N	
Blistering	Y	X	N	
Cracking	Y		N	X
Peeling	Y		N	X
Holidays	Y		N	X
Pitting	Y		N	X
Corrosion 2%	Y	X	N	
Seams/Welds	Fair			

Conclusion/Discrepancies: Minor corrosion around the outer edges with blistering on the interior

Effluent

Common in out

Coating				
Satisfactory	Fair	X	N	
Blistering	Y	X	N	
Cracking	Y		N	X
Peeling	Y		N	X
Holidays	Y		N	X
Pitting	Y		N	X
Corrosion 2%	Y	X	N	
Seams/Welds	Fair			

Conclusion/Discrepancies: Minor corrosion around the outer edges with blistering on the interior

Drain

Coating				
Satisfactory	Y		N	X
Blistering	Y	X	N	
Cracking	Y		N	X
Peeling	Y		N	X
Holidays	Y		N	X
Pitting	Y		N	X
Corrosion 25%	Y	X	N	
Seams/Welds	Fair			

Conclusion/Discrepancies: Corrosion on the screen and interior of the pipe other wise in working condition

Conclusion

Based on the results of this underwater inspection and the cleaning which took place, it appears this tank is in operational condition and should continue to provide a reliable water storage capacity for potable water use with and after proper maintenance.
The interior coating is at the end of its service life and needs to be redone before the steel is compromised from present corrosion

Recommendations

PDI concurs with the recommendations of AWWA that all potable water reservoirs or storage tanks be cleaned and inspected at least every five years and in some cases, depending upon source waters, type and quantities of sediment, and presence (or lack thereof) of cathodic protection systems, more frequently.
The following recommendations are made to provide continued, uninterrupted service of your water storage tank:

1. Your tank should be inspected and cleaned every five years, as suggested by the AWWA. Routine inspections and cleanings provide ample time to perform remedial repairs to abnormalities discovered before having a chance to become problematic.
2. The roof lid needs to have a new gasket put in place as part is missing.
3. The exterior coating on the shell and the roof is heavily oxidized and thinning out. Touch up these areas along with the nicks and scratches to minimize corrosion and extend the service life of the coating.
4. The interior coating is at the end of its service life exhibiting severe blistering, minor cracking, with some pitting and bare steel exposed. The interior of the tank needs to be sandblasted and recoated at the earliest convenience.

Tank 3 Report

1C

POTABLE DIVERS INC.

866-789-3483

Lake Shastina Community Services District
Field Report

25-Apr-17

Underwater Cleaning & Inspection
300,000 Gallon
Tank 3
Potable Water Storage Tank

Submitted To:

Lake Shastina Community Services District
Robert Moser
16320 Everhart Dr.
Weed, CA 96094

Phone: 530-938-3281

Submitted By:

Potable Divers Inc.
PO Box 474
Vernal, UT 84078-0474

Phone: (866) 789-3483
Fax: (866) 913-4905
E-mail david@potabledivers.com

David Harvey Dive Supervisor

EXTERIOR ROOF

Safety Rail	None				
Satisfactory				N	
Coating					
Welds					
Corrosion		Y		N	
Coating					
Satisfactory		Fair	X	N	
Oxidized		Y	X	N	
Pitting		Y		N	X
Delamination		Y		N	X
Corrosion	<2%	Y	X	N	
Seams/Welds	Good				
Low Spots		Y		N	X
Cathodic Protection Plates	Good				

Conclusion/Discrepancies: The coating is oxidized and thin, the primer is exposed with indications of corrosion starting to form.
Plan for a new coating in the near future

ACCESS HATCH

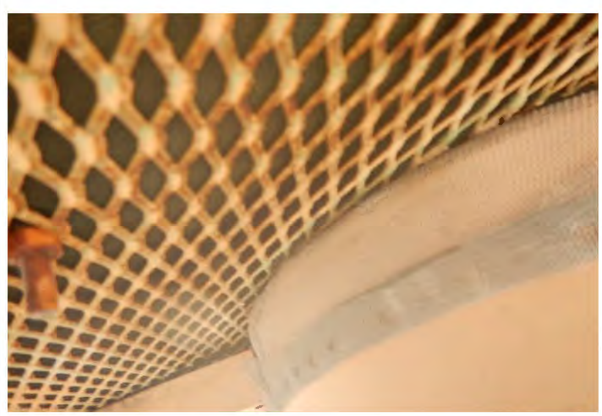
Satisfactory	Y	X	N	
Coating				
Corrosion	Y	X	N	
Proper Design	Y	X	N	
Locked	Y	X	N	
Gasket	Y		N	X
Hinge	Good			
Hatch Size	2	FT	X	FT

Conclusion/Discrepancies Needs a gasket put in place, minor corrosion where gasket should be

VENTS

Satisfactory		Y	X	N	
Coating					
Corrosion	%	Y		N	X
Proper Design		Y	X	N	
Screens		Y	X	N	
Sealed Edges & Seams		Y	X	N	
Cap/Cover		Y	X	N	

Conclusion/Discrepancies Screen in place and well secured Vent is in good condition
no problematic concerns



EXTERIOR SHELL

Rings					
Chime	Good				
2nd Weld Ring	Good				
3rd Weld Ring	Good				
4th Weld Ring	Good				
5th Weld Ring					
Ring(s) 4 in all	Good				
Wall to Roof Seam	Good				
Coating					
Satisfactory	Y	X	N		
Oxidized	Y	X	N		
Pitting	Y		N	X	
Delamination	Y		N	X	
Corrosion	Y		N	X	

Conclusion/Discrepancies Coating is oxidized but holding up well no discrepancies noted

EXTERIOR LADDER

Construction		Coated Steel			
Satisfactory		Y	X	N	
Coating					
Satisfactory		Y	X	N	
Oxidized		Y	X	N	
Pitting		Y		N	X
Delamination		Y		N	X
Corrosion	2%	Y	X	N	
Welds/Joints		Good			
Supports		Good			
Safety Cage/Climb		Y	X	N	

Conclusion/Discrepancies Ladder, cage and braces all in working condition, minor rust noted

OVERFLOW STRUCTURE

Coating					
Satisfactory		Y	X	N	
Oxidized		Y	X	N	
Pitting		Y		N	X
Delamination		Y		N	X
Corrosion	1%	Y	X	N	
Welds/Joints		Good			
Supports		Good			
Screens		Y		N	
Attachments		In ground			
Foundation		Good			

Conclusion/Discrepancies Pipe and braces are in good condition.

FOUNDATION

Concrete Slab/Ring Retention

	Y		N	
Satisfactory	Y	X	N	
Cracking	Y	X	N	
Spalling	Y		N	X
Exposed Aggregate	Y		N	X
Erosion Undermining	Y		N	X

Seismic Restraints None

	Y		N	
Corrosion	Y		N	
Tight	Y		N	

Conclusion/Discrepancies Concrete support ring has minor superficial cracking. No undermining or erosion noted overall satisfactory

MANWAY ENTRIES

Coating

		Y		N	
Satisfactory		Y	X	N	
Oxidized		Y	X	N	
Pitting		Y		N	X
Delamination		Y		N	X
Corrosion	<1%	Y	X	N	

Welds/Joints Fair

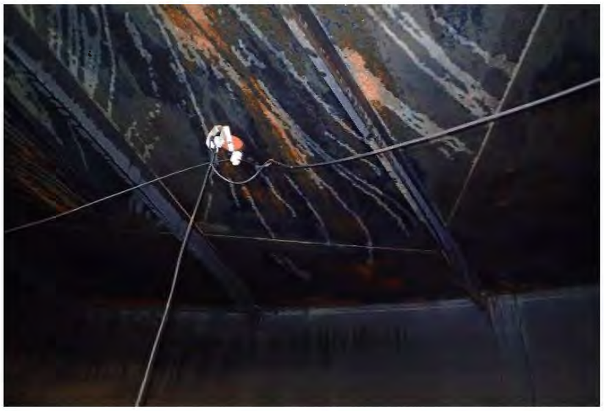
Conclusion/Discrepancies Man way entry is in satisfactory condition with no discrepancies

MANUAL LEVEL INDICATOR

		Y		N	
Float		Y	X	N	
Guide Wires		Y	X	N	
Guide Wire Anchors		Y	X	N	
Cable / Hardware		Y	X	N	
Corrosion	%	Y		N	X
Operation		Y	X	N	

Conclusion/Discrepancies: Indicator appears to be in good condition

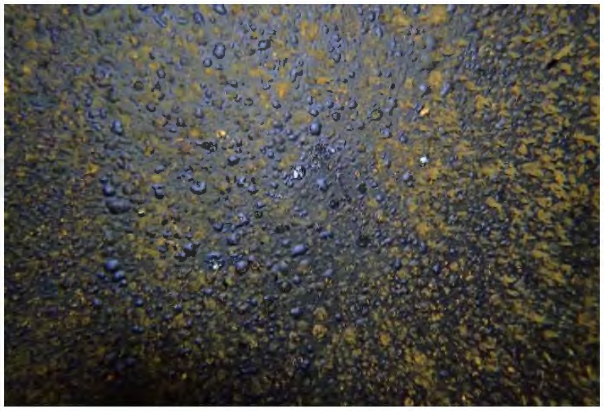
INTERIOR ROOF



Coating						
Satisfactory		Y		N	X	
Blistering		Y		N	X	
Cracking		Y		N	X	
Peeling		Y		N	X	
Holidays		Y		N	X	
Corrosion	20%	Y	X	N		
Seams/Welds		Fair				
Trusses		Fair				
Gussets		Fair				
Coating						
Blistering		Y		N	X	
Cracking		Y		N	X	
Peeling		Y		N	X	
Holidays		Y		N	X	
Corrosion	5%	Y	X	N		
Vent Penetration		Good				
Roof Hatch		Fair				

Conclusion/Discrepancies: Surface corrosion covers the plates , minor corrosion on the trusses and hardware. Coating is at the end of its service life and needs redone

INTERIOR SHELL



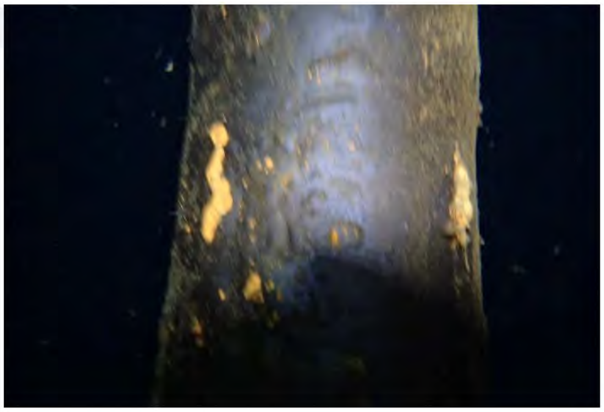
Coating						
Satisfactory		Y		N	X	
Blistering		Y	X	N		
Cracking		Y	X	N		
Peeling		Y		N	X	
Holidays		Y		N	X	
Pitting		Y		N	X	
Corrosion	15%	Y	X	N		
Seams/Welds		Poor heavily blistered				
Rings						
Chime		Fair				
2nd Weld Ring		Poor heavily blistered				
3rd Weld Ring		Poor heavily blistered				
4th Weld Ring		Fair				
5th Weld Ring						
Ring(s)	4 in all	Fair				
Wall to Roof Seam		Fair				
Baffle/Support Walls		None				

Conclusion/Discrepancies: Weld seams are heavily blistered with corrosion present above the water line corrosion and cracking more extensive

SUPPORT COLUMNS

Coating					
Satisfactory		Y		N	X
Blistering		Y	X	N	
Cracking		Y	X	N	
Peeling		Y		N	X
Holidays		Y		N	X
Pitting		Y		N	X
Corrosion	10%	Y	X	N	
Seams/Welds	Fair				
Floor/Base Plates	Fair				
Construction	Coated steel				
Conclusion/Discrepancies:	Blistering and surface				

corrosion noted from exposed steel. Coating has failed sandblast and recoat

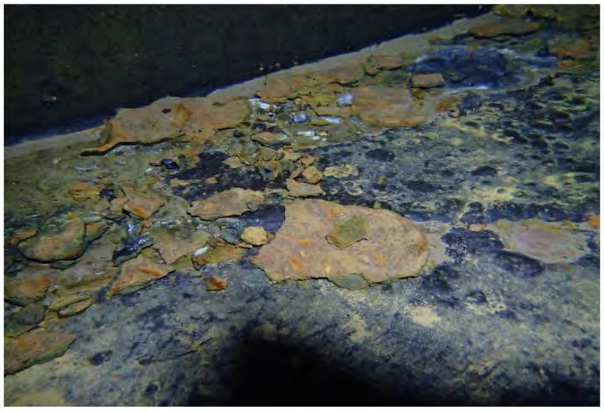


FLOOR

Coating					
Satisfactory		Y		N	X
Blistering		Y	X	N	
Cracking		Y	X	N	
Peeling		Y	X	N	
Holidays		Y		N	X
Pitting		Y		N	X
Corrosion	10%	Y	X	N	
Seams/Welds	Fair				
Conclusion/Discrepancies:	Coating is at the end				

of its service life with mineral build up and corrosion noted, recoat in the near future

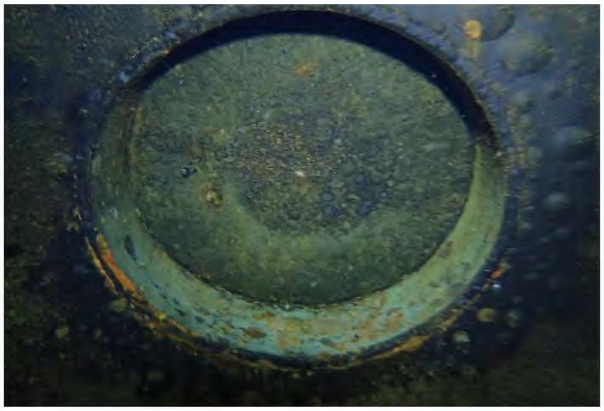
Sediment Depth 1/4 of an inch



MANWAY ENTRIES

Coating					
Satisfactory		Y		N	X
Blistering		Y	X	N	
Cracking		Y		N	X
Peeling		Y		N	X
Holidays		Y		N	X
Pitting		Y		N	X
Corrosion	5%	Y	X	N	
Seams/Welds	Fair				
Conclusion/Discrepancies:	Blistering and surface				

corrosion noted around the outer edges and interior of the doorway extension



LADDER

Construction		Coated Steel			
Satisfactory		Fair	X	N	
Coating					
Satisfactory		Y		N	X
Blistering		Y	X	N	
Cracking		Y	X	N	
Peeling		Y		N	X
Holidays		Y		N	X
Pitting		Y		N	X
Corrosion	20%	Y	X	N	
Seams/Welds		Fair			
Safety Cage/Climb		Y		N	X

Conclusion/Discrepancies: Coating has failed blistering and bare steel present. Little to no coating present

OVERFLOW

Coating					
Satisfactory		Y	X	N	
Blistering		Y		N	X
Cracking		Y		N	X
Peeling		Y		N	X
Holidays		Y		N	X
Pitting		Y		N	X
Corrosion	%	Y		N	X
Seams/Welds		Good			

Conclusion/Discrepancies: funnel and welds are in good condition

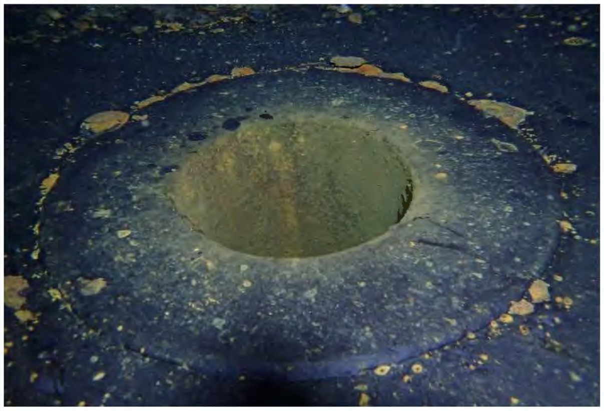
MANUAL LEVEL INDICATOR

Float		Y	X	N	
Guide Wires		Y	X	N	
Guide Wire Anchors		Y	X	N	
Cable / Hardware		Y	X	N	
Corrosion	5%	Y	X	N	
Operation		Y	X	N	

Conclusion/Discrepancies: Corrosion on the floor anchor where the guide wires connect

APPURTENANCES

Influent

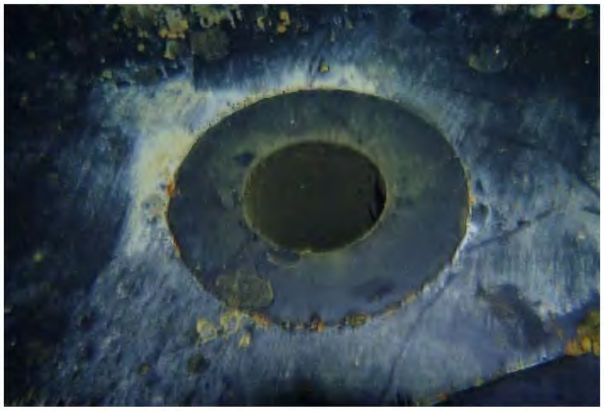


Coating

Satisfactory		Fair	X	N	
Blistering		Y	X	N	
Cracking		Y		N	X
Peeling		Y		N	X
Holidays		Y		N	X
Pitting		Y		N	X
Corrosion	5%	Y	X	N	
Seams/Welds		Fair			

Conclusion/Discrepancies: Blistering and corrosion noted around the weld seam, minor corrosion on the interior of the e pipe

Effluent

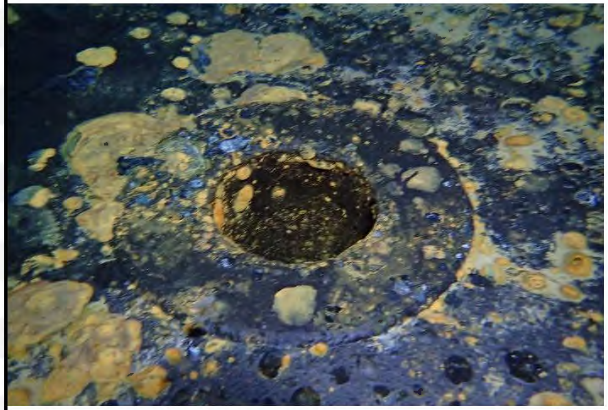


Coating

Satisfactory		Y		N	X
Blistering		Y	X	N	
Cracking		Y	X	N	
Peeling		Y		N	X
Holidays		Y		N	X
Pitting		Y		N	X
Corrosion	5%	Y	X	N	
Seams/Welds		Fair			

Conclusion/Discrepancies: Blistering and corrosion noted around the weld seam

Drain



Coating

Satisfactory		Y	X	N	
Blistering		Y		N	X
Cracking		Y		N	X
Peeling		Y		N	X
Holidays		Y		N	X
Pitting		Y		N	X
Corrosion	20%	Y	X	N	
Seams/Welds		Fair			

Conclusion/Discrepancies: Corrosion on the interior of the pipe and the weld seam coating in poor condition

Conclusion

Based on the results of this underwater inspection and the cleaning which took place, it appears this tank is in operational condition and should continue to provide a reliable water storage capacity for potable water use with and after proper maintenance.
Interior coating is at the end of its service life, the tank needs to be sandblasted and recoated in the near future.

Recommendations

PDI concurs with the recommendations of AWWA that all potable water reservoirs or storage tanks be cleaned and inspected at least every five years and in some cases, depending upon source waters, type and quantities of sediment, and presence (or lack thereof) of cathodic protection systems, more frequently.
The following recommendations are made to provide continued, uninterrupted service of your water storage tank:

1. Your tank should be inspected and cleaned every five years, as suggested by the AWWA. Routine inspections and cleanings provide ample time to perform remedial repairs to abnormalities discovered before having a chance to become problematic.
2. The entry hatch needs a gasket put in place to create a good seal and minimize the corrosion on the underside of the lid.
3. The exterior roof coating is very thin and the primer layer is visible. Plan for a new top coat in the near future.
4. The interior coating on the floor, shell, and roof, in addition to all the appurtenances need to be sandblasted and recoated as the coating has exceeded its useful service life. Blisters, and corrosion are present with some bare steel exposed as well. Sandblast and recoat the interior in the near future.

Tank 4 Report

1D

POTABLE DIVERS INC.

866-789-3483

Lake Shastina Community Services District
Field Report

25-Apr-17

Underwater Cleaning & Inspection
250,000 Gallon
Tank 4
Potable Water Storage Tank

Submitted To:

Lake Shastina Community Services District
Robert Moser
16320 Everhart Dr.
Weed, CA 96094

Phone: 530-938-3281

Submitted By:

Potable Divers Inc.
PO Box 474
Vernal, UT 84078-0474

Phone: (866) 789-3483
Fax: (866) 913-4905
E-mail david@potabledivers.com

David Harvey Dive Supervisor

EXTERIOR ROOF

Safety Rail					
Satisfactory		Fair	X	N	
Coating	Good needs touch up				
Welds	Good				
Corrosion		Y	X	N	
Coating					
Satisfactory		Y	X	N	
Oxidized		Y	X	N	
Pitting		Y		N	X
Delamination		Y		N	X
Corrosion	<2%	Y	X	N	
Seams/Welds	Good				
Low Spots		Y	X	N	
Cathodic Protection Plates	Good				

Conclusion/Discrepancies: A few low spots around the outer edges
Coating is oxidized but in good condition needs minor touch up work
around the entry hatch

ACCESS HATCH

Satisfactory		Fair	X	N	
Coating					
Corrosion		Y	X	N	
Proper Design		Y	X	N	
Locked		Y	X	N	
Gasket		Y	X	N	
Hinge	Good				
Hatch Size	2 FT X 2 FT				

Conclusion/Discrepancies Needs new gasket
present one is broken and missing parts.
Corrosion on the underside of the lid

VENTS

Satisfactory		Y	X	N	
Coating					
Corrosion	%	Y		N	X
Proper Design		Y	X	N	
Screens		Y	X	N	
Sealed Edges & Seams		Y	X	N	
Cap/Cover		Y	X	N	

Conclusion/Discrepancies Screen in place and
well secured Vent is in good condition
no problematic concerns

EXTERIOR SHELL

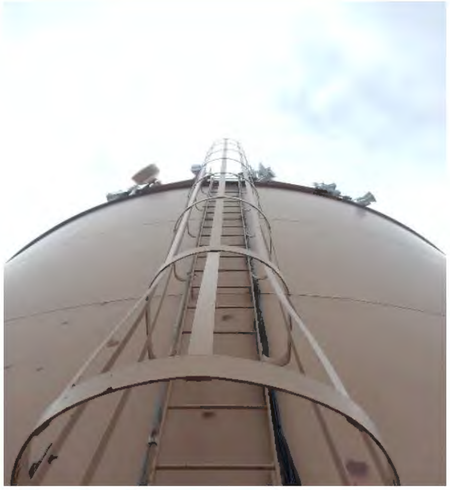
Rings						
Chime		Good				
2nd Weld Ring		Good				
3rd Weld Ring		Good				
4th Weld Ring		Good				
5th Weld Ring		Good				
Ring(s)	5 in all	Good				
Wall to Roof Seam		Good				
Coating						
Satisfactory		Y	X	N		
Oxidized		Y	X	N		
Pitting		Y		N	X	
Delamination		Y		N	X	
Corrosion	<2%	Y	X	N		

Conclusion/Discrepancies Nicks and scratches that need touch up. Many areas already corrected and appears to be holding up with no corrosion present

EXTERIOR LADDER

Construction		Coated Steel			
Satisfactory		Y	X	N	
Coating					
Satisfactory		Y	X	N	
Oxidized		Y	X	N	
Pitting		Y		N	X
Delamination		Y		N	X
Corrosion	2%	Y	X	N	
Welds/Joints		Good			
Supports		Good			
Safety Cage/Climb		Y	X	N	

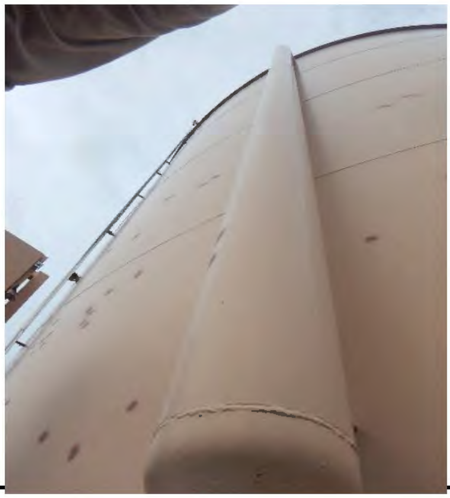
Conclusion/Discrepancies Ladder, cage and braces all in working condition, minor rust noted



OVERFLOW STRUCTURE

Coating					
Satisfactory		Y	X	N	
Oxidized		Y	X	N	
Pitting		Y		N	X
Delamination		Y		N	X
Corrosion	<1%	Y	X	N	
Welds/Joints		Good			
Supports		Good			
Screens		Y		N	
Attachments		In ground			
Foundation		Good			

Conclusion/Discrepancies Pipe and braces are in good condition with minor rust that needs touched up



FOUNDATION

Concrete Slab/Ring Retention

Item		Y		N	
Satisfactory		Y	X	N	
Cracking		Y	X	N	
Spalling		Y		N	X
Exposed Aggregate		Y		N	X
Erosion Undermining		Y		N	X

Seismic Restraints None

Item		Y		N	
Corrosion		Y		N	
Tight		Y		N	

Conclusion/Discrepancies Minor superficial cracks noted in the concrete. No undermining or erosion noted overall satisfactory

MANWAY ENTRIES

Coating

Item		Y		N	
Satisfactory		Y		N	X
Oxidized		Y	X	N	
Pitting		Y		N	X
Delamination		Y	X	N	
Corrosion	5%	Y	X	N	

Welds/Joints Fair

Conclusion/Discrepancies Needs touch up work around the edges of the doorway as the coating is peeling

MANUAL LEVEL INDICATOR

Item		Y		N	
Float		Y	X	N	
Guide Wires		Y	X	N	
Guide Wire Anchors		Y	X	N	
Cable / Hardware		Y	X	N	
Corrosion	%	Y		N	X
Operation		Y	X	N	

Conclusion/Discrepancies: Indicator appears to be in good condition

INTERIOR ROOF

Coating					
Satisfactory		Y		N	X
Blistering		Y		N	X
Cracking		Y		N	X
Peeling		Y		N	X
Holidays		Y		N	X
Corrosion	35%	Y	X	N	
Seams/Welds		Fair			
Trusses		Fair			
Gussets		Fair			
Coating					
Blistering		Y		N	X
Cracking		Y		N	X
Peeling		Y		N	X
Holidays		Y		N	X
Corrosion	20%	Y	X	N	
Vent Penetration		Good			
Roof Hatch		Fair			

Conclusion/Discrepancies: Surface corrosion covers the plates as well as the trusses and hardware. Coating has failed and needs to be sandblasted and recoated

INTERIOR SHELL

Coating					
Satisfactory		Y		N	X
Blistering		Y	X	N	
Cracking		Y	X	N	
Peeling		Y		N	X
Holidays		Y		N	X
Pitting		Y		N	X
Corrosion	35%	Y	X	N	
Seams/Welds		Fair			
Rings					
Chime		Fair			
2nd Weld Ring		Fair			
3rd Weld Ring		Fair			
4th Weld Ring		Fair			
5th Weld Ring		Fair			
Ring(s)	5 in all	Fair			
Wall to Roof Seam		Fair			
Baffle/Support Walls		None			

Conclusion/Discrepancies: Coating is severely blistered, most of which have cracked open and corrosion is forming. Sandblast and recoat in the immediate future

SUPPORT COLUMNS

		Y		N	
Coating					
Satisfactory		Y		N	X
Blistering		Y	X	N	
Cracking		Y	X	N	
Peeling		Y		N	X
Holidays		Y		N	X
Pitting		Y		N	X
Corrosion	5%	Y	X	N	
Seams/Welds	Fair				
Floor/Base Plates	Fair				
Construction	Coated steel				

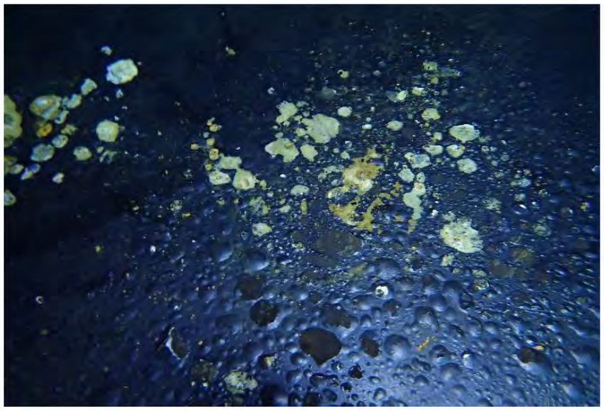
Conclusion/Discrepancies: Blistering and surface corrosion noted from exposed steel. Coating has failed sandblast and recoat

FLOOR

		Y		N	
Coating					
Satisfactory		Y		N	X
Blistering		Y	X	N	
Cracking		Y		N	X
Peeling		Y		N	X
Holidays		Y		N	X
Pitting		Y		N	X
Corrosion	10%	Y	X	N	
Seams/Welds	Fair				

Conclusion/Discrepancies: Large areas of bare steel, minimal corrosion cathodic protection is working properly coating has failed

Sediment Depth 1/8 of an inch



MANWAY ENTRIES

		Y		N	
Coating					
Satisfactory		Y		N	X
Blistering		Y	X	N	
Cracking		Y		N	X
Peeling		Y		N	X
Holidays		Y		N	X
Pitting		Y		N	X
Corrosion	5%	Y	X	N	
Seams/Welds	Fair				

Conclusion/Discrepancies: Blistering and surface corrosion noted around the outer edges
Hanger and hardware also exhibit corrosion and blistering

LADDER

Construction		None			
Satisfactory		Y		N	
Coating					
Satisfactory		Y		N	
Blistering		Y		N	
Cracking		Y		N	
Peeling		Y		N	
Holidays		Y		N	
Pitting		Y		N	
Corrosion	%	Y		N	
Seams/Welds					
Safety Cage/Climb		Y		N	

Conclusion/Discrepancies:
No interior ladder

866-789-3483

OVERFLOW

Coating					
Satisfactory		Y	X	N	
Blistering		Y		N	X
Cracking		Y		N	X
Peeling		Y		N	X
Holidays		Y		N	X
Pitting		Y		N	X
Corrosion	%	Y		N	X
Seams/Welds		Good			

Conclusion/Discrepancies: pipe and welds are in good condition

MANUAL LEVEL INDICATOR

Float		Y	X	N	
Guide Wires		Y	X	N	
Guide Wire Anchors		Y	X	N	
Cable / Hardware		Y	X	N	
Corrosion	15%	Y	X	N	
Operation		Y	X	N	

Conclusion/Discrepancies: Corrosion on the guide wire anchors, system is in working condition, float has some water on the interior and is losing buoyancy

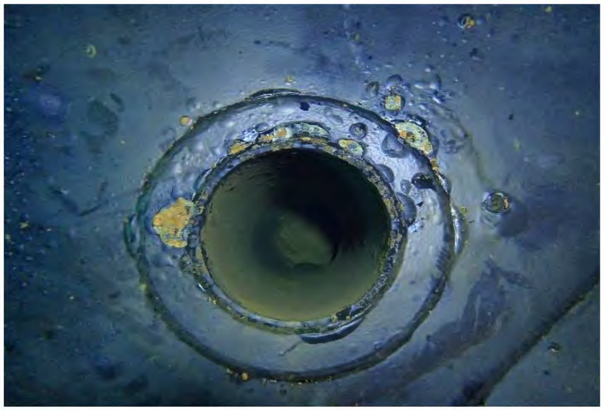
APPURTENANCES

Influent

Coating

		Y		N	
Satisfactory		Y		N	X
Blistering		Y	X	N	
Cracking		Y	X	N	
Peeling		Y		N	X
Holidays		Y		N	X
Pitting		Y		N	X
Corrosion	5%	Y	X	N	
Seams/Welds	Fair				

Conclusion/Discrepancies: Blistering and corrosion noted around the weld seam

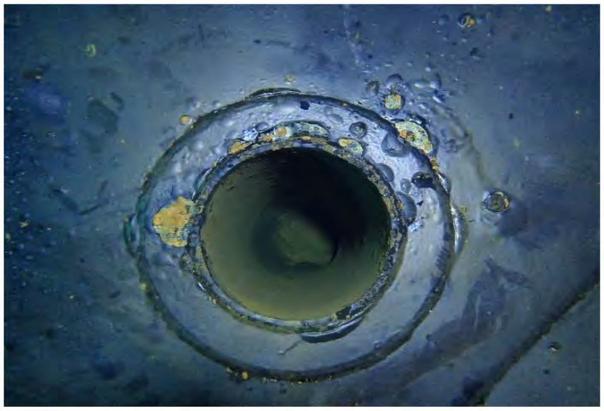


Effluent

Coating

		Y		N	
Satisfactory		Y		N	X
Blistering		Y	X	N	
Cracking		Y	X	N	
Peeling		Y		N	X
Holidays		Y		N	X
Pitting		Y		N	X
Corrosion	5%	Y	X	N	
Seams/Welds	Fair				

Conclusion/Discrepancies: Blistering and corrosion noted around the weld seam



Drain

Coating

		Y		N	
Satisfactory		Y		N	X
Blistering		Y		N	X
Cracking		Y		N	X
Peeling		Y		N	X
Holidays		Y		N	X
Pitting		Y		N	X
Corrosion	15%	Y	X	N	
Seams/Welds	Fair				

Conclusion/Discrepancies: Corrosion around the weld seam and on the interior of the pipe

Conclusion

Based on the results of this underwater inspection and the cleaning which took place, it appears this tank is in operational condition and should continue to provide a reliable water storage capacity for potable water use with and after proper maintenance.
Interior coating is at the end of its service life, the tank needs to be sandblasted and recoated in the immediate future.

Recommendations

PDI concurs with the recommendations of AWWA that all potable water reservoirs or storage tanks be cleaned and inspected at least every five years and in some cases, depending upon source waters, type and quantities of sediment, and presence (or lack thereof) of cathodic protection systems, more frequently.
The following recommendations are made to provide continued, uninterrupted service of your water storage tank:

1. Your tank should be inspected and cleaned every five years, as suggested by the AWWA. Routine inspections and cleanings provide ample time to perform remedial repairs to abnormalities discovered before having a chance to become problematic.
2. The entry hatch needs a new gasket put in place as the current one is cracked and not all there.
3. The exterior roof needs touch up work done around the entry way, numerous nicks and scratches with minor corrosion are present.
4. The interior coating on the floor, shell, and roof, in addition to all the appurtenances need to be sandblasted and recoated as the coating has exceeded its useful service life. Blisters, and corrosion are present with some bare steel exposed as well. Sandblast and recoat the interior in the immediate future.
5. The float for the level indicator system needs to be replaced. The float has water inside and is losing buoyancy.

Energy Management Study

2

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350 Hartnell Avenue, Suite B, Redding, CA 96002-1875

Reference: 520022

May 4, 2022

Robert Moser, General Manager
Lake Shastina Community Services District
16320 Everhart Drive
Weed, CA 96094

Subject: **Lake Shastina Community Services District Water System Energy Management Study**

Objective

The purpose of this study is to determine the energy usage baseline and to recommend energy savings solutions for the Lake Shastina Community Services District (LSCSD) drinking water system.

Analysis

Monthly energy expenses to operate LSCSD's water supply and distribution pumps range between $4,300 and $14,000 with an average of $7,821. This variation is accounted for by the seasonal variation in water demand. Between the months of November and March, the average daily flow rate is 0.22 million gallons per day (MGD), and between April and October the average daily flow rate is 1 MGD. LSCSD is comprised of three supply wells and five booster stations, where 71% of the energy usage is expended by the supply wells.

SHN analyzed monthly energy usage and expense reports from Pacific Power and water volumetric production data provided by LSCSD. Averages of the system are provided in Table 1 and the detailed data are provided in Tables 3 through 10. It should be noted that this analysis has a limited amount of data, thus the findings provided are partly qualitative and rely on assumptions for evaluation.

Table 1. LSCSD's Municipal Water Supply Monthly Averages, Energy Usage, Production and Cost Summary

Average Monthly Cost	$7,821
Average Gallons per Month	19,921,000
Cost per Million Gallons (MG)	$509
Energy Usage (Kilowatt hour [kWhr])	46,800
Wire to Water (kWhr/MG)	2,634
Percent Well Consumption	71%

A key component of this study is the "Wire to Water Energy Ratio." The wire to water energy ratio is a measure of kilowatt-hour per million gallons of water (kWhr/MG); simply, it is the amount of energy used to produce a million gallons of water. A lower wire to water energy ratio is better, essentially using less power to move a million gallons of water. The wire to water energy ratio is used to assess how your system compares with other public water distribution systems and create new, energy efficiency goals. LSCSD's wire to water energy ratio is 2,634 kWhr/MG. According to the EPA and statistics on public water systems using ground water, "The average typical power usage is 1,800 kWhr/MG." The next figure looks at the fluctuating efficiency values and where the system is performing well and where there is room for improvement.

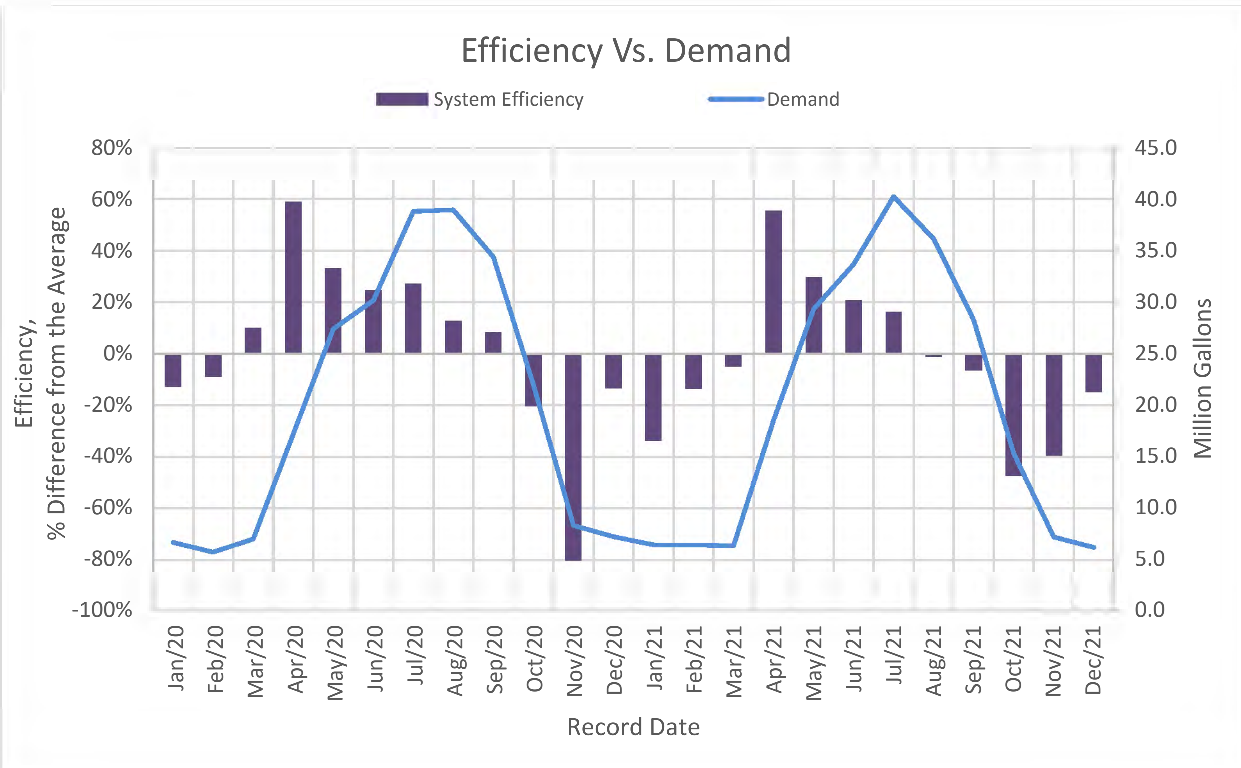

Figure 1: Efficiency Trends

- The y-axis is the % difference from the average efficiency of 2,634 kWhr/MG.
- Positive percentages represent improved efficiency.

Lake Shastina has seasonal trends for water use as seen above in Figure 1; generally these seasons are between the summer months of April and October, and the winter months between November and March. The influx of residents during the warmer months and an increased use for irrigation creates a high demand on LSCSD's water distribution system. The system observes a broad range of demands, and this results in a wide range of efficiencies. Figure 1 illustrates the seasonal trend and compares this with efficiency values (efficiency on the y-axis is the percent difference from the yearly average of 2,634 Kilowatt hour per million gallons [kWhr/MG], positive numbers reflect improved efficiency). A correlation between the two graphs can be seen; as demand increases so does efficiency, but as demand decreases, efficiency declines.

Figure 2 shows a correlation between efficiency and operational run time of Well Pumps 3 and 4. Run time is a measure of how long a pump is operational per day and does not account for the number of cycles per day. As the chart moves from left to right, run time increases and the wire to water ratio also improves. Additionally, the number of points to the left of the chart indicate that there are many instances a pump runs for a short duration.

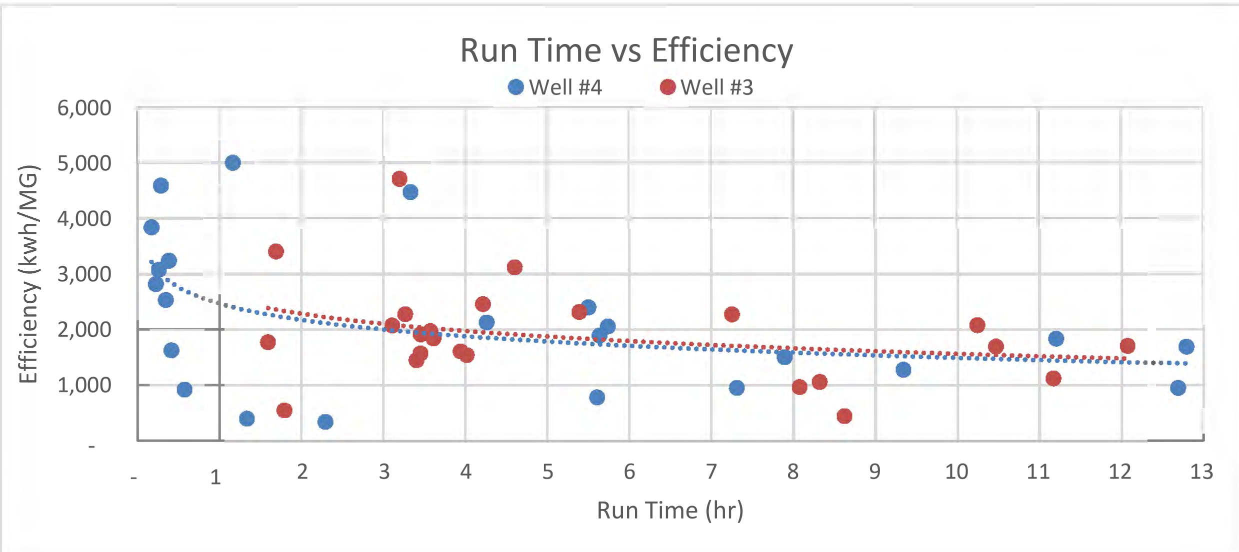

Figure 2: Daily Run Time vs Efficiency (kWhr/MG)

- "Run time" is a measure of how long a pump is operational per day and does not account for the number of cycles.

Figure 3 displays a distribution of daily total run times. Run times of less than 1.5 hours account for 40% of occurrences. These short durations are found to be inefficient and are considered a key factor of the inefficiencies in the system.

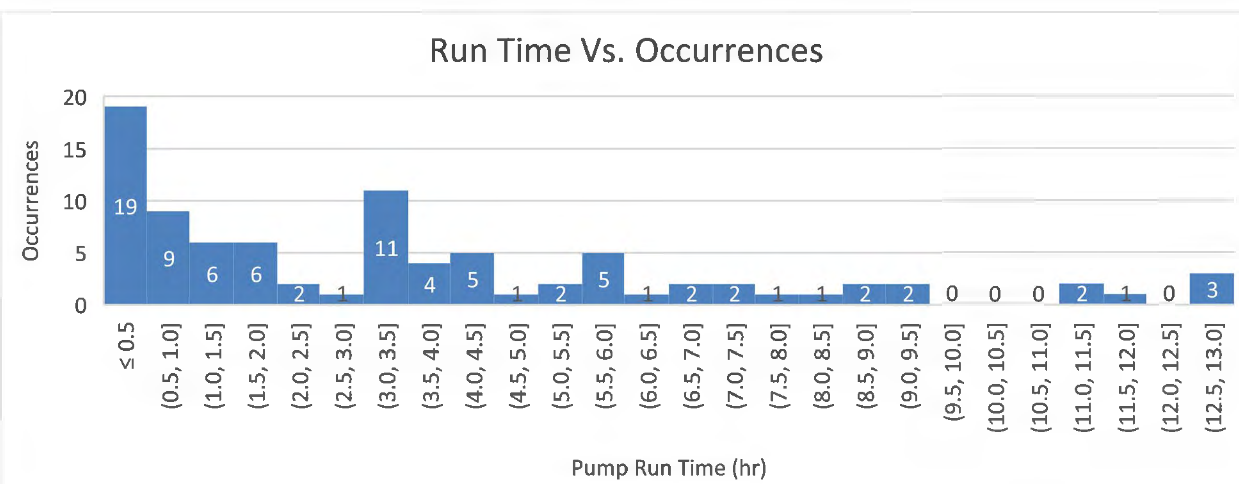

Figure 3: Daily Total Run Time Distribution.

The combination of lower demand and short cycles is a large contributor to the inefficiencies found within the system. Finding ways to decrease cycles of a pump and stay within the most efficient range will ultimately improve energy efficiency.

Analysis Results

The overall system runs efficiently when at high demands. Although, this is not the case when demand is low. An example for a low demand case is between the months of November and March when Well 4 kicks on to fill Tank 2. Well 4 is activated when the water elevation in Tank 2 falls below 15.8 ft and kicks off when the water elevation reaches 17.8 ft. Table 2 provides the characteristics of Tank 2 and Well 4 below. The estimated time to fill is only 18.6 minutes, these short cycles are leading to inefficiencies in the system.

Table 2. LSCSD's Well 4 to Fill Tank 2 (Winter Operation).

Well 4 "Run Time" Calculation	
Well 4 Capacity:	1,400 gallons per minute (GPM)
Tank 2 Total Volume:	300,000 gallons
Tank 2 Dimensions:	24 feet tall, 47-foot diameter
Tank 2 Fill Volume:	26,000 gallons (gal)
Time to Fill Tank 2:	26,000 gal /1400 GPM = 18.6 minutes

Overall, Well 3 performs the best and has the highest efficiency.

Well 9 is showing undesirable results but is subject to very little usage and short run times causing very poor efficiencies.

Recommended Improvements

SHN recommends the integration of Variable Frequency Drives (VFDs). This energy management device improves efficiency, performance, and reliability of the system. Our findings from the analysis suggest that the well pumps are oversized during the winter months and would benefit from the features of a VFD. A VFD will reduce the frequency of the motor, thus reducing the speed and ultimately the discharge of the pump. By reducing the frequency of the motor, significant energy savings are achievable.

A thesis study (Mancosky, 2017), out of the University of Wisconsin-Madison, found promising results for the installation of VFDs in deep well pump applications. Mancosky states:

> "Reduction in head and energy use is the primary benefit for VFD installation on deep well pumps, but there are additional energy and system benefits. Operating at lower speeds and flow rates increases the duration of pump run time and lessens the number of pump starts, saving additional energy... For this particular combination of deep well properties and pump attributes, reducing the speed by 10% from 1780 rpm to 1602 rpm translates to an 18% reduction in flow rate (2,390 gpm to 1,960 gpm), a 9% reduction in head (310 ft to 281 ft), and an increase of 2.3% in pump

> efficiency. This translates to a 28% reduction in input power required for the pump (180 kW to 130 kW) and a 12% savings in energy use when pumping the unit well daily average of 1.9 MG." (Mancosky, 2017)

Another feature of a VFD is the integrated soft start feature. A VFD employs a soft start feature that conserves energy by gradually increasing the frequency of a pump and reducing the initial current surge when a pump starts. The soft start feature improves efficiency while also reducing stresses to the pump and other system components.

Other energy savings strategies that can be utilized are:

- e Time-of-use: Modify schedule/usage for off-peak operationse
- e Identify unnecessary processes/depowering of equipment.e
- e Efficient lighting fixtures, including reduced use and sensors.e

By installing VFDs, LSCSD can expect to see a more versatile system and an improved wire-to-water energy ratio. A continued energy management program can be aided by the following resources and tools provided by the U.S. Environmental Protection Agency (EPA):

- e "Strategies for Saving Energy at Public Water Systems"e
- e "Ensuring a Sustainable Future: An Energy Management Guidebook for Wastewater and Watere Utilities"e
- e "The Plan-Do-Check-Act approach"e

Reference Cited

Mancosky, C. (2017). "Methodology for Estimating Energy Savings Potential Form VFD Installation on Deep Well Pumps. Master's thesis." University of Wisconsin-Madison.

Please call me at (530) 221-5424 if you have any questions.

Sincerely,

SHN

Anders Rasmussen

Anders H. Rasmussen, PE
Senior Civil Engineer

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CIVIL
STATE OF CALIFORNIA

Anders H. Rasmussen

Signed
5/4/2022

Data Provided
by LSCSD

2A

Data Provided by LSCSD

Table 3. LSCSD Monthly Electric Cost 2021

STA	Dec-21	Nov-21	Oct-21	Sep-21	Aug-21	Jul-21	Jun-21	May-21	Apr-21	Mar-21	Feb-21	Jan-21
B4	$1,104	$1,135	$2,771	$3,658	$4,558	$4,553	$4,217	$3,046	$1,144	$1,105	$1,082	$1,155
B3	$1,677	$2,495	$3,700	$4,406	$4,367	$3,813	$2,795	$2,854	$1,962	$1,532	$1,594	$1,850
B9	$546	$678	$835	$831	$1,107	$985	$850	$689	$546	$395	$609	$590
B50	$136	$105	$97	$97	$110	$109	$106	$105	$150	$174	$195	$213
B51	$121	$97	$95	$108	$120	$100	$94	$117	$146	$145	$150	$163
B52	$43	$20	$15	$15	$15	$15	$15	$20	$39	$43	$44	$47
B53	$605	$887	$1,619	$2,171	$2,590	$2,469	$2,021	$1,586	$818	$742	$718	$832
B54	$31	$18	$15	$15	$15	$15	$18	$27	$39	$45	$48	$51
B56	$107	$73	$62	$73	$82	$68	$59	$98	$141	$150	$153	$165
B57	$257	$243	$286	$288	$260	$191	$154	$130	$154	$239	$227	$280
TTL	$4,916	$6,186	$10,044	$12,205	$14,071	$13,112	$11,025	$9,231	$5,531	$4,726	$5,202	$5,656
* B4, B3, B9 are wells, 4, 3, and 9 respectively. Remaining stations are booster stations.												

Table 4. LSCSD Monthly Electric Usage 2021 (kWhr)

STA	Dec-21	Nov-21	Oct-21	Sep-21	Aug-21	Jul-21	Jun-21	May-21	Apr-21	Mar-21	Feb-21	Jan-21
B4	2,240	1,680	15,480	23,360	31,400	31,640	28,720	18,560	2,040	1,720	1,520	2,120
B3	10,120	15,829	26,030	32,542	32,564	28,028	19,193	19,707	11,963	8,291	8,844	11,133
B9	840	1,600	2,940	3,000	5,440	4,400	3,120	1,640	400	580	980	880
B50	781	531	480	495	582	587	562	559	851	1,014	1,151	1,280
B51	717	513	505	598	682	558	519	674	861	859	889	980
B52	187	30	-	-	-	-	-	39	159	188	195	218
B53	2,202	4,182	10,342	15,272	18,990	18,145	14,256	10,484	3,850	3,140	3,456	3,830
B54	109	17	-	-	-	-	26	82	162	203	219	239
B56	583	328	260	340	401	315	256	510	794	857	874	958
B57	1,600	1,400	1,680	1,720	1,560	1,120	880	720	880	1,440	1,360	1,720
TTL	18,619	26,310	58,977	78,607	95,499	88,073	69,772	53,895	21,480	17,432	19,108	22,518
* B4, B3, B9 are wells, 4, 3, and 9 respectively. Remaining stations are booster stations.												

Table 5. LSCSD Well Volume Production 2021

STA	Dec-21	Nov-21	Oct-21	Sep-21	Aug-21	Jul-21	Jun-21	May-21	Apr-21	Mar-21	Feb-21	Jan-21
B4	882,939	437,848	3,097,432	10,975,746	15,273,675	21,008,382	1,517,272	19,459,210	5,910,515	1,058,988	539,021	688,759
B3	5,281,246	6,440,952	11,451,032	15,651,670	19,068,820	1,653,553	17,070,709	8,512,249	12,340,183	5,276,811	5,731,216	5,642,814
B9	36,312	334,931	747,115	1,651,176	1,796,364	2,710,676	1,429,054	1,361,199	267,653	22,314	160,298	110,486
TTL	6,200,497	7,213,731	15,295,579	28,278,592	36,138,859	25,372,611	20,017,035	29,332,658	18,518,351	6,358,113	6,430,535	6,442,059

Table 6. **LSCSD Well Volume Average Daily 2021 (gallons)**

STA	Dec-21	Nov-21	Oct-21	Sep-21	Aug-21	Jul-21	Jun-21	May-21	Apr-21	Mar-21	Feb-21	Jan-21
B4	29,431	14,594	99,917	365,858	492,699	677,689	483,909	627,716	197,017	35,299	19,250	22,218
B3	176,041	214,698	369,388	521,722	615,123	533,340	569,023	274,588	411,399	175,893	204,686	182,026
B9	1,210	11,164	24,100	55,039	57,947	87,441	47,635	43,909	8,921	743	5,853	3,564
TTL	206,682	240,456	493,405	942,619	1,165,769	1,298,470	1,100,567	946,213	617,337	211,935	229,789	207,808

Table 7. **LSCSD Monthly Electric Cost 2020**

STA	Dec-20	Nov-20	Oct-20	Sep-20	Aug-20	Jul-20	Jun-20	May-20	Apr-20	Mar-20	Feb-20	Jan-20
B4	$1,248	$1,821	$5,315	$6,813	$7,291	$4,478	$5,359	$4,551	$2,198	$1,089	$1,170	$913
B3	$1,689	$3,019	$2,125	$1,701	$1,698	$3,233	$1,253	$1,077	$738	$1,676	$1,465	$2,090
B9	$578	$310	$490	$498	$505	$536	$394	$502	$213	$561	$414	$223
B50	$174	$107	$98	$107	$108	$98	$101	$94	$104	$112	$134	$158
B51	$146	$99	$94	$100	$111	$110	-	-	-	-	-	-
B52	$36	$14	$14	$14	$14	$13	-	-	-	-	-	-
B53	$748	$1,174	$1,922	$2,318	$2,488	$2,167	$1,818	$1,515	$703	$723	$712	$799
B54	$36	$14	$14	$14	$14	$13	-	-	-	-	-	-
B56	$123	$65	$57	$64	$65	$52	$58	$72	$106	$111	$128	$120
B57	$269	$203	$250	$280	$291	$138	$139	$133	$122	$140	$187	
TTL	$5,356	$6,933	$10,619	$12,127	$12,799	$11,236	$9,377	$8,313	$4,275	$4,833	$4,437	$4,526
* B4, B3, B9 are wells, 4, 3, and 9 respectively. Remaining stations are booster stations.												

Table 8. **LSCSD Monthly Electric Usage 2020 (kWhr)**

STA	Dec-20	Nov-20	Oct-20	Sep-20	Aug-20	Jul-20	Jun-20	May-20	Apr-20	Mar-20	Feb-20	Jan-20
B4	3,280	8,480	39,640	53,000	57,520	32,080	39,520	31,840	11,320	1,760	3,240	1,400
B3	10,029	21,927	13,955	10,172	10,191	23,769	6,096	4,467	1,513	9,083	7,299	11,744
B9	920	60	200	240	260	300	120	360	540	560	560	620
B50	1,042	593	530	594	600	529	545	501	559	583	683	814
B51	888	576	543	583	660	648	-	-	-	-	-	-
B52	145	-	-	-	-	-	-	-	-	-	-	-
B53	3,399	7,225	13,905	17,238	19,082	16,070	12,679	10,022	3,445	3,400	3,324	3,910
B54	147	-	-	-	-	-	-	-	-	-	-	-
B56	699	307	255	306	313	224	256	354	574	578	646	588
B57	1,680	1,240	1,560	1,760	1,840	800	800	760	680	760	1,000	
TTL	21,469	39,228	69,228	82,373	88,886	73,920	59,336	47,904	18,491	16,524	16,312	19,696
* B4, B3, B9 are wells, 4, 3, and 9 respectively. Remaining stations are booster stations.												

Table 9. LSCSD Well Volume Production 2020 (gallons)

STA	Dec-21	Nov-21	Oct-21	Sep-21	Aug-21	Jul-21	Jun-21	May-21	Apr-21	Mar-21	Feb-21	Jan-21
B4	1,012,546	1,022,526	8,861,089	28,857,879	34,058,052	33,783,270	16,463,169	24,862,764	14,440,690	4,346,982	706,821	1,522,405
B3	6,225,437	7,032,743	13,139,957	5,521,569	4,910,765	5,045,902	13,618,691	2,517,401	2,745,467	2,671,482	5,029,034	5,160,176
B9	-	271,629	-	-	-	-	90,041	21,048	31,354	-	-	-
TTL	7,237,983	8,326,898	22,001,046	34,379,448	38,968,817	38,829,172	30,171,901	27,401,213	17,217,511	7,018,464	5,735,855	6,682,581

Table 10. LSCSD Well Volume Average Daily 2020 (gallons)

STA	Dec-21	Nov-21	Oct-21	Sep-21	Aug-21	Jul-21	Jun-21	May-21	Apr-21	Mar-21	Feb-21	Jan-21
B4	32,662	32,984	285,841	961,929	1,098,646	1,089,782	472,360	802,024	481,356	114,899	24,373	49,109
B3	200,820	234,424	423,869	184,052	158,411	162,771	439,312	81,206	91,515	86,176	173,414	166,457
B9	0	9,054	0	0	0	0	3,001	676	1,045	0	0	0
TTL	233,482	276,462	709,710	1,145,981	1,257,057	1,252,553	914,673	883,906	573,916	201,075	197,787	215,566

Eureka, CA | Arcata, CA | Redding, CA | Willits, CA | Fort Bragg, CA | Coos Bay, OR | Klamath Falls, OR

Attachment B

Air Quality & GHG Modeling Outputs

LSCSD Drinking Water Improvement Project - Construction Detailed Report

Table of Contents

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	LSCSD Drinking Water Improvement Project - Construction
Construction Start Date	5/1/2025
Lead Agency	—
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	1.20
Precipitation (days)	53.4
Location	Lake Shastina, CA 96094, USA
County	Siskiyou
City	Unincorporated
Air District	Siskiyou County APCD
Air Basin	Northeast Plateau
TAZ	166
EDFZ	0-D
Electric Utility	PacifiCorp
Gas Utility	—
App Version	2022.1.1.25

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description
General Light Industry	13.5	1000sqft	0.31	13,500	0.00	—	—	—

User Defined Linear	1.80	Mile	0.75	0.00	—	—	—	—
Other Asphalt Surfaces	12.0	1000sqft	0.28	0.00	0.00	—	—	—
Other Non-Asphalt Surfaces	8.00	1000sqft	0.18	0.00	0.00	—	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

No measures selected

2. Emissions Summary

2.1. Construction Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	3.16	2.49	68.0	24.7	0.31	1.44	18.1	19.5	1.39	6.22	7.61	—	45,429	45,429	0.15	6.84	83.7	47,556
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	65.5	65.5	9.09	10.4	0.02	0.33	0.11	0.40	0.30	0.02	0.32	—	1,927	1,927	0.08	0.03	0.01	1,937
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	1.43	1.35	3.77	4.30	0.01	0.14	0.14	0.28	0.13	0.05	0.17	—	898	898	0.03	0.03	0.20	908
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.26	0.25	0.69	0.79	< 0.005	0.02	0.03	0.05	0.02	0.01	0.03	—	149	149	0.01	0.01	0.03	150
Exceeds (Daily Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Threshol	—	250	250	2,500	250	—	—	250	—	—	250	—	—	—	—	—	—	—
Unmit.	—	No	No	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—
Exceeds (Average Daily)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Threshold	—	250	250	2,500	250	—	—	250	—	—	250	—	—	—	—	—	—	—
Unmit.	—	No	No	No	No	—	—	No	—	—	No	—	—	—	—	—	—	—

2.2. Construction Emissions by Year, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Year	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily - Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2025	3.16	2.49	68.0	24.7	0.31	1.44	18.1	19.5	1.39	6.22	7.61	—	45,429	45,429	0.15	6.84	83.7	47,556
Daily - Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2025	65.5	65.5	9.09	10.4	0.02	0.33	0.11	0.40	0.30	0.02	0.32	—	1,927	1,927	0.08	0.03	0.01	1,937
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2025	1.43	1.35	3.77	4.30	0.01	0.14	0.14	0.28	0.13	0.05	0.17	—	898	898	0.03	0.03	0.20	908
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
2025	0.26	0.25	0.69	0.79	< 0.005	0.02	0.03	0.05	0.02	0.01	0.03	—	149	149	0.01	0.01	0.03	150

3. Construction Emissions Details

3.1. Demolition (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.75	1.47	13.9	15.1	0.02	0.57	—	0.57	0.52	—	0.52	—	2,494	2,494	0.10	0.02	—	2,502
Demolition	—	—	—	—	—	—	0.48	0.48	—	0.07	0.07	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.05	0.04	0.38	0.41	< 0.005	0.02	—	0.02	0.01	—	0.01	—	68.3	68.3	< 0.005	< 0.005	—	68.5
Demolition	—	—	—	—	—	—	0.01	0.01	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.07	0.08	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	11.3	11.3	< 0.005	< 0.005	—	11.3
Demolition	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	0.08	0.07	0.05	0.75	0.00	0.00	0.11	0.11	0.00	0.02	0.02	—	121	121	0.01	< 0.005	0.47	123
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.01	0.01	0.50	0.10	< 0.005	0.01	0.11	0.12	0.01	0.03	0.04	—	399	399	< 0.005	0.06	0.77	419
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	3.19	3.19	< 0.005	< 0.005	0.01	3.24
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	10.9	10.9	< 0.005	< 0.005	0.01	11.5
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.53	0.53	< 0.005	< 0.005	< 0.005	0.54
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	1.81	1.81	< 0.005	< 0.005	< 0.005	1.90

3.3. Site Preparation (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.56	1.31	12.1	12.1	0.02	0.56	—	0.56	0.52	—	0.52	—	2,065	2,065	0.08	0.02	—	2,072
Dust From Material Movement	—	—	—	—	—	—	6.37	6.37	—	3.02	3.02	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.03	0.03	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	5.66	5.66	< 0.005	< 0.005	—	5.68
Dust From Material Movement	—	—	—	—	—	—	0.02	0.02	—	0.01	0.01	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.94	0.94	< 0.005	< 0.005	—	0.94
Dust From Material Movement	—	—	—	—	—	—	< 0.005	< 0.005	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.04	0.03	0.45	0.00	0.00	0.06	0.06	0.00	0.01	0.01	—	72.4	72.4	< 0.005	< 0.005	0.28	73.5
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	1.28	0.91	54.3	10.4	0.29	0.83	11.6	12.4	0.83	3.17	4.00	—	42,999	42,999	0.04	6.82	83.2	45,116
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.19	0.19	< 0.005	< 0.005	< 0.005	0.19
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	0.15	0.03	< 0.005	< 0.005	0.03	0.03	< 0.005	0.01	0.01	—	118	118	< 0.005	0.02	0.10	124
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.03	0.03	< 0.005	< 0.005	< 0.005	0.03
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	19.5	19.5	< 0.005	< 0.005	0.02	20.5

3.5. Grading (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.80	1.51	14.1	14.5	0.02	0.64	—	0.64	0.59	—	0.59	—	2,455	2,455	0.10	0.02	—	2,463
Dust From Material Movement	—	—	—	—	—	—	7.08	7.08	—	3.42	3.42	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.08	0.08	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	13.5	13.5	< 0.005	< 0.005	—	13.5

Dust From Material Movement	—	—	—	—	—	—	0.04	0.04	—	0.02	0.02	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	2.23	2.23	< 0.005	< 0.005	—	2.23
Dust From Material Movement	—	—	—	—	—	—	0.01	0.01	—	< 0.005	< 0.005	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.05	0.04	0.60	0.00	0.00	0.08	0.08	0.00	0.02	0.02	—	96.5	96.5	< 0.005	< 0.005	0.37	98.0
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.51	0.51	< 0.005	< 0.005	< 0.005	0.52
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.08	0.08	< 0.005	< 0.005	< 0.005	0.09
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.7. Building Construction (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.28	1.07	8.95	10.0	0.02	0.33	—	0.33	0.30	—	0.30	—	1,801	1,801	0.07	0.01	—	1,807
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	1.28	1.07	8.95	10.0	0.02	0.33	—	0.33	0.30	—	0.30	—	1,801	1,801	0.07	0.01	—	1,807
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.35	0.29	2.45	2.75	0.01	0.09	—	0.09	0.08	—	0.08	—	493	493	0.02	< 0.005	—	495
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.06	0.05	0.45	0.50	< 0.005	0.02	—	0.02	0.02	—	0.02	—	81.7	81.7	< 0.005	< 0.005	—	82.0
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.03	0.02	0.34	0.00	0.00	0.05	0.05	0.00	0.01	0.01	—	54.7	54.7	< 0.005	< 0.005	0.21	55.6
Vendor	< 0.005	< 0.005	0.10	0.04	< 0.005	< 0.005	0.02	0.02	< 0.005	0.01	0.01	—	73.9	73.9	< 0.005	0.01	0.20	77.1
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.03	0.04	0.35	0.00	0.00	0.05	0.05	0.00	0.01	0.01	—	52.2	52.2	< 0.005	< 0.005	0.01	53.0
Vendor	< 0.005	< 0.005	0.11	0.04	< 0.005	< 0.005	0.02	0.02	< 0.005	0.01	0.01	—	73.9	73.9	< 0.005	0.01	0.01	77.0
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.09	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	14.5	14.5	< 0.005	< 0.005	0.03	14.7
Vendor	< 0.005	< 0.005	0.03	0.01	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	< 0.005	—	20.2	20.2	< 0.005	< 0.005	0.02	21.1
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	2.40	2.40	< 0.005	< 0.005	< 0.005	2.43
Vendor	< 0.005	< 0.005	0.01	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	3.35	3.35	< 0.005	< 0.005	< 0.005	3.49
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.9. Paving (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.59	0.49	4.63	6.50	0.01	0.20	—	0.20	0.19	—	0.19	—	992	992	0.04	0.01	—	995
Paving	0.54	0.54	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.06	0.09	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	13.6	13.6	< 0.005	< 0.005	—	13.6
Paving	0.01	0.01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.01	0.02	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	2.25	2.25	< 0.005	< 0.005	—	2.26
Paving	< 0.005	< 0.005	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.07	0.07	0.08	0.78	0.00	0.00	0.11	0.11	0.00	0.02	0.02	—	115	115	0.01	< 0.005	0.01	117
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.60	1.60	< 0.005	< 0.005	< 0.005	1.62
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.26	0.26	< 0.005	< 0.005	< 0.005	0.27
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.11. Architectural Coating (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.15	0.13	0.88	1.14	< 0.005	0.03	—	0.03	0.03	—	0.03	—	134	134	0.01	< 0.005	—	134
Architectural Coatings	65.4	65.4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.01	0.02	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	1.83	1.83	< 0.005	< 0.005	—	1.84
Architectural Coatings	0.90	0.90	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.30	0.30	< 0.005	< 0.005	—	0.30
Architectural Coatings	0.16	0.16	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	0.01	0.07	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	10.4	10.4	< 0.005	< 0.005	< 0.005	10.6
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.14	0.14	< 0.005	< 0.005	< 0.005	0.15
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.02	0.02	< 0.005	< 0.005	< 0.005	0.02
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.13. Linear, Grubbing & Land Clearing (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.29	0.24	1.83	2.90	0.01	0.07	—	0.07	0.06	—	0.06	—	960	960	0.04	0.01	—	963
Dust From Material Movement	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	0.01	0.05	0.08	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	26.3	26.3	< 0.005	< 0.005	—	26.4
Dust From Material Movement	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	4.35	4.35	< 0.005	< 0.005	—	4.37
Dust From Material Movement	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.03	0.03	0.02	0.30	0.00	0.00	0.04	0.04	0.00	0.01	0.01	—	48.2	48.2	< 0.005	< 0.005	0.19	49.0
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.28	1.28	< 0.005	< 0.005	< 0.005	1.30
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.21	0.21	< 0.005	< 0.005	< 0.005	0.21
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.15. Linear, Grading & Excavation (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Off-Road Equipment	0.22	0.19	1.49	1.23	< 0.005	0.05	—	0.05	0.05	—	0.05	—	221	221	0.01	< 0.005	—	221
Dust From Material Movement	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03	0.02	0.18	0.15	< 0.005	0.01	—	0.01	0.01	—	0.01	—	27.2	27.2	< 0.005	< 0.005	—	27.3
Dust From Material Movement	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.01	< 0.005	0.03	0.03	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	4.50	4.50	< 0.005	< 0.005	—	4.52
Dust From Material Movement	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.04	0.03	0.45	0.00	0.00	0.06	0.06	0.00	0.01	0.01	—	72.4	72.4	< 0.005	< 0.005	0.28	73.5

Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.01	0.01	< 0.005	0.05	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	8.62	8.62	< 0.005	< 0.005	0.01	8.74
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	1.43	1.43	< 0.005	< 0.005	< 0.005	1.45
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.17. Linear, Drainage, Utilities, & Sub-Grade (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.30	0.26	2.12	2.94	< 0.005	0.08	—	0.08	0.07	—	0.07	—	430	430	0.02	< 0.005	—	432
Dust From Material Movement	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.03	0.02	0.17	0.24	< 0.005	0.01	—	0.01	0.01	—	0.01	—	35.4	35.4	< 0.005	< 0.005	—	35.5
Dust From Material Movement	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.03	0.04	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	5.86	5.86	< 0.005	< 0.005	—	5.88
Dust From Material Movement	—	—	—	—	—	—	0.00	0.00	—	0.00	0.00	—	—	—	—	—	—	—
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.05	0.04	0.03	0.45	0.00	0.00	0.06	0.06	0.00	0.01	0.01	—	72.4	72.4	< 0.005	< 0.005	0.28	73.5
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Worker	< 0.005	< 0.005	< 0.005	0.04	0.00	0.00	0.01	0.01	0.00	< 0.005	< 0.005	—	5.74	5.74	< 0.005	< 0.005	0.01	5.83
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.01	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.95	0.95	< 0.005	< 0.005	< 0.005	0.96
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

3.19. Linear, Paving (2025) - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Location	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Onsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.39	0.33	2.92	3.88	0.01	0.13	—	0.13	0.12	—	0.12	—	589	589	0.02	< 0.005	—	591
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	0.02	0.01	0.12	0.16	< 0.005	0.01	—	0.01	0.01	—	0.01	—	24.2	24.2	< 0.005	< 0.005	—	24.3
Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Off-Road Equipment	< 0.005	< 0.005	0.02	0.03	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	4.01	4.01	< 0.005	< 0.005	—	4.02

Onsite truck	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Offsite	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	0.06	0.05	0.04	0.60	0.00	0.00	0.08	0.08	0.00	0.02	0.02	—	96.5	96.5	< 0.005	< 0.005	0.37	98.0
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	0.02	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	3.83	3.83	< 0.005	< 0.005	0.01	3.89
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Worker	< 0.005	< 0.005	< 0.005	< 0.005	0.00	0.00	< 0.005	< 0.005	0.00	< 0.005	< 0.005	—	0.63	0.63	< 0.005	< 0.005	< 0.005	0.64
Vendor	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Hauling	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00

4. Operations Emissions Details

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

5. Activity Data

5.1. Construction Schedule

Phase Name	Phase Type	Start Date	End Date	Days Per Week	Work Days per Phase	Phase Description
Demolition	Demolition	5/1/2025	5/15/2025	5.00	10.0	—
Site Preparation	Site Preparation	5/16/2025	5/17/2025	5.00	1.00	—
Grading	Grading	5/18/2025	5/20/2025	5.00	2.00	—
Building Construction	Building Construction	5/21/2025	10/8/2025	5.00	100	—
Paving	Paving	10/9/2025	10/16/2025	5.00	5.00	—
Architectural Coating	Architectural Coating	10/17/2025	10/24/2025	5.00	5.00	—
Linear, Grubbing & Land Clearing	Linear, Grubbing & Land Clearing	5/1/2025	5/15/2025	5.00	10.0	—
Linear, Grading & Excavation	Linear, Grading & Excavation	5/16/2025	7/18/2025	5.00	45.0	—
Linear, Drainage, Utilities, & Sub-Grade	Linear, Drainage, Utilities, & Sub-Grade	7/19/2025	8/30/2025	5.00	30.0	—
Linear, Paving	Linear, Paving	8/31/2025	9/21/2025	5.00	15.0	—

5.2. Off-Road Equipment

5.2.1. Unmitigated

Phase Name	Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor
Demolition	Tractors/Loaders/Backhoes	Diesel	Average	3.00	8.00	84.0	0.37

Demolition	Rubber Tired Dozers	Diesel	Average	1.00	8.00	367	0.40
Demolition	Concrete/Industrial Saws	Diesel	Average	1.00	8.00	33.0	0.73
Site Preparation	Graders	Diesel	Average	1.00	8.00	148	0.41
Site Preparation	Tractors/Loaders/Backhoes	Diesel	Average	1.00	8.00	84.0	0.37
Site Preparation	Rubber Tired Dozers	Diesel	Average	1.00	7.00	367	0.40
Grading	Graders	Diesel	Average	1.00	8.00	148	0.41
Grading	Tractors/Loaders/Backhoes	Diesel	Average	2.00	7.00	84.0	0.37
Grading	Rubber Tired Dozers	Diesel	Average	1.00	8.00	367	0.40
Building Construction	Cranes	Diesel	Average	1.00	6.00	367	0.29
Building Construction	Forklifts	Diesel	Average	1.00	6.00	82.0	0.20
Building Construction	Tractors/Loaders/Backhoes	Diesel	Average	1.00	6.00	84.0	0.37
Building Construction	Generator Sets	Diesel	Average	1.00	8.00	14.0	0.74
Building Construction	Welders	Diesel	Average	3.00	8.00	46.0	0.45
Paving	Tractors/Loaders/Backhoes	Diesel	Average	1.00	8.00	84.0	0.37
Paving	Pavers	Diesel	Average	1.00	6.00	81.0	0.42
Paving	Rollers	Diesel	Average	1.00	7.00	36.0	0.38
Paving	Cement and Mortar Mixers	Diesel	Average	1.00	6.00	10.0	0.56
Paving	Paving Equipment	Diesel	Average	1.00	8.00	89.0	0.36
Architectural Coating	Air Compressors	Diesel	Average	1.00	6.00	37.0	0.48
Linear, Grubbing & Land Clearing	Excavators	Diesel	Average	1.00	6.00	367	0.29
Linear, Grubbing & Land Clearing	Tractors/Loaders/Backhoes	Diesel	Average	1.00	6.00	84.0	0.37
Linear, Grading & Excavation	Excavators	Diesel	Average	1.00	6.00	36.0	0.38

Linear, Grading & Excavation	Tractors/Loaders/Backh	Diesel	Average	1.00	6.00	16.0	0.38
Linear, Grading & Excavation	Dumpers/Tenders	Diesel	Average	1.00	6.00	16.0	0.38
Linear, Drainage, Utilities, & Sub-Grade	Excavators	Diesel	Average	1.00	6.00	36.0	0.38
Linear, Drainage, Utilities, & Sub-Grade	Tractors/Loaders/Backhoes	Diesel	Average	1.00	6.00	84.0	0.37
Linear, Drainage, Utilities, & Sub-Grade	Rollers	Diesel	Average	1.00	6.00	36.0	0.38
Linear, Paving	Pavers	Diesel	Average	1.00	6.00	89.0	0.36
Linear, Paving	Rollers	Diesel	Average	1.00	6.00	36.0	0.38
Linear, Paving	Cement and Mortar Mixers	Diesel	Average	1.00	6.00	10.0	0.56
Linear, Paving	Tractors/Loaders/Backhoes	Diesel	Average	1.00	6.00	84.0	0.37

5.3. Construction Vehicles

5.3.1. Unmitigated

Phase Name	Trip Type	One-Way Trips per Day	Miles per Trip	Vehicle Mix
Demolition	—	—	—	—
Demolition	Worker	12.5	11.9	LDA,LDT1,LDT2
Demolition	Vendor	—	10.6	HHDT,MHDT
Demolition	Hauling	5.80	20.0	HHDT
Demolition	Onsite truck	—	—	HHDT
Site Preparation	—	—	—	—
Site Preparation	Worker	7.50	11.9	LDA,LDT1,LDT2
Site Preparation	Vendor	—	10.6	HHDT,MHDT
Site Preparation	Hauling	625	20.0	HHDT

Site Preparation	Onsite truck	—	—	HHDT
Grading	—	—	—	—
Grading	Worker	10.0	11.9	LDA,LDT1,LDT2
Grading	Vendor	—	10.6	HHDT,MHDT
Grading	Hauling	0.00	20.0	HHDT
Grading	Onsite truck	—	—	HHDT
Building Construction	—	—	—	—
Building Construction	Worker	5.67	11.9	LDA,LDT1,LDT2
Building Construction	Vendor	2.21	10.6	HHDT,MHDT
Building Construction	Hauling	0.00	20.0	HHDT
Building Construction	Onsite truck	—	—	HHDT
Paving	—	—	—	—
Paving	Worker	12.5	11.9	LDA,LDT1,LDT2
Paving	Vendor	—	10.6	HHDT,MHDT
Paving	Hauling	0.00	20.0	HHDT
Paving	Onsite truck	—	—	HHDT
Architectural Coating	—	—	—	—
Architectural Coating	Worker	1.13	11.9	LDA,LDT1,LDT2
Architectural Coating	Vendor	—	10.6	HHDT,MHDT
Architectural Coating	Hauling	0.00	20.0	HHDT
Architectural Coating	Onsite truck	—	—	HHDT
Linear, Grubbing & Land Clearing	—	—	—	—
Linear, Grubbing & Land Clearing	Worker	5.00	11.9	LDA,LDT1,LDT2
Linear, Grubbing & Land Clearing	Vendor	0.00	10.6	HHDT,MHDT
Linear, Grubbing & Land Clearing	Hauling	0.00	20.0	HHDT
Linear, Grubbing & Land Clearing	Onsite truck	—	—	HHDT
Linear, Grading & Excavation	—	—	—	—

Linear, Grading & Excavation	Worker	7.50	11.9	LDA,LDT1,LDT2
Linear, Grading & Excavation	Vendor	0.00	10.6	HHDT,MHDT
Linear, Grading & Excavation	Hauling	0.00	20.0	HHDT
Linear, Grading & Excavation	Onsite truck	—	—	HHDT
Linear, Drainage, Utilities, & Sub-Grade	—	—	—	—
Linear, Drainage, Utilities, & Sub-Grade	Worker	7.50	11.9	LDA,LDT1,LDT2
Linear, Drainage, Utilities, & Sub-Grade	Vendor	0.00	10.6	HHDT,MHDT
Linear, Drainage, Utilities, & Sub-Grade	Hauling	0.00	20.0	HHDT
Linear, Drainage, Utilities, & Sub-Grade	Onsite truck	—	—	HHDT
Linear, Paving	—	—	—	—
Linear, Paving	Worker	10.0	11.9	LDA,LDT1,LDT2
Linear, Paving	Vendor	0.00	10.6	HHDT,MHDT
Linear, Paving	Hauling	0.00	20.0	HHDT
Linear, Paving	Onsite truck	—	—	HHDT

5.4. Vehicles

5.4.1. Construction Vehicle Control Strategies

Non-applicable. No control strategies activated by user.

5.5. Architectural Coatings

Phase Name	Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
Architectural Coating	0.00	0.00	20,250	6,750	1,200

5.6. Dust Mitigation

5.6.1. Construction Earthmoving Activities

Phase Name	Material Imported (Cubic Yards)	Material Exported (Cubic Yards)	Acres Graded (acres)	Material Demolished (Building Square Footage)	Acres Paved (acres)
Demolition	0.00	0.00	0.00	5,000	—
Site Preparation	5,000	—	0.94	0.00	—
Grading	—	—	2.00	0.00	—
Paving	0.00	0.00	0.00	0.00	1.21
Linear, Grubbing & Land Clearing	—	—	0.75	0.00	—
Linear, Grading & Excavation	—	—	0.75	0.00	—
Linear, Drainage, Utilities, & Sub-Grade	—	—	0.75	0.00	—

5.6.2. Construction Earthmoving Control Strategies

Non-applicable. No control strategies activated by user.

5.7. Construction Paving

Land Use	Area Paved (acres)	% Asphalt
General Light Industry	0.00	0%
User Defined Linear	0.75	100%
Other Asphalt Surfaces	0.28	100%
Other Non-Asphalt Surfaces	0.18	0%

5.8. Construction Electricity Consumption and Emissions Factors

kWh per Year and Emission Factor (lb/MWh)

Year	kWh per Year	CO2	CH4	N2O
2025	0.00	1,499	0.03	< 0.005

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.2. Sequestration

5.18.2.1. Unmitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

Cal-Adapt midcentury 2040–2059 average projections for four hazards are reported below for your project location. These are under Representation Concentration Pathway (RCP) 8.5 which assumes GHG emissions will continue to rise strongly through 2050 and then plateau around 2100.

Climate Hazard	Result for Project Location	Unit
Temperature and Extreme Heat	26.4	annual days of extreme heat
Extreme Precipitation	6.15	annual days with precipitation above 20 mm
Sea Level Rise	—	meters of inundation depth
Wildfire	45.4	annual hectares burned

Temperature and Extreme Heat data are for grid cell in which your project are located. The projection is based on the 98th historical percentile of daily maximum/minimum temperatures from observed historical data (32 climate model ensemble from Cal-Adapt, 2040–2059 average under RCP 8.5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

Extreme Precipitation data are for the grid cell in which your project are located. The threshold of 20 mm is equivalent to about ¾ an inch of rain, which would be light to moderate rainfall if received over a full day or heavy rain if received over a period of 2 to 4 hours. Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Sea Level Rise data are for the grid cell in which your project are located. The projections are from Radke et al. (2017), as reported in Cal-Adapt (Radke et al., 2017, CEC-500-2017-008), and consider inundation location and depth for the San Francisco Bay, the Sacramento-San Joaquin River Delta and California coast resulting different increments of sea level rise coupled with extreme storm events. Users may select from four scenarios to view the range in potential inundation depth for the grid cell. The four scenarios are: No rise, 0.5 meter, 1.0 meter, 1.41 meters
Wildfire data are for the grid cell in which your project are located. The projections are from UC Davis, as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider historical data of climate, vegetation, population density, and large (> 400 ha) fire history. Users may select from four model simulations to view the range in potential wildfire probabilities for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

6.2. Initial Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	N/A	N/A	N/A	N/A
Extreme Precipitation	1	0	0	N/A
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	1	0	0	N/A
Flooding	0	0	0	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	N/A	N/A	N/A	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores do not include implementation of climate risk reduction measures.

6.3. Adjusted Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	N/A	N/A	N/A	N/A
Extreme Precipitation	1	1	1	2
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	1	1	1	2

Flooding	1	1	1	2
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	N/A	N/A	N/A	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores include implementation of climate risk reduction measures.

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Exposure Indicators	—
AQ-Ozone	35.2
AQ-PM	0.31
AQ-DPM	4.28
Drinking Water	38.8
Lead Risk Housing	28.6
Pesticides	81.1
Toxic Releases	2.49
Traffic	6.88
Effect Indicators	—
CleanUp Sites	74.2
Groundwater	81.9

Haz Waste Facilities/Generators	61.6
Impaired Water Bodies	51.2
Solid Waste	94.6
Sensitive Population	—
Asthma	38.9
Cardio-vascular	75.4
Low Birth Weights	—
Socioeconomic Factor Indicators	—
Education	35.9
Housing	26.7
Linguistic	16.4
Poverty	63.0
Unemployment	69.1

7.2. Healthy Places Index Scores

The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Economic	—
Above Poverty	33.8380598
Employed	9.713845759
Median HI	26.87026819
Education	—
Bachelor's or higher	50.58385731
High school enrollment	9.739509817
Preschool enrollment	57.97510586
Transportation	—
Auto Access	29.34684974

Active commuting	57.82112152
Social	—
2-parent households	22.26356987
Voting	81.81701527
Neighborhood	—
Alcohol availability	82.42012062
Park access	23.88040549
Retail density	4.850506865
Supermarket access	37.91864494
Tree canopy	94.49505967
Housing	—
Homeownership	59.04016425
Housing habitability	56.79455922
Low-inc homeowner severe housing cost burden	51.12280252
Low-inc renter severe housing cost burden	51.9183883
Uncrowded housing	76.50455537
Health Outcomes	—
Insured adults	49.23649429
Arthritis	0.0
Asthma ER Admissions	66.9
High Blood Pressure	0.0
Cancer (excluding skin)	0.0
Asthma	0.0
Coronary Heart Disease	0.0
Chronic Obstructive Pulmonary Disease	0.0
Diagnosed Diabetes	0.0
Life Expectancy at Birth	16.5

Cognitively Disabled	5.5
Physically Disabled	24.6
Heart Attack ER Admissions	18.4
Mental Health Not Good	0.0
Chronic Kidney Disease	0.0
Obesity	0.0
Pedestrian Injuries	60.6
Physical Health Not Good	0.0
Stroke	0.0
Health Risk Behaviors	—
Binge Drinking	0.0
Current Smoker	0.0
No Leisure Time for Physical Activity	0.0
Climate Change Exposures	—
Wildfire Risk	45.0
SLR Inundation Area	0.0
Children	77.6
Elderly	17.9
English Speaking	90.4
Foreign-born	2.3
Outdoor Workers	36.2
Climate Change Adaptive Capacity	—
Impervious Surface Cover	89.7
Traffic Density	8.0
Traffic Access	0.0
Other Indices	—
Hardship	55.2

Other Decision Support	—
2016 Voting	54.2

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	50.0
Healthy Places Index Score for Project Location (b)	34.0
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	No
Project Located in a Low-Income Community (Assembly Bill 1550)	Yes
Project Located in a Community Air Protection Program Community (Assembly Bill 617)	No

a: The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.
b: The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

7.4. Health & Equity Measures

No Health & Equity Measures selected.

7.5. Evaluation Scorecard

Health & Equity Evaluation Scorecard not completed.

7.6. Health & Equity Custom Measures

No Health & Equity Custom Measures created.

8. User Changes to Default Data

Screen	Justification
Construction: Off-Road Equipment	Per Project Plans

LSCSD Drinking Water Improvement Project - Operations Detailed Report

Table of Contents

1. Basic Project Information

1.1. Basic Project Information

Data Field	Value
Project Name	LSCSD Drinking Water Improvement Project - Operations
Operational Year	2026
Lead Agency	—
Land Use Scale	Project/site
Analysis Level for Defaults	County
Windspeed (m/s)	1.20
Precipitation (days)	53.4
Location	Lake Shastina, CA 96094, USA
County	Siskiyou
City	Unincorporated
Air District	Siskiyou County APCD
Air Basin	Northeast Plateau
TAZ	166
EDFZ	0-D
Electric Utility	PacifiCorp
Gas Utility	—
App Version	2022.1.1.25

1.2. Land Use Types

Land Use Subtype	Size	Unit	Lot Acreage	Building Area (sq ft)	Landscape Area (sq ft)	Special Landscape Area (sq ft)	Population	Description
General Light Industry	6.30	1000sqft	0.14	6,300	0.00	—	—	—

User Defined Linear	1.80	Mile	0.75	0.00	0.00	—	—	—
Other Asphalt Surfaces	12.0	1000sqft	0.28	0.00	0.00	—	—	—
Other Non-Asphalt Surfaces	8.00	1000sqft	0.18	0.00	0.00	—	—	—

1.3. User-Selected Emission Reduction Measures by Emissions Sector

No measures selected

2. Emissions Summary

2.4. Operations Emissions Compared Against Thresholds

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Un/Mit.	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.42	0.40	0.26	1.50	< 0.005	0.01	0.20	0.20	0.01	0.05	0.06	7.00	672	679	0.73	0.02	2.54	707
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.37	0.35	0.30	1.36	< 0.005	0.01	0.20	0.20	0.01	0.05	0.06	7.00	664	671	0.74	0.02	1.66	698
Average Daily (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.87	0.81	2.28	2.45	< 0.005	0.08	0.17	0.25	0.07	0.04	0.12	7.00	874	881	0.74	0.02	1.99	909
Annual (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Unmit.	0.16	0.15	0.42	0.45	< 0.005	0.01	0.03	0.04	0.01	0.01	0.02	1.16	145	146	0.12	< 0.005	0.33	150

2.5. Operations Emissions by Sector, Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Sector	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.18	0.17	0.19	1.17	< 0.005	< 0.005	0.20	0.20	< 0.005	0.05	0.05	—	256	256	0.01	0.01	0.90	261
Area	0.23	0.23	< 0.005	0.27	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	1.13	1.13	< 0.005	< 0.005	—	1.13
Energy	0.01	< 0.005	0.07	0.06	< 0.005	0.01	—	0.01	0.01	—	0.01	—	389	389	0.01	< 0.005	—	389
Water	—	—	—	—	—	—	—	—	—	—	—	2.79	26.7	29.4	0.29	0.01	—	38.7
Waste	—	—	—	—	—	—	—	—	—	—	—	4.21	0.00	4.21	0.42	0.00	—	14.7
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.64	1.64
Stationary	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.42	0.40	0.26	1.50	< 0.005	0.01	0.20	0.20	0.01	0.05	0.06	7.00	672	679	0.73	0.02	2.54	707
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.18	0.17	0.23	1.30	< 0.005	< 0.005	0.20	0.20	< 0.005	0.05	0.05	—	248	248	0.02	0.02	0.02	253
Area	0.18	0.18	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Energy	0.01	< 0.005	0.07	0.06	< 0.005	0.01	—	0.01	0.01	—	0.01	—	389	389	0.01	< 0.005	—	389
Water	—	—	—	—	—	—	—	—	—	—	—	2.79	26.7	29.4	0.29	0.01	—	38.7
Waste	—	—	—	—	—	—	—	—	—	—	—	4.21	0.00	4.21	0.42	0.00	—	14.7
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.64	1.64
Stationary	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.37	0.35	0.30	1.36	< 0.005	0.01	0.20	0.20	0.01	0.05	0.06	7.00	664	671	0.74	0.02	1.66	698
Average Daily	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.16	0.15	0.19	1.10	< 0.005	< 0.005	0.17	0.17	< 0.005	0.04	0.05	—	227	227	0.01	0.01	0.35	232
Area	0.20	0.20	< 0.005	0.14	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.56	0.56	< 0.005	< 0.005	—	0.56

Energy	0.01	< 0.005	0.07	0.06	< 0.005	0.01	—	0.01	0.01	—	0.01	—	389	389	0.01	< 0.005	—	389
Water	—	—	—	—	—	—	—	—	—	—	—	2.79	26.7	29.4	0.29	0.01	—	38.7
Waste	—	—	—	—	—	—	—	—	—	—	—	4.21	0.00	4.21	0.42	0.00	—	14.7
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.64	1.64
Stationary	0.50	0.45	2.02	1.15	< 0.005	0.07	0.00	0.07	0.07	0.00	0.07	0.00	231	231	0.01	< 0.005	0.00	232
Total	0.87	0.81	2.28	2.45	< 0.005	0.08	0.17	0.25	0.07	0.04	0.12	7.00	874	881	0.74	0.02	1.99	909
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Mobile	0.03	0.03	0.03	0.20	< 0.005	< 0.005	0.03	0.03	< 0.005	0.01	0.01	—	37.6	37.6	< 0.005	< 0.005	0.06	38.4
Area	0.04	0.04	< 0.005	0.02	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.09	0.09	< 0.005	< 0.005	—	0.09
Energy	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	64.4	64.4	< 0.005	< 0.005	—	64.5
Water	—	—	—	—	—	—	—	—	—	—	—	0.46	4.41	4.87	0.05	< 0.005	—	6.40
Waste	—	—	—	—	—	—	—	—	—	—	—	0.70	0.00	0.70	0.07	0.00	—	2.44
Refrig.	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.27	0.27
Stationary	0.09	0.08	0.37	0.21	< 0.005	0.01	0.00	0.01	0.01	0.00	0.01	0.00	38.3	38.3	< 0.005	< 0.005	0.00	38.4
Total	0.16	0.15	0.42	0.45	< 0.005	0.01	0.03	0.04	0.01	0.01	0.02	1.16	145	146	0.12	< 0.005	0.33	150

4. Operations Emissions Details

4.1. Mobile Emissions by Land Use

4.1.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

General Light Industry	0.18	0.17	0.19	1.17	< 0.005	< 0.005	0.20	0.20	< 0.005	0.05	0.05	—	256	256	0.01	0.01	0.90	261
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.18	0.17	0.19	1.17	< 0.005	< 0.005	0.20	0.20	< 0.005	0.05	0.05	—	256	256	0.01	0.01	0.90	261
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	0.18	0.17	0.23	1.30	< 0.005	< 0.005	0.20	0.20	< 0.005	0.05	0.05	—	248	248	0.02	0.02	0.02	253
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.18	0.17	0.23	1.30	< 0.005	< 0.005	0.20	0.20	< 0.005	0.05	0.05	—	248	248	0.02	0.02	0.02	253
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	0.03	0.03	0.03	0.20	< 0.005	< 0.005	0.03	0.03	< 0.005	0.01	0.01	—	37.6	37.6	< 0.005	< 0.005	0.06	38.4
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.03	0.03	0.03	0.20	< 0.005	< 0.005	0.03	0.03	< 0.005	0.01	0.01	—	37.6	37.6	< 0.005	< 0.005	0.06	38.4

4.2. Energy

4.2.1. Electricity Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	—	306	306	0.01	< 0.005	—	306
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	306	306	0.01	< 0.005	—	306
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	—	306	306	0.01	< 0.005	—	306
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	306	306	0.01	< 0.005	—	306
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

General Light Industry	—	—	—	—	—	—	—	—	—	—	—	—	50.7	50.7	< 0.005	< 0.005	—	50.7
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	—	50.7	50.7	< 0.005	< 0.005	—	50.7

4.2.3. Natural Gas Emissions By Land Use - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	0.01	< 0.005	0.07	0.06	< 0.005	0.01	—	0.01	0.01	—	0.01	—	82.8	82.8	0.01	< 0.005	—	83.0
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.01	< 0.005	0.07	0.06	< 0.005	0.01	—	0.01	0.01	—	0.01	—	82.8	82.8	0.01	< 0.005	—	83.0
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	0.01	< 0.005	0.07	0.06	< 0.005	0.01	—	0.01	0.01	—	0.01	—	82.8	82.8	0.01	< 0.005	—	83.0

Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	0.01	< 0.005	0.07	0.06	< 0.005	0.01	—	0.01	0.01	—	0.01	—	82.8	82.8	0.01	< 0.005	—	83.0
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	13.7	13.7	< 0.005	< 0.005	—	13.7
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	—	0.00	0.00	—	0.00	—	0.00	0.00	0.00	0.00	—	0.00
Total	< 0.005	< 0.005	0.01	0.01	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	13.7	13.7	< 0.005	< 0.005	—	13.7

4.3. Area Emissions by Source

4.3.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Source	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	0.14	0.14	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.04	0.04	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Landscape Equipment	0.05	0.04	< 0.005	0.27	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	1.13	1.13	< 0.005	< 0.005	—	1.13
Total	0.23	0.23	< 0.005	0.27	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	1.13	1.13	< 0.005	< 0.005	—	1.13
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	0.14	0.14	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.04	0.04	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	0.18	0.18	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Consumer Products	0.02	0.02	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Architectural Coatings	0.01	0.01	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Landscape Equipment	< 0.005	< 0.005	< 0.005	0.02	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.09	0.09	< 0.005	< 0.005	—	0.09
Total	0.04	0.04	< 0.005	0.02	< 0.005	< 0.005	—	< 0.005	< 0.005	—	< 0.005	—	0.09	0.09	< 0.005	< 0.005	—	0.09

4.4. Water Emissions by Land Use

4.4.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	2.79	26.7	29.4	0.29	0.01	—	38.7
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	2.79	26.7	29.4	0.29	0.01	—	38.7
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	2.79	26.7	29.4	0.29	0.01	—	38.7
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	2.79	26.7	29.4	0.29	0.01	—	38.7
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	0.46	4.41	4.87	0.05	< 0.005	—	6.40
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00

Total	—	—	—	—	—	—	—	—	—	—	—	0.46	4.41	4.87	0.05	< 0.005	—	6.40

4.5. Waste Emissions by Land Use

4.5.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	4.21	0.00	4.21	0.42	0.00	—	14.7
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	4.21	0.00	4.21	0.42	0.00	—	14.7
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	4.21	0.00	4.21	0.42	0.00	—	14.7
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	4.21	0.00	4.21	0.42	0.00	—	14.7

Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	0.70	0.00	0.70	0.07	0.00	—	2.44
Other Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Other Non-Asphalt Surfaces	—	—	—	—	—	—	—	—	—	—	—	0.00	0.00	0.00	0.00	0.00	—	0.00
Total	—	—	—	—	—	—	—	—	—	—	—	0.70	0.00	0.70	0.07	0.00	—	2.44

4.6. Refrigerant Emissions by Land Use

4.6.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.64	1.64
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.64	1.64
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
General Light Industry	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.64	1.64
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	1.64	1.64
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

General Light Industry	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.27	0.27
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	0.27	0.27

4.7. Offroad Emissions By Equipment Type

4.7.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.8. Stationary Emissions By Equipment Type

4.8.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e

Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Emergency Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Emergency Generator	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Total	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Emergency Generator	0.09	0.08	0.37	0.21	< 0.005	0.01	0.00	0.01	0.01	0.00	0.01	0.00	38.3	38.3	< 0.005	< 0.005	0.00	38.4
Total	0.09	0.08	0.37	0.21	< 0.005	0.01	0.00	0.01	0.01	0.00	0.01	0.00	38.3	38.3	< 0.005	< 0.005	0.00	38.4

4.9. User Defined Emissions By Equipment Type

4.9.1. Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Equipment Type	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10. Soil Carbon Accumulation By Vegetation Type

4.10.1. Soil Carbon Accumulation By Vegetation Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Vegetation	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.2. Above and Belowground Carbon Accumulation by Land Use Type - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Land Use	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Total	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

4.10.3. Avoided and Sequestered Emissions by Species - Unmitigated

Criteria Pollutants (lb/day for daily, ton/yr for annual) and GHGs (lb/day for daily, MT/yr for annual)

Species	TOG	ROG	NOx	CO	SO2	PM10E	PM10D	PM10T	PM2.5E	PM2.5D	PM2.5T	BCO2	NBCO2	CO2T	CH4	N2O	R	CO2e
Daily, Summer (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Daily, Winter (Max)	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Remove	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Annual	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Avoided	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Sequestered	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Removed	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Subtotal	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

5. Activity Data

5.9. Operational Mobile Sources

5.9.1. Unmitigated

Land Use Type	Trips/Weekday	Trips/Saturday	Trips/Sunday	Trips/Year	VMT/Weekday	VMT/Saturday	VMT/Sunday	VMT/Year
General Light Industry	31.2	12.5	31.5	10,443	270	108	272	90,239
Other Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Other Non-Asphalt Surfaces	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

5.10. Operational Area Sources

5.10.1. Hearths

5.10.1.1. Unmitigated

5.10.2. Architectural Coatings

Residential Interior Area Coated (sq ft)	Residential Exterior Area Coated (sq ft)	Non-Residential Interior Area Coated (sq ft)	Non-Residential Exterior Area Coated (sq ft)	Parking Area Coated (sq ft)
0	0.00	9,450	3,150	1,200

5.10.3. Landscape Equipment

Season	Unit	Value
Snow Days	day/yr	0.00
Summer Days	day/yr	180

5.11. Operational Energy Consumption

5.11.1. Unmitigated

Electricity (kWh/yr) and CO2 and CH4 and N2O and Natural Gas (kBTU/yr)

Land Use	Electricity (kWh/yr)	CO2	CH4	N2O	Natural Gas (kBTU/yr)
General Light Industry	74,495	1,499	0.0330	0.0040	258,388
Other Asphalt Surfaces	0.00	1,499	0.0330	0.0040	0.00
Other Non-Asphalt Surfaces	0.00	1,499	0.0330	0.0040	0.00

5.12. Operational Water and Wastewater Consumption

5.12.1. Unmitigated

Land Use	Indoor Water (gal/year)	Outdoor Water (gal/year)

General Light Industry	1,456,875	0.00
Other Asphalt Surfaces	0.00	0.00
Other Non-Asphalt Surfaces	0.00	0.00

5.13. Operational Waste Generation

5.13.1. Unmitigated

Land Use	Waste (ton/year)	Cogeneration (kWh/year)
General Light Industry	7.81	—
Other Asphalt Surfaces	0.00	—
Other Non-Asphalt Surfaces	0.00	—

5.14. Operational Refrigeration and Air Conditioning Equipment

5.14.1. Unmitigated

Land Use Type	Equipment Type	Refrigerant	GWP	Quantity (kg)	Operations Leak Rate	Service Leak Rate	Times Serviced
General Light Industry	Other commercial A/C and heat pumps	R-410A	2,088	0.30	4.00	4.00	18.0

5.15. Operational Off-Road Equipment

5.15.1. Unmitigated

Equipment Type	Fuel Type	Engine Tier	Number per Day	Hours Per Day	Horsepower	Load Factor

5.16. Stationary Sources

5.16.1. Emergency Generators and Fire Pumps

Equipment Type	Fuel Type	Number per Day	Hours per Day	Hours per Year	Horsepower	Load Factor
Emergency Generator	Diesel	1.00	0.00	25.0	2,011	0.73
Emergency Generator	Diesel	1.00	0.00	25.0	2,011	0.73

5.16.2. Process Boilers

Equipment Type	Fuel Type	Number	Boiler Rating (MMBtu/hr)	Daily Heat Input (MMBtu/day)	Annual Heat Input (MMBtu/yr)

5.17. User Defined

Equipment Type	Fuel Type

5.18. Vegetation

5.18.1. Land Use Change

5.18.1.1. Unmitigated

Vegetation Land Use Type	Vegetation Soil Type	Initial Acres	Final Acres

5.18.1. Biomass Cover Type

5.18.1.1. Unmitigated

Biomass Cover Type	Initial Acres	Final Acres

5.18.2. Sequestration

5.18.2.1. Unmitigated

Tree Type	Number	Electricity Saved (kWh/year)	Natural Gas Saved (btu/year)

6. Climate Risk Detailed Report

6.1. Climate Risk Summary

Cal-Adapt midcentury 2040–2059 average projections for four hazards are reported below for your project location. These are under Representation Concentration Pathway (RCP) 8.5 which assumes GHG emissions will continue to rise strongly through 2050 and then plateau around 2100.

Climate Hazard	Result for Project Location	Unit
Temperature and Extreme Heat	26.4	annual days of extreme heat
Extreme Precipitation	6.15	annual days with precipitation above 20 mm
Sea Level Rise	—	meters of inundation depth
Wildfire	45.4	annual hectares burned

Temperature and Extreme Heat data are for grid cell in which your project are located. The projection is based on the 98th historical percentile of daily maximum/minimum temperatures from observed historical data (32 climate model ensemble from Cal-Adapt, 2040–2059 average under RCP 8.5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Extreme Precipitation data are for the grid cell in which your project are located. The threshold of 20 mm is equivalent to about ¾ an inch of rain, which would be light to moderate rainfall if received over a full day or heavy rain if received over a period of 2 to 4 hours. Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.
Sea Level Rise data are for the grid cell in which your project are located. The projections are from Radke et al. (2017), as reported in Cal-Adapt (Radke et al., 2017, CEC-500-2017-008), and consider inundation location and depth for the San Francisco Bay, the Sacramento-San Joaquin River Delta and California coast resulting different increments of sea level rise coupled with extreme storm events. Users may select from four scenarios to view the range in potential inundation depth for the grid cell. The four scenarios are: No rise, 0.5 meter, 1.0 meter, 1.41 meters
Wildfire data are for the grid cell in which your project are located. The projections are from UC Davis, as reported in Cal-Adapt (2040–2059 average under RCP 8.5), and consider historical data of climate, vegetation, population density, and large (> 400 ha) fire history. Users may select from four model simulations to view the range in potential wildfire probabilities for the grid cell. The four simulations make different assumptions about expected rainfall and temperature are: Warmer/drier (HadGEM2-ES), Cooler/wetter (CNRM-CM5), Average conditions (CanESM2), Range of different rainfall and temperature possibilities (MIROC5). Each grid cell is 6 kilometers (km) by 6 km, or 3.7 miles (mi) by 3.7 mi.

6.2. Initial Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	N/A	N/A	N/A	N/A
Extreme Precipitation	1	0	0	N/A
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	1	0	0	N/A
Flooding	0	0	0	N/A
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A

Air Quality Degradation	N/A	N/A	N/A	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores do not include implementation of climate risk reduction measures.

6.3. Adjusted Climate Risk Scores

Climate Hazard	Exposure Score	Sensitivity Score	Adaptive Capacity Score	Vulnerability Score
Temperature and Extreme Heat	N/A	N/A	N/A	N/A
Extreme Precipitation	1	1	1	2
Sea Level Rise	N/A	N/A	N/A	N/A
Wildfire	1	1	1	2
Flooding	1	1	1	2
Drought	N/A	N/A	N/A	N/A
Snowpack Reduction	N/A	N/A	N/A	N/A
Air Quality Degradation	N/A	N/A	N/A	N/A

The sensitivity score reflects the extent to which a project would be adversely affected by exposure to a climate hazard. Exposure is rated on a scale of 1 to 5, with a score of 5 representing the greatest exposure.
The adaptive capacity of a project refers to its ability to manage and reduce vulnerabilities from projected climate hazards. Adaptive capacity is rated on a scale of 1 to 5, with a score of 5 representing the greatest ability to adapt.
The overall vulnerability scores are calculated based on the potential impacts and adaptive capacity assessments for each hazard. Scores include implementation of climate risk reduction measures.

6.4. Climate Risk Reduction Measures

7. Health and Equity Details

7.1. CalEnviroScreen 4.0 Scores

The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Exposure Indicators	—

AQ-Ozone	35.2
AQ-PM	0.31
AQ-DPM	4.28
Drinking Water	38.8
Lead Risk Housing	28.6
Pesticides	81.1
Toxic Releases	2.49
Traffic	6.88
Effect Indicators	—
CleanUp Sites	74.2
Groundwater	81.9
Haz Waste Facilities/Generators	61.6
Impaired Water Bodies	51.2
Solid Waste	94.6
Sensitive Population	—
Asthma	38.9
Cardio-vascular	75.4
Low Birth Weights	—
Socioeconomic Factor Indicators	—
Education	35.9
Housing	26.7
Linguistic	16.4
Poverty	63.0
Unemployment	69.1

7.2. Healthy Places Index Scores

The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

Indicator	Result for Project Census Tract
Economic	—
Above Poverty	33.8380598
Employed	9.713845759
Median HI	26.87026819
Education	—
Bachelor's or higher	50.58385731
High school enrollment	9.739509817
Preschool enrollment	57.97510586
Transportation	—
Auto Access	29.34684974
Active commuting	57.82112152
Social	—
2-parent households	22.26356987
Voting	81.81701527
Neighborhood	—
Alcohol availability	82.42012062
Park access	23.88040549
Retail density	4.850506865
Supermarket access	37.91864494
Tree canopy	94.49505967
Housing	—
Homeownership	59.04016425
Housing habitability	56.79455922
Low-inc homeowner severe housing cost burden	51.12280252
Low-inc renter severe housing cost burden	51.9183883
Uncrowded housing	76.50455537

Health Outcomes	—
Insured adults	49.23649429
Arthritis	0.0
Asthma ER Admissions	66.9
High Blood Pressure	0.0
Cancer (excluding skin)	0.0
Asthma	0.0
Coronary Heart Disease	0.0
Chronic Obstructive Pulmonary Disease	0.0
Diagnosed Diabetes	0.0
Life Expectancy at Birth	16.5
Cognitively Disabled	5.5
Physically Disabled	24.6
Heart Attack ER Admissions	18.4
Mental Health Not Good	0.0
Chronic Kidney Disease	0.0
Obesity	0.0
Pedestrian Injuries	60.6
Physical Health Not Good	0.0
Stroke	0.0
Health Risk Behaviors	—
Binge Drinking	0.0
Current Smoker	0.0
No Leisure Time for Physical Activity	0.0
Climate Change Exposures	—
Wildfire Risk	45.0
SLR Inundation Area	0.0

Children	77.6
Elderly	17.9
English Speaking	90.4
Foreign-born	2.3
Outdoor Workers	36.2
Climate Change Adaptive Capacity	—
Impervious Surface Cover	89.7
Traffic Density	8.0
Traffic Access	0.0
Other Indices	—
Hardship	55.2
Other Decision Support	—
2016 Voting	54.2

7.3. Overall Health & Equity Scores

Metric	Result for Project Census Tract
CalEnviroScreen 4.0 Score for Project Location (a)	50.0
Healthy Places Index Score for Project Location (b)	34.0
Project Located in a Designated Disadvantaged Community (Senate Bill 535)	No
Project Located in a Low-Income Community (Assembly Bill 1550)	Yes
Project Located in a Community Air Protection Program Community (Assembly Bill 617)	No

a: The maximum CalEnviroScreen score is 100. A high score (i.e., greater than 50) reflects a higher pollution burden compared to other census tracts in the state.
b: The maximum Health Places Index score is 100. A high score (i.e., greater than 50) reflects healthier community conditions compared to other census tracts in the state.

7.4. Health & Equity Measures

No Health & Equity Measures selected.

7.5. Evaluation Scorecard

Health & Equity Evaluation Scorecard not completed.

7.6. Health & Equity Custom Measures

No Health & Equity Custom Measures created.

8. User Changes to Default Data

Screen	Justification
Construction: Off-Road Equipment	Fix later with Garry
Operations: Emergency Generators and Fire Pumps	—

Attachment C
Biological Resources Report

Lcscd,

Biological Report

Lake Shastina Community Services Infrastructure Improvement Project Lake Shastina, California

Prepared for:

Lake Shastina Community Services

February 2023

520022.500

Phone: (707) 822-5785 Email: info@shn-engr.com
Web: shn-engr.com • 1062 G Street, Ste. I, Arcata, CA 95521-5800

Biological Report

Lake Shastina Community Services Infrastructure Improvement Project Lake Shastina, California

Prepared for:

Lake Shastina Community Services

Prepared by:

SHN

350 Hartnell Ave. Suite B
Redding, CA 96002-1875
530-221-5424

February 2023

QA/QC: ___
Reference: 520022.500

Table of Contents

List of Illustrations

Abbreviations and Acronyms

Units of Measure

F	Fahrenheit
ft	feet
km	kilometer
m	meter

Additional Terms

APN	Assessor's Parcel Number
BIOS	Biogeographical Information and Observation System
BMP	best management practices
C	candidate
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CEQA	California Environmental Quality Act
CESA	California Endangered Species Act
CFGC	California Fish and Game Code
CFR	Code of Federal Regulations
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CRPR	California Rare Plant Rank
CT	candidate threatened species status
CWA	Clean Water Act
D	delisted species status
DPS	distinct population segment/species status
E	endangered species status
EPA	United States Environmental Protection Agency
ESU	evolutionarily significant unit/species status
FESA	Federal Endangered Species Act
FP	fully protected species status
G	Global
G1/S1	critically imperiled species heritage rank
G2/S2	imperiled species heritage rank
G3/S3	vulnerable species heritage rank
G4/S4	apparently secure species heritage rank
G5/S5	secure species heritage rank
GIS	Geographic Information Systems
IPaC	Information for Planning and Conservation
LSA	Lake and Streambed Alteration
LSCSD	Lake Shastina Community Services District
MBTA	Migratory Bird Treaty Act
NCCP	Natural Community Conservation Planning
NEPA	National Environmental Policy Act
NL	not listed
NMFS	National Marine Fisheries Service
NOAA	National Oceanic and Atmospheric Administration

Abbreviations and Acronyms (cont'd)

NPPA	Native Plant Protection Act
NT	Near threatened species status
PT	proposed threatened species status
RWQCB	Regional Water Quality Control Board
S	State
SSC	species of special concern
SWRCB	State Water Resources Control Board
T	threatened species status
U.S.	United States
USACE	United States Army Corps of Engineers
USC	United States Code
USDA	United States Department of Agriculture
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VegCAMP	Vegetation Classification and Mapping Program
WDR	Waste Discharge Requirement
WL	watch list species status

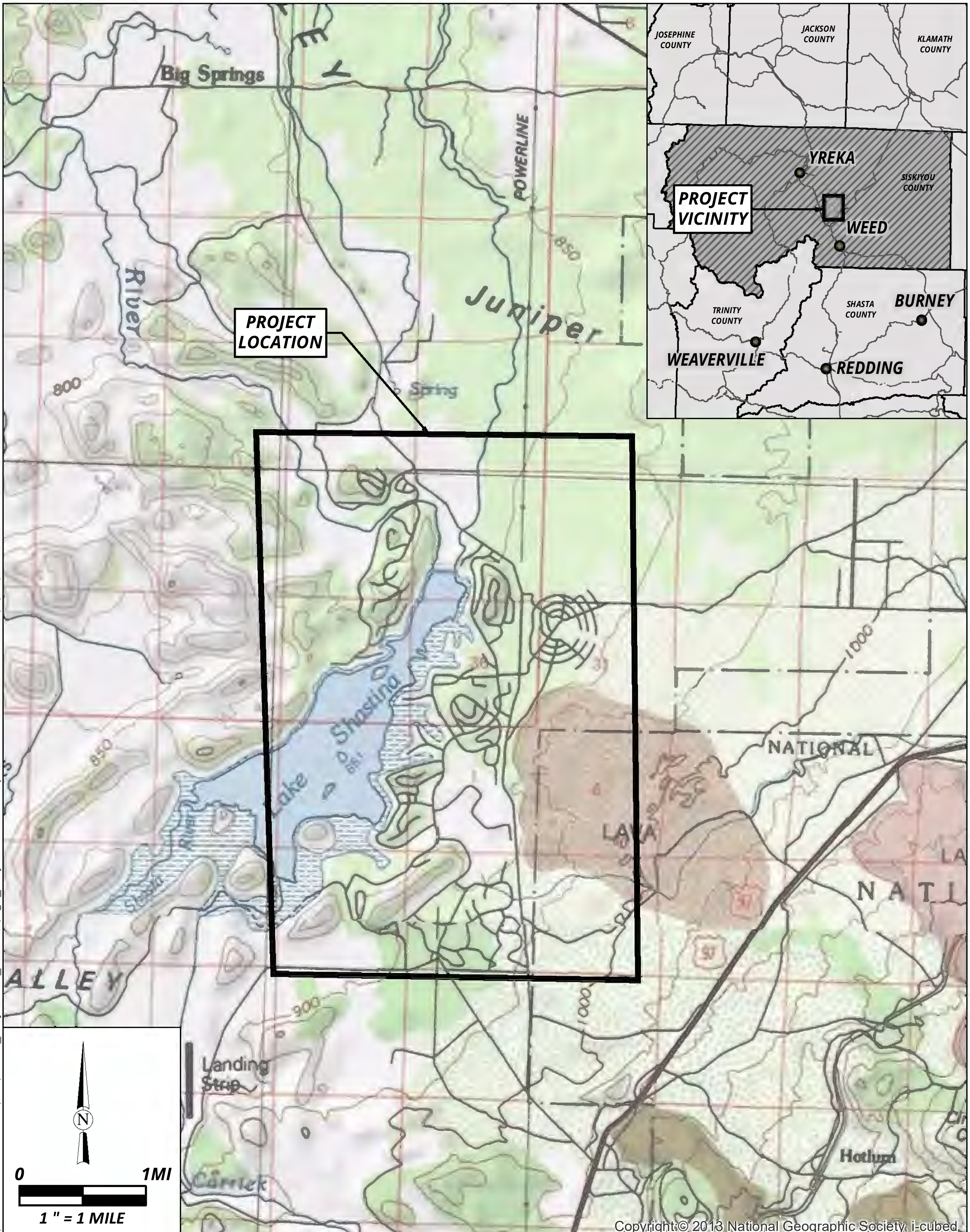
1.0 Introduction

SHN has conducted literature review, special-status animal species surveys, and habitat assessments to determine biological resources present and potential to occur in the vicinity of the Lake Shastina Community Services District (LSCSD) upgrades to their water meters, fire hydrants, water tanks, wells, and construction of one small pump station. This Biological Report is intended to provide biological resources information for planning and permitting purposes. Fieldwork was performed by an SHN staff biologist with over five years of experience.

1.1 Project Location

The project is located approximately five miles northeast of Weed, California, and 300 feet west of A29/Big Springs Road within Siskiyou County (Figure 1). The study area is in Township 43 North, Range 5 West, Sections 1, 2, 11, 12, 25, 26, 31, 35, and 36, Mount Diablo Meridian. The proposed activities are located within the following Assessor's Parcel Numbers (APNs) along with a brief description of the locations:

- Water tank 4 location APN: 020-071-270-000, LSCSD owned, Dead end of Tennis Court. See Appendix 1, Photo 4.
- Water tank 3 location APN: 108-200-120-000, LSCSD owned, Legal Description: Unit 9-2 Lot 238 Lake Shastina, west side of Stone Crest Drive near the southern dead end. See Appendix 1, Photo 3.
- Water tank 2 location APN: 106-380-450-000, LSCSD owned, Legal Description: Unit 4 Por Stag St & Deer Mtn Rd Lot 43 Lake Shastina, where Stag Street and Stag Mountain Road split. See Figure 2 and Figure 3-1.
- Water tank 1 location APN: 106-190-150-000, LSCSD owned, Legal Description: Unit 3 Par F Lake Shastina, Juniper Peak Rd is to the west and Windmill Dr is to the east. See Figure 2 and 3-1.
- Test Well 12 site location APN: 020-071-430-000, private resident, where Lake Shore Drive and Cottonwood Drive meet up and end. See Appendix 1, Photo 5, and Figure 2.
- Test Well 11 site location APN: 020-280-280-000, LSCSD owned, where Lake Shore Drive meets Big Springs Rd on the north side of the lake, the parcel is north east by 0.03 miles. See Figure 2.
- Place a temporary water tank outside of pump station 53 on APN: 107-080-270-000, LSCSD owned, legal description: Unit 5 Lots 8 & 9 One OR 98 9949 Lake Shastina. See Appendix 1, Photo 1 and Figure 2.
- New pump station would be placed where the demolished pump station #52 use to be (near fire hydrant 190): APN: 107-450-550-000 (east side of Elk Trail Rd), LSCSD owned, Legal description: Unit 7-2 Incl Por Puma Dr Cottontail Dr Elk Trail & All Fox Ct Lake Shastina See Appendix 2, Photo 10 and Figure 3.
- 319 fire hydrant replacements throughout the project area within Township 43 North, Range 5 West, sections 35, 26, 25, 31, 36, 1, 12, 11, 2, Mount Diablo Meridian, Siskiyou county. See Figure 4.



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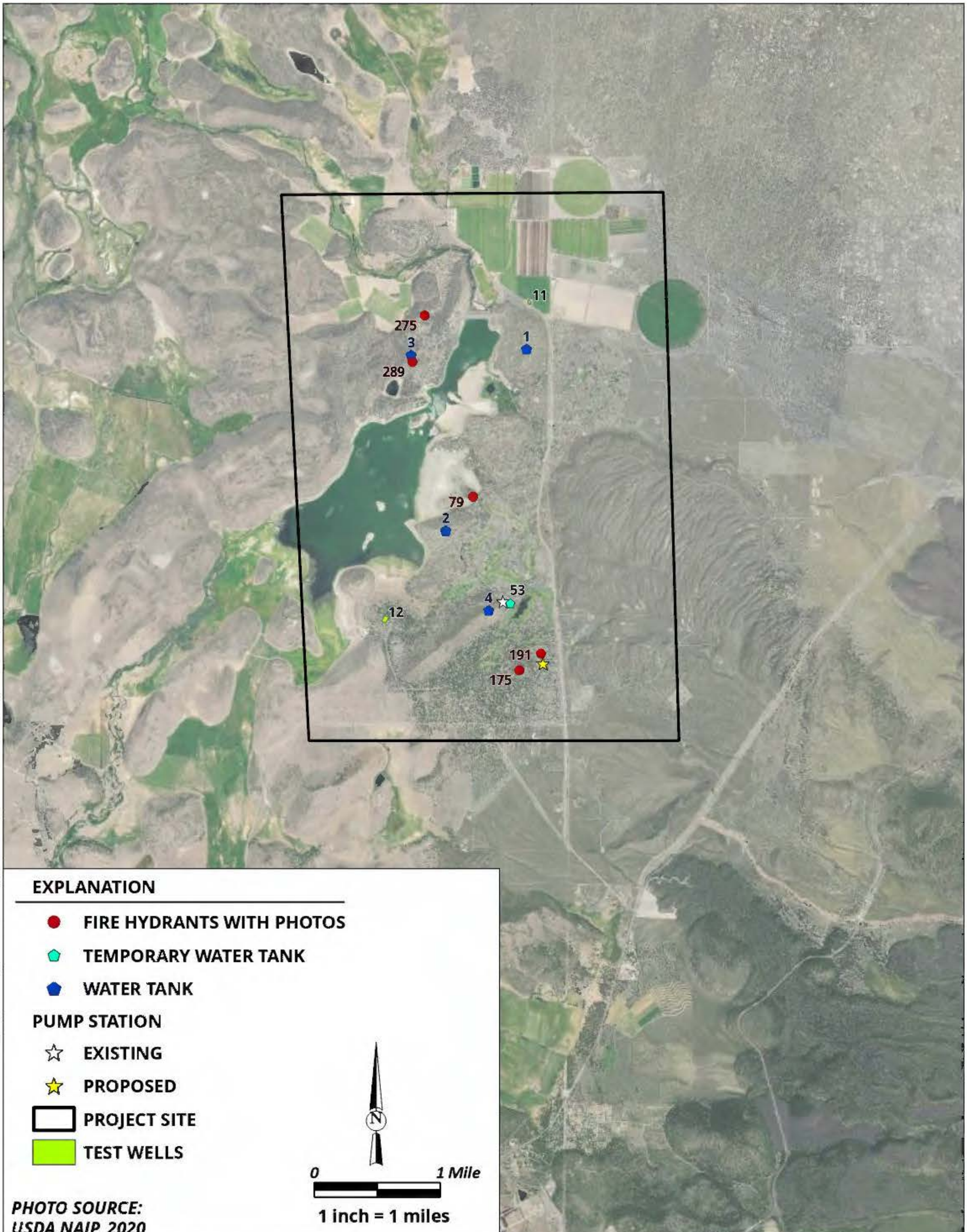
Lake Shastina Community Services
Infrastructure Improvements Biological Report
Weed, California

Project Location Map

December 2022 - 520022

Figure 1



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SHN

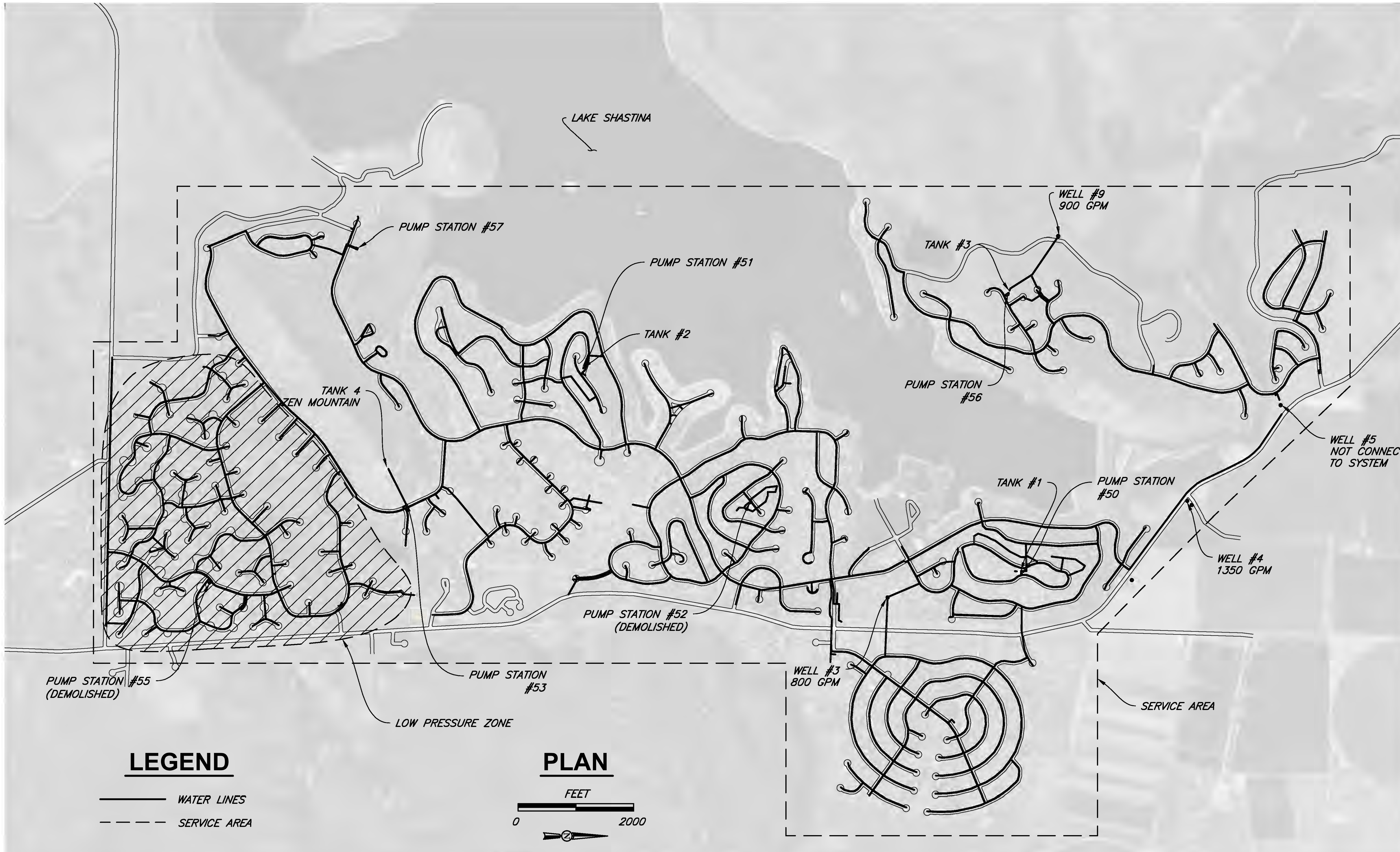
Lake Shastina Community Services District
Biological CEQA Assessment
Weed, California

Utility Upgrades and Construction

February 2023 - 520022

Figure

2



SHN	Lake Shastina CSD Drinking Water System Improvements Lake Shastina, CA	Existing Conditions SHN 520022
August 2021	520022-LSCSD-FIGS	Figure 3-1

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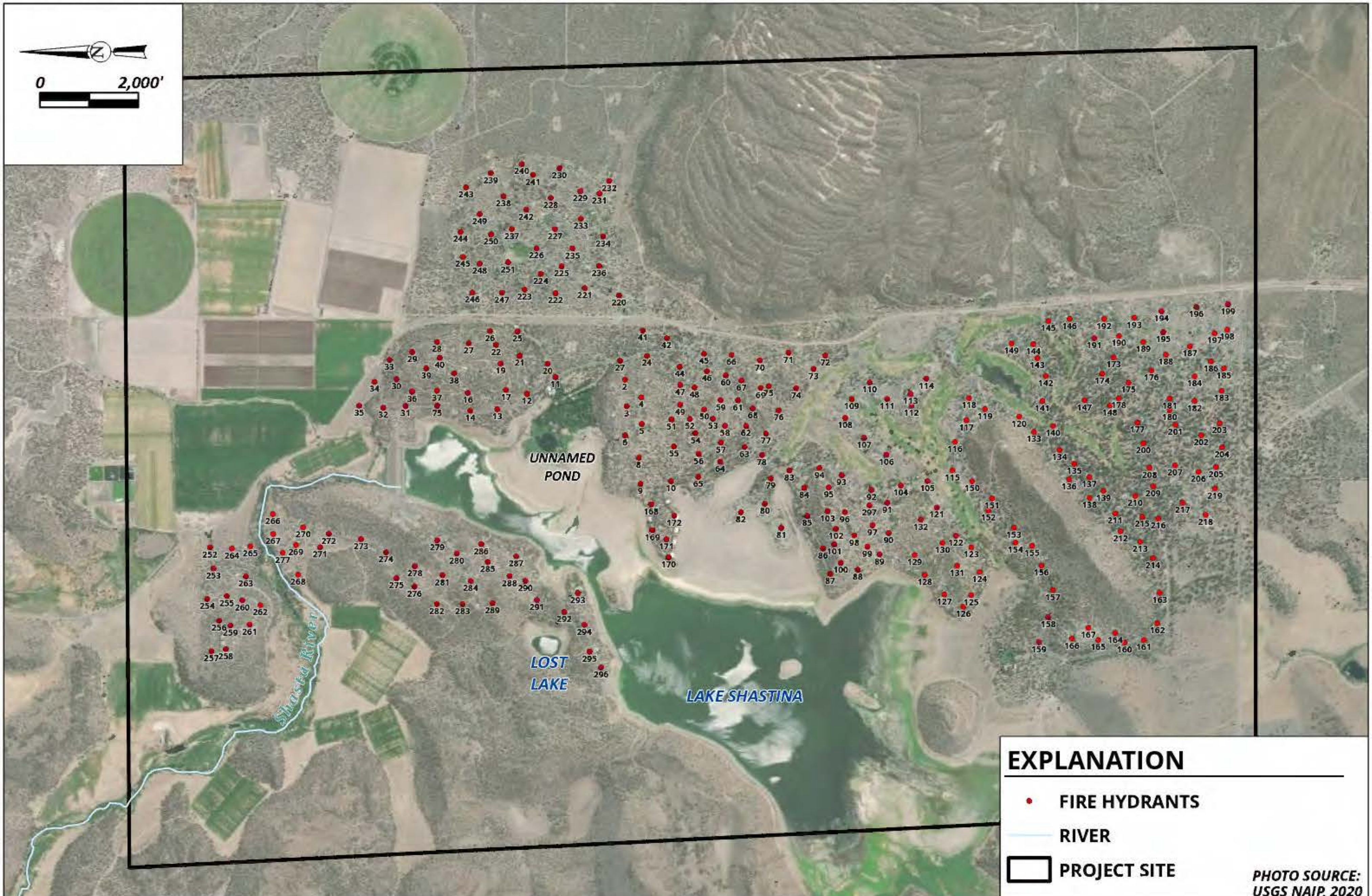

Lake Shastina Community Services District Biological CEQA Assessment Weed, California	**Fire Hydrant Upgrades** December 2022 - 520022	**Figure** **4**

1.2 Pro

LSCSD is planning to make upgrades to all water meters and fire hydrants throughout the project site. The water meters will be replaced with automatic sensor meters and no ground disturbance will be required at these locations. The fire hydrants will need to be replaced to the elbow joint in the ground. Soil disturbance within 10 feet of each fire hydrant and a few inches of depth is expected with the use of a backhoe and hand tools, within negligible vegetation or bare ground (See Figure 4).

- LSCSD proposes to make upgrades to water tanks 1, 2, 3, and 4. Water tanks 1, 2, and 3 will be painted and water tank 4 will be replaced with a larger tank to keep up with the water demands of the area. A crane and truck will be used to move and transport water tanks. Pump station 53 will house a temporary water tank outside of the pump station while tank 4 is being replaced (See Figure 2).
- A new test well 12 will be drilled (on APN 020-280-280-000; See Figure 2).
- A new test well 11 will be drilled next to existing test wells (on APN 020-280-280-000).
- A new pump house station will be constructed (on APN 107-450-550-000) to allow better water pressure to residents in that area. Soil disturbance and minor vegetation removal by using a backhoe and hand tools within 20 feet of the area will occur.

This plan will not involve vegetation or soil disturbance within 50 feet of a stream or drainage and will not have hydrological impacts to any adjacent jurisdictional (Regional Water Quality Control Board [RWQCB] or California Department of Fish and Wildlife [CDFW]) features. Minor soil disturbance would be required at several locations that vary from 170 feet to 5,000 feet away from the riparian habitat to replace fire hydrants, water tank 4, and the new pump house station.

1.3 Site Description

The study area is situated between approximately 2,680 and 3,230 feet (ft) above the mean sea level, with the highest elevations represented at the most south eastern corner of the study area where Jackson Ranch Road and A29/Big Springs Road meet. The residential areas that surround half of Lake Shastina was created because of the construction of the Dwinnell Dam with Shasta River flowing north from the north tip of the lake. The residential area within the study area has been under development for the past 54 years with road, underground power, water, and sewage improvements brought to the area to house around 2,400 residents. The habitat within the project area consists of rural residential development with managed landscapes. The areas not landscaped with fescue grasses and maples are sparse shrubs consisting of rabbitbrush (*Chrysothamnus* sp.) and manzanita (*Arctostaphylos* sp.), mixed with Western juniper (*Juniperus occidentalis*) and ponderosa pine (*Pinus ponderosa*).

2.0 Methods

2.1 Literature Review

This Biological Report includes a review of pertinent literature on habitat characteristics of the site, and a review of information related to special-status plant and animal species that could potentially use the described habitats.

The findings for this report are a result of several sources, including a review of existing literature regarding sensitive resources that have the potential to occur within the site. Resources for this determination included:

- California Natural Diversity Database (CNDDB) query for the Lake Shastina and surrounding United States Geological Survey (USGS) 7.5-minute topographic quadrangles (Lake Shastina, Juniper Flat, Gazelle, Montague, Little Shasta, Solomons Temple, China Mountain, Weed, and Hotlum; CDFW, 2022a)
- Biogeographical Information and Observation System (BIOS; CDFW, 2022b)
- Electronic Inventory of Rare and Endangered Vascular Plants of California (California Native Plant Society [CNPS], 2022a), queried for a list of all botanical species reported for the Lake Shastina and surrounding USGS 7.5-minute topographic quadrangles
- Special Animals of California List (CDFW, 2022c)
- United States Fish and Wildlife Service (USFWS) Information for Planning and Consultation (IPaC) was queried for threatened, endangered, proposed, and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of the proposed project and/or may be affected by the proposed project (USFWS, 2022a)
- USFWS Critical Habitat Mapper (USFWS, 2022b)

From the database queries, a list of potential target species for the study area was compiled. Tables 1 and 2 in Appendix 2 include botanical and animal species reported by the CNDDB and USFWS, and species listed in the CNPS inventory of rare plants.

2.2 Field Observations and Studies

An SHN biologist conducted a site visit on June 22, 2022 for biological surveys and habitat assessments. A total of seven hours of surveying occurred. A survey was conducted to identify all species present within the project-related study areas, including possible special-status species. In addition to surveying for target species, lists of all botanical and animal species encountered were compiled and included in Appendix 3. As this field visit was reconnaissance level, the survey was not conducted according to CDFW protocol as outlined in *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Sensitive Natural Communities* (CDFW, 2018). Pre-construction protocol surveys are included in Section 7 Recommendations.

Site photographs from the site visit are included in Appendix 1.

3.0 Environmental Setting

The average annual 29 years precipitation data from the Mount Shasta Area from 1991 to 2020 is 36.03 inches (National Oceanic and Atmospheric Administration [NOAA], 2022) with most precipitation occurring between November and April. Temperatures in the Lake Shastina range from an average low of 28 degrees Fahrenheit (F) in December to an average high of 85 F in July; extremes in temperatures are relatively uncommon.

3.1 Hydrology

The project location is within the Shasta River watershed (hydrologic unit code 18010207; See Figure 4). Snowmelt from Mount Shasta contributes significantly to surface runoff and groundwater hydrology. Water from melted snow percolates down through porous volcanic rocks and flows subsurface, eventually emerging as springs and seeps on the valley margin or floor. (Normandeau Associates, Inc., 2022). The study area contains four hydrology types: one lake (Lake Shastina), two freshwater ponds, and one river (Shasta River). Lake Shastina is a 1,613.31-acre lake that is classified as L1UBHh (lacustrine, limnetic, unconsolidated bottom, permanently flooded, and diked). Lost Lake, which is one of the freshwater ponds, is 10.41 acres and situated 0.28 miles west of Lake Shastina and is classified as a PABG (palustrine, aquatic bed, and intermittently exposed). The unnamed freshwater pond that is located within the northeast mouth of Lake Shastina, is 2.94 acres and classified as a PABGx (palustrine, aquatic bed, intermittently exposed, and excavated). The Shasta River enters Lake Shastina in the southwest corner and flows/exists through the riverine north of Lake Shastina. After 0.5 miles due north, the river flows northwest towards the Klamath River. Shasta River has various classifications within the study area that include R3UBH (riverine, upper perennial, unconsolidated bottom, permanently flooded), PEM1C (palustrine, emergent, persistent, seasonally flooded), PSSC (palustrine, scrub-shrub, seasonally flooded), PEM1A (palustrine, emergent, persistent, and temporary flooded), PEM1Ch (palustrine, emergent, persistent, seasonally flooded, diked), and PFOC (Palustrine, forested, and seasonally flooded) (USFWS, 2022c).

Lake Shastina has a large seepage rate to the groundwater basin beneath the Shasta River to the northwest. The Montague canal from Lake Shastina also has a high seepage rate (estimated as 25% of the canal flow) that recharges the groundwater between Lake Shastina and Montague. There is also considerable recharge from the irrigated pastures and alfalfa fields in other parts of Shasta Valley (CDFW, 2022e).

3.2 Geology and Soils

Geology within the location is a terrain built on deposits of lava flow from the eruption of ancestral Mt. Shasta, with slopes between 0 and 65 percent in the study area. The lava flows also developed the small hills just east of U.S. Highway 5 that spans from Weed to Yreka. To the west of U.S. Highway 5 are the Klamath Mountains, which comprise of ocean floor crust and sediment. Mount Shasta can be seen to the south east of Weed and has developed during the past 250,000 years in a series of eruptive episodes (Christiansen et al., 2017). The top three soils within the project area consist of Delaney sand, Delaney gravelly sand, and Mary-Rock outcrop complex. (See Appendix 4 Soils Map; United States Department of Agriculture [USDA]-Natural Resources Conservation Service [NRCS], 2022; McLaughlin and Harradine, 1965). Delaney sand (129), which occurs on 0 to 9 percent slopes and is somewhat excessively drained, Delaney gravelly sand (130) occurs on 0 to 9 percent slopes and is somewhat excessively drained, and Mary-Rock (188) outcrop complex which occurs on 2 to 50 percent slopes are well drained. The 18 different soil types within the study area range from very poorly drained (Gazelle silt loam) to excessively drained (rock outcrop and Lithic Haploxerolls-Rock outcrop complex; Hirt, 1995). The soils support residential homes, agricultural fields, a lake, ponds, rivers, scrub-shrub, mixed-conifer, and rocky outcrop habitats.

3.3 Vegetation

Vegetation composition varies across the study area. On the east side of the study area is cultivated crop land of alfalfa hay. The southeast portion of the study area contains the majority of the scrub-shrub habitat, consisting of rabbitbrush and manzanita. The subdivision residential areas around the lake are mixed with ponderosa pine, western juniper, and rocky outcrops surrounding Lake Shastina. The northern part of the study area contains Shasta River, which creates willow (*Salix*) and wetland habitats.

3.4 Wildlife Habitats

Common wildlife species expected on the site are those associated with northern California disturbed residential areas with small parcels of wet meadows, willow, ponderosa pine, western juniper, manzanita, and rabbitbrush. Lake Shastina provides foraging opportunity for special-status birds such as Osprey and Bald Eagle. Osprey were observed during the June 22, 2022 visit in the northern area near the Shasta River. No osprey nests were observed. Bald Eagles were not observed, nor bald eagle nests during the first assessment. Other wildlife species observed at the site included the Canada Goose (*Branta canadensis*), American goldfinch (*Spinus tristis*), Turkey vulture (*Cathartes aura*), Black-capped chickadee (*Poecile atricapillus*), and California scrub jay (*Aphelocoma californica*), among others (see Appendix 3, Table 1). Other wildlife species are likely to inhabit the surrounding area and it is expected that there are many other bird, mammal, and amphibian species that might use the project site, if only transitionally (see Appendix 2, Table 1 for special-status species reported within the vicinity). Human activities within the roadside, residential, and public utility portions of the study area may limit the abundance of a variety of birds and animals within those areas. See Section 5.4 for more special-status habitat descriptions observed within the study area.

3.5 Offsite Conditions

Offsite conditions are like those found within the study area; disturbed residential areas with pockets of rabbitbrush-manzanita shrub, ponderosa pine-western juniper evergreen mix, crop land of alfalfa hay, and willows/wetland vegetation in the Shasta River areas.

4.0 Regulatory Setting

Regulatory authority over biological resources is shared by federal, State, and local authorities under a variety of legislative acts. The following section summarizes the federal, State, and local regulations for special-status species, jurisdictional waters of the U.S. and State of California, and other sensitive biological resources. This section provides a listing and overview of these federal, State, and local laws.

4.1 Federal Laws

4.1.1 Clean Water Act Sections 404 and 401

Under Section 404 (33 U.S. Code (USC) 1341) of the Clean Water Act (CWA), as amended, the United States Army Corps of Engineers (USACE) retains primary responsibility for permits to discharge dredged or fill material into waters of the U.S. All discharges of dredged or fill material into jurisdictional waters of the U.S. that result in permanent or temporary losses of waters of the U.S. are regulated by the (U.S. Environmental Protection Agency [EPA], 2008). A permit from the USACE must be obtained before placing fill or grading in wetlands or other waters of the U.S., unless the activity is exempt from CWA Section 404 regulation (for example, certain farming and forestry activities). The USACE defines wetlands as "those areas that are inundated or saturated by surface or ground water at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions" (Environmental Laboratory, 1987). In other words, the USACE defines wetlands by the presence of all three wetland indicators: hydrophytic vegetation, hydric soils, and wetland hydrology.

Waters of the U.S. are defined in 33 Code of Federal Regulations (CFR) Part 328. They include traditional navigable waters; relatively permanent, non-navigable tributaries of traditional navigable waters; and certain wetlands. Following recent court cases, the EPA and USACE published a memorandum entitled

"Clean Water Act Jurisdiction" (EPA/USACE, 2008) to guide the determination of jurisdiction over waters of the U.S., especially for wetlands. The applicability of Section 404 permitting over discharges to wetlands is, therefore, a two-step process: 1) determining the areas that are wetlands, and 2) where a wetland is present, assessing the wetland's connection to traditional navigable waters and nonnavigable tributaries to determine whether the wetland is jurisdictional under the CWA. A wetland is considered jurisdictional if it meets certain specified criteria. The USACE is required to consult with the USFWS and/or National Marine Fisheries Service (NMFS) under Section 7 of the Federal Endangered Species Act (FESA) if the action subject to CWA permitting could result in "Take" of federally listed species or an adverse effect to designated critical habitat. The project is within the jurisdiction of the San Francisco District of the USACE.

Section 401 of the CWA (33 USC 1341; EPA, 1977) 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 U.S. 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, that the discharge will comply with the applicable effluent limitations and water quality standards. A certification obtained for the construction of any facility must also pertain to the subsequent operation of the facility. The responsibility for the protection of water quality in California rests with the State Water Resources Control Board (SWRCB) and its nine RWQCBs. The project is within the jurisdiction of the North Coast RWQCB.

4.1.2 Fish and Wildlife Coordination Act

The Fish and Wildlife Coordination Act (16 USC Sections 661-667e, as amended, 1958, 1978, 1994, and 1995) requires that whenever waters, the channel of a stream, or other body of water are proposed or authorized to be modified by a public or private agency under a federal license or permit, the federal agency must first consult with the USFWS and/or NMFS and with the head of the agency exercising administration over the wildlife resources of the state where construction will occur (in this case, the CDFW). These guidelines aim at conservation of birds, fish, mammals, and all other classes of wild animals, and all types of aquatic and land vegetation upon which wildlife is dependent (USFWS, 1934). If direct permanent impacts occur to waters of the U.S. from a proposed project, then a permit from USACE under CWA Section 404 is required for the construction of the proposed project. USACE is required to consult with USFWS and/or NMFS as appropriate regarding potential impacts to federally-listed species under FESA. Such action may prompt consultation with CDFW, which would review the project pursuant to California Endangered Species Act (CESA) and issue a consistency letter with USFWS and/or NMFS, if required.

4.1 eral Endangered Species Act

The United States Congress passed the FESA in 1973 to protect species that are endangered or threatened with extinction (USACE/EPA, 1973). The FESA is intended to operate in conjunction with the National Environmental Policy Act (NEPA) to help protect the ecosystems upon which endangered and threatened species depend and within which they live. The USFWS and the NMFS are the designated federal agencies responsible for administering the FESA. The FESA prohibits the "Take" of endangered or threatened wildlife species. A "Take" is defined as harassing, harming (including significantly modifying or degrading habitat), pursuing, hunting, shooting, wounding, killing, trapping, capturing, or collecting wildlife species, or any attempt to engage in such conduct (16 USC 1531, 50 CFR 17.3). An activity can be defined as a "Take" even if it is unintentional or accidental. Taking can result in civil or criminal penalties. Activities that could result in "Take" of a federally-listed species require an incidental "Take" authorization resulting from FESA Section 7 consultation or FESA Section 10 consultation. Plants are legally protected under the FESA only if "Take" occurs on federal land or from federal actions, such as, issuing a wetland fill permit. A federal endangered species is one that is considered in danger of becoming extinct throughout all, or a significant portion, of its range. A federal threatened species is one that is likely to become endangered in the foreseeable future. The USFWS also maintains a list of species proposed for listing as threatened or endangered. Proposed species are those for which a proposed rule to list as endangered or threatened has been published in the Federal Register. In addition to endangered, threatened, and proposed species, the USFWS maintains a list of candidate species. Candidate species are those for which the USFWS has on file sufficient information to support issuance of a proposed listing rule.

Pursuant to the requirements of the FESA, an agency reviewing a proposed project within its jurisdiction must determine whether any federally-listed endangered or threatened species may be present in the project area and determine whether the proposed project will have a potentially significant impact on such a species. In addition, the agency is required to determine whether the project is likely to jeopardize the continued existence of any species proposed to be listed under the FESA or result in the destruction or adverse modification of critical habitat designated or proposed to be designated for such species (16 USC 1536[3], [4]). Project-related impacts to species on the FESA endangered or threatened list would be considered significant and would require mitigation.

4.1.4 Migratory Bird Treaty Act

The federal Migratory Bird Treaty Act (MBTA) of 1918 makes it unlawful to take, possess, buy, sell, purchase, or barter any migratory bird listed in CFR Part 10, including feathers or other parts, nests, eggs, or products, except as allowed by implementing regulations (50 CFR 21; USFWS, 1918). The MBTA also prohibits disturbance and harassment of nesting migratory birds at any time during their breeding season. The USFWS is responsible for enforcing the MBTA (16 USC 703). The migratory bird nesting season is generally considered to be between March 15 and August 15 within the study region.

4.2 State Laws

4.2.1 Porter-Cologne Water Quality Control Act

The state and RWQCB also maintain independent regulatory authority over the placement of waste, including fill, into waters of the state under the Porter-Cologne Water Quality Control Act (SWRCB, 1969). Waters of the state are defined by the Porter-Cologne Water Quality Control Act as "any surface water or groundwater, including saline waters, within the boundaries of the state." The SWRCB protects all waters in its regulatory scope but has special responsibility for isolated wetlands and headwaters. These water bodies might not be regulated by other programs, such as, Section 404 of the CWA. Waters of the state are regulated by the RWQCBs under the State Water Quality Certification Program, which regulates discharges of dredged and fill material under Section 401 of the CWA and the Porter-Cologne Water Quality Control Act. Projects that require an USACE permit, or fall under other federal jurisdiction, and have the potential to impact waters of the state are required to comply with the terms of the Water Quality Certification Program. If a proposed project does not require a federal license or permit but does involve activities that may result in a discharge of harmful substances to waters of the state, the RWQCBs have the option to regulate such activities under their state authority in the form of Waste Discharge Requirements (WDRs) or certification of WDRs.

4.2.2 California Endangered Species Act

The State of California enacted the CESA in 1984 (CDFW, 1984). The CESA is similar **to the FESA, but** pertains to state-listed endangered and threatened species. Under the CESA, the CDFW has the responsibility for maintaining a list of threatened and endangered species designated under state law (California Fish and Game Code [CFGC] 2070; CDFW, 1998). Section 2080 of the CFGC prohibits "Take" of any species that the commission determines to be an endangered or threatened species. "Take" is defined in Section 86 of the CFGC as "to hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill."

The state and federal lists of threatened and endangered species are generally similar; however, a species present on one list may be absent from the other. CESA regulations are also somewhat different from the FESA in that the California regulations include threatened, endangered, and candidate plants on non-federal lands within the definition of "Take." CESA allows for "Take" incidental to otherwise lawful development projects. Pursuant to the requirements of the CESA, an agency reviewing a proposed project within its jurisdiction must determine whether any state-listed endangered or threatened species may be present in the project area and determine whether the proposed project will have a potentially significant impact on such species. Project-related impacts to species on the CESA endangered or threatened list (or, in addition, designated by the CDFW as a Species of Special Concern [SSC], which is a level below threatened or endangered status) would be considered significant and would require mitigation.

4.2.3 Native Plant Protection Act

The Native Plant Protection Act (NPPA; Sec. 1900-1913 of the CFGC) was enacted in 1977 and allows the Fish and Game Commission to designate plants as rare or endangered. The NPPA precedes the CESA. Statewide, there are 64 species, subspecies, and varieties of plants that are protected as rare under the NPPA. The NPPA prohibits take of endangered or rare native plants, but includes some exceptions for agricultural and nursery operations, emergencies, and after properly notifying CDFW for vegetation removal from canals, roads, and other sites, changes in land use, and in certain other situations. Plants listed as rare or endangered under the NPPA should be considered during project review as if they were listed under the CESA. Appendix 2 includes potentially-occurring endangered or rare native plants that may occur in the project area (including CNPS lists).

4.2.4 California Environmental Quality Act

California Environmental Quality Act (CEQA) Guidelines Sections 15125(c) and 15380(d) provide that a species not listed on the federal or State list of protected species may be considered rare or endangered if the species can be shown to meet certain specified criteria (CNRA, 1970). Thus, CEQA provides the ability to protect a species from potential project impacts until the respective government agencies have an opportunity to designate the species as protected, if warranted. CNPS maintains an inventory of plant species native to California, with populations that are significantly reduced from historical levels, occur in limited distribution, or otherwise are rare or threatened with extinction. This information is published in the Inventory of Rare and Endangered Plants of California (CNPS, 2022a). Taxa with a California Rare Plant Rank (CRPR) of 1A, 1B, 2A, 2B, and 3 in the CNPS inventory consist of plants that are eligible for state listing and meet the definition of Rare or Endangered under CEQA Guidelines Sections 15125(c) and 15380(d). CRPR 4 populations may qualify for consideration under CEQA if they are peripheral or disjunct populations, represent the type of locality of the species, or exhibit unusual morphology and/or occur on unusual substrates. Additionally, CDFW maintains lists of special-status animals and plants. These lists include a species conservation ranking status from multiple sources, including FESA, CESA, federal departments with unique jurisdictions, CNPS, and other non-governmental organizations. Based on these sources, CDFW assigns a heritage rank to each species according to their degree of imperilment (as measured by rarity, trends, and threats). These ranks follow NatureServe's Heritage Methodology, in which all species are listed with a G (global) and S (state) rank. Species with state ranks of S1-S3 are also considered highly imperiled. CEQA checklist IV(b) calls for the consideration of riparian habitats and 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, or by the CDFW (that is, the CNDDB and Vegetation Classification and Mapping Program [VegCAMP]) or the USFWS. Impacts to sensitive natural communities and habitats must be considered and evaluated under CEQA (California Code of Regulations [CCR]: Title 14, Div. 6, Chap. 3).

Although sensitive natural communities do not (at present) have legal protection, CEQA calls for an assessment of whether any such resources would be affected and requires a finding of significance if there will be substantial losses. High-quality occurrences of natural communities with heritage ranks of 3 or lower are considered by CDFW to be significant resources and fall under the CEQA guidelines for addressing impacts. Local planning documents (such as general plans) often identify these resources as well. Avoidance, minimizations, or mitigation measures should be implemented if project-affected stands of rare vegetation types or natural communities are considered high-quality occurrences of the given community. As a trustee agency under CEQA, CDFW reviews potential project impacts to biological resources, including wetlands. In accordance with the CEQA thresholds of significance for biological resources, areas that meet the state criteria for wetlands and could be impacted by a project must be analyzed. Pursuant to CFGC Section 2785, CDFW defines wet areas as "lands which may be covered periodically or permanently with shallow water and which include saltwater marshes, freshwater marshes, open or closed brackish water marshes, swamps, mudflats, fens, and vernal pools."

4.2.5 California Fish and Game Code Section 1600

Streams, lakes, and riparian vegetation as habitat for fish and other wildlife species, are subject to jurisdiction by the CDFW under Sections 1600-1616 of the CFGC (CDFW, 1994). Any activity that will do one or more of the following generally require a Lake and Streambed Alteration (LSA) Agreement:

1) Substantially obstruct or divert the natural flow of a river, stream, or lake

2) Substantially change or use any material from the bed, channel, or bank of a river, stream, or lake

3) Deposit or dispose of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into a river, stream, or lake (CDFW, 1994).

The term "stream," which includes creeks and rivers, is defined in the CCR as, "a body of water that flows at least periodically or intermittently through a bed or channel having banks and supports fish or other aquatic life." This includes watercourses having a surface or subsurface flow that supports or has supported riparian vegetation (14 CCR 1.72; CNRA, 1987).

In addition, the term "stream" can include ephemeral streams, dry washes, watercourses with subsurface flows, canals, aqueducts, irrigation ditches, and other means of water conveyance if they support aquatic life, riparian vegetation, or stream-dependent terrestrial wildlife. Riparian is defined as "on, or pertaining to, the banks of a stream"; therefore, riparian vegetation is defined as vegetation that occurs in and/or adjacent to a stream and is dependent on, and occurs because of, the stream itself. Removal of riparian vegetation also requires an LSA agreement from CDFW.

4.2.6 California Fish and Game Code Sections 3503 and 3513

According to Section 3503 of the CFGC, it is unlawful to take, possess, or needlessly destroy the nest or eggs of any bird (except English sparrows [*Passer domesticus*] and European starlings [*Sturnus vulgaris*]). Section 3503.5 specifically protects birds in the orders Falconiformes and Strigiformes (birds of-prey). Section 3513 essentially overlaps with the MBTA, prohibiting the "Take" or possession of any migratory non-game bird. Disturbance that causes nest abandonment and/or loss of reproductive effort is considered "Take" by the CDFW.

4.2.7 Fully Protected Species and Species of Special Concern

The classification of "fully protected" was the CDFW's initial effort to identify and provide additional protection to those animals that were rare or faced with possible extinction. Lists were created for fishes, amphibians, reptiles, birds, and mammals. Most of the species on these lists have subsequently been listed under CESA and/or FESA. The CFGC sections (fish at Sec. 5515, amphibians and reptiles at Sec. 5050, birds at Sec. 3511, and mammals at Sec. 4700) dealing with "fully protected" species state that these species "…may not be taken or possessed at any time and no provision of this code or any other law shall be construed to authorize the issuance of permits or licenses to take any fully protected species," (CDFW, 1998) although "Take" may be authorized for necessary scientific research. This language makes the "fully protected" designation the strongest and most restrictive regarding the "Take" of these species. In 2003, the code sections dealing with fully protected species were amended to allow the CDFW to authorize "Take" resulting from recovery activities for state-listed species.

SSCs are broadly defined as animals not listed under the CESA, but that are nonetheless of concern to the CDFW because they are declining at a rate that could result in listing or historically occurred in low numbers with known threats to their persistence currently existing. This designation is intended to result in special consideration for these animals by the CDFW, land managers, consulting biologists, and others, and is intended to focus attention on the species to help avert the need for costly listing under CESA and cumbersome recovery efforts that might ultimately be required. This designation also is intended to stimulate collection of additional information on the biology, distribution, and status of poorly known at-risk species, and focus research and management attention on them. Although the SSC designation provides no special legal status, they are given special consideration under CEQA during project review.

Table 1 in Appendix 2 includes potentially-occurring federal- and state-listed species and SSC animals that may occur in the project area.

4.2.8 Natural Community Conservation Planning Act

The Natural Community Conservation Planning (NCCP) Act of 1991 is an effort by the State of California and numerous private and public partners that is broader in its orientation and objectives than the CESA and FESA (refer to discussions above). The primary objective of the NCCP Act is to conserve natural communities at the ecosystem scale while accommodating compatible land uses (CDFW, 1991). The NCCP Act seeks to anticipate and prevent the controversies and gridlock caused by species listings by focusing on the long-term stability of wildlife and plant communities and including key interests in the process.

No regionally-occurring natural community or associated plan is listed by the state for the project area.

5.0 Special-status Biological Resources

An evaluation was conducted for the presence or absence of potential habitat for special-status plant and animal species. CNDDB RareFind (CDFW, 2022a), BIOS (CDFW, 2022b), and CNPS (CNPS, 2022a) searches were completed for the 7.5-minute USGS Lake Shastina quadrangle and all adjacent quadrangles. The databases were queried for historical and existing occurrences of listed species or species proposed for listing. In addition, a list of all federally-listed species that are known to occur or may occur in the vicinity was obtained from the USFWS' IPaC (USFWS, 2022a). The critical habitat mapper (USFWS, 2022b) was reviewed, however no critical habitat was mapped within or adjacent to the study area.

Table 1 in Appendix 2 includes all the animal species reported from the queries, their preferred habitat, and a notation whether there is suitable habitat present within the study area for the species. Table 2 in Appendix 2 includes all the plant species reported from the queries and the typical habitat where they occur. The potential for occurrence of those species included on the lists were then evaluated based on the habitat requirements of each species relative to the conditions observed during the field surveys. Each species was evaluated for its potential to occur in the study area according to the following criteria:

- None. Species listed having "none" are those species for which:
  - There is no suitable habitat present in the study area (that is, habitats in the study area suitable for the species requirements [for example, elevation, hydrology, disturbance regime, etc.]).
- Low. Species listed as having a "low" potential to occur in the study area are those species for which:
  - There is no known record of occurrence in the vicinity, and
  - There is marginal or very limited suitable habitat present within the study area
- Moderate. Species listed as having a "moderate" potential to occur in the study area are those species for which:
  - There are known records of occurrence in the vicinity, and
  - There is suitable habitat present in the study area
- High. Species listed have a "high" potential to occur in the study area are those species for which:
  - There are known records of occurrence in the vicinity (there are many records and/or records in proximity), and
  - There is high suitable habitat present in the study area
- Present. Species listed as "present" in the study area are those species for which:
  - The species was observed in the study area

5.1 Special-status Animal Species

Based on a review of special-status animal species, 43 special-status animal species have been reported with the potential to occur in the project region consisting of the Lake Shastina quadrangle and the surrounding quadrangles. Of the special-status animal species potentially occurring in the region, 30 animal species are considered to have no or a low potential to occur at the project site and 13 species have a moderate to high potential. Species with a moderate or high potential for occurrence within the study area are described below.

5.1.1 A

No special-status amphibians have a moderate or high potential to occur within the study area.

5.1.2 B

The Cooper's Hawk (*Accipiter cooperii*) occupies woodlands, open and interrupted and marginal habitats. Nests are primarily in riparian areas with deciduous trees, in canyons bottoms, and among live pines and spruces. It is not listed under CESA or FESA, but is on the CDFW Watch List and has heritage ranking of G5/S4. Suitable habitat exists within the study area for this species, and it was detected. The project will not directly impact suitable habitat for this species. Noise disturbance from project activities has the potential to impact this species during the nesting season.

The golden eagle (*Aquila chrysaetos*) occupies cliff-walled canyons for nesting along with large trees in open areas and prefers rolling foothills, sage-juniper flats, and mountain areas. It is not listed under CESA or FESA, but is on the CDFW Watch List, listed as Sensitive and Fully Protected, is a USFWS Bird of Conservation Concern, and has heritage ranking of G5/S3. Although this species was not detected, suitable habitat does exist within the study area. The project will not directly impact suitable habitat for this species.

The great blue heron (*Ardea Herodias*) is found in wetlands, riparian forests, and marshes. They typically nest on north slopes near water in rookeries in large trees that are red fir, lodgepole pine, Jeffrey pine, or aspens. It is not listed under CESA or FESA, but is listed as Sensitive by CDFW and has a heritage ranking of G5/S4. Suitable habitat exists within the study area for this species, and it was detected. The project will not directly impact suitable habitat for this species.

The black tern (*Chlidonias niger*) prefers large freshwater wetlands, dense marshes, river edges, and lakes. They nest in areas of shallow and still water sheltered by cattails and bulrushes. It is not listed under either CESA or FESA, but has a heritage ranking of G4G5/S2. Although this species was not detected, suitable habitat does exist within the study area. The project will not directly impact suitable habitat for this species.

The prairie falcon (*Falco mexicanus*) occupies grassland and scrub in dry and open terrain. Nesting sites can be found on cliffs and it forages long distances for prey. It is not listed under either federal or California endangered species acts but is on the CDFW Watch List and has a heritage ranking of G5/S4. Although this species was not detected, suitable habitat does exist within the study area. The project will not directly impact suitable habitat for this species.

The bald eagle (*Haliaeetus leucocephalus*) can be found near rivers and lake margins. Most nests will be within a mile of water and will be in tall protruding conifer trees. It is Delisted from FESA, but is Endangered under CESA with special status by CDFW of Fully Protected and Sensitive and by USFWS as a Bird of Conservation Concern. The bald eagle has a heritage ranking of G5/S3. Although this species was not detected, suitable habitat does exist within the study area. The project will not directly impact suitable habitat for this species.

The California gull (*Larus californicus*) favors shorelines, lakes and marshes. They nest in large groups on islands within strongly alkaline lakes. It is not listed under CESA or FESA, but is on the CDFW Watch List and listed as a Bird of Conservation Concern by USFWS. The California gull has a heritage ranking of G5/S4. Suitable habitat exists within the study area for this species and it was detected. The project will not directly impact suitable habitat for this species.

The double-crested cormorant (*Nannopterum auritum*) is found near lakes and ponds with perching areas. It forms breeding colonies in fresh or strongly alkaline lakes. It is not listed under CESA or FESA, but is on the CDFW Watch List and has heritage ranking of G5/S4. Suitable habitat exists within the study area for this species, and it was detected. The project will not directly impact suitable habitat for this species.

The osprey (*Pandion haliaetus*) occupies any fish-filed water, including rivers, reservoirs, and lakes. They build nests on top of elevated telephone or power poles and treetops near bodies of water with large amounts of fish. It is not listed under CESA or FESA, but is considered Sensitive, is on the CDFW Watch List, and has heritage ranking of G5/S4. Suitable habitat exists within the study area for this species, and it was detected. The project will not directly impact suitable habitat for this species. Noise disturbance from project activities has the potential to impact this species during the nesting season.

The bank swallow (*Riparia riparia*) can be found in riparian scrub, riparian woodlands, and swamp edges. It requires vertical banks/cliffs with fine-textured/sandy soils near streams, rivers, and lakes to dig nesting holes. It is not listed under FESA, but under CESA is listed as Threatened, listed as Sensitive by CDFW, and has heritage ranking of G5/S2. Although this species was not detected, suitable habitat does exist within the study area. The project will not directly impact suitable habitat for this species.

The yellow warbler (*Setophaga petechia*) favors open woodlands, swamp edges, and streams below 9,000 ft. Nests are built near streamside thickets in willows, hawthorns, dogwoods, and white cedars, 10-40 ft off the ground. It is not listed under CESA or FESA and has heritage ranking of G5/S3S4. Although this species was not detected, suitable habitat does exist within the study area. The project will not directly impact suitable habitat for this species.

5.1.3 Fi

No special-status fishes have a moderate or high potential to occur within the study area.

5.1.4 Insects

No special-status insects have a moderate or high potential to occur within the study area.

5.1.5 M s

The North American porcupine (*Erethizon dorsatum*) occupies forested habitats in a wide variety of coniferous and mixed woodlands within the Sierra Nevada, Cascade, and Coast ranges. It is not listed under FESA and CESA and has heritage ranking of G5/S3. Although this species was not detected, suitable habitat does exist within the study area. The project will not directly impact suitable habitat for this species.

5.1.6 R

The western pond turtle (*Emys marmorata*) occupies ponds, marshes, rivers and stream below 6,000 ft elevation. They require upland habitat 0.5 kilometers (km) from water for egg-laying. It is not listed under CESA or FESA, but is listed as a SSC, Vulnerable, and Sensitive with a heritage ranking of G5/S3S4. Although this species was not detected, suitable habitat does exist within the study area. The project will not directly impact suitable habitat for this species.

5.2 Special-status Plant Species

Based on review for the special-status botanical species, 42 special-status botanical species have been reported from the region consisting of the Lake Shastina quadrangle and the surrounding quadrangles. Of the special-status botanical species reported for the region, 30 botanical species are considered to have low or no potential to occur within the study area. Twelve (12) species have a moderate to high potential of occurring within the study area. Species with a moderate or high potential of occurrence within the study area are described below.

Woolly balsamroot (*Balsamorhiza lanata*) is a perennial herb in the Asteraceae family. It is neither state nor federally listed but has a CRPR of 1B.2 and a heritage rank of G3/S3. Its elevation range is reported from 2,624–3,444 ft above sea level. Within its range in northern California, its blooming period is reported as April to June. This species is reported in cismontane woodland and is typically found in rocky and volcanic areas. There are 34 occurrences that have been observed and reported within the nine-quad search, with the most recent occurrence within the Weed quad in 2003. This recorded occurrence was less than a mile from the study area situated southwest of Jackson Ranch Road.

Greene's mariposa-lily (*Calochortus greenei*) is a perennial herb in the Liliaceae family. It is neither state nor federally listed but has a CRPR of 1B.2 and a heritage rank of G3/S2S3. Its elevation is reported from 3,395–6,200 ft above sea level. Within its range in northern California, its blooming period is reported as June to August. This species is reported in cismontane woodland and is typically found in rocky and volcanic areas. Within the nine-quad search, numerous Rarefind occurrences are reported, the nearest is approximately 8 miles northeast of the study area with an observation date in 2011.

Shasta chaenactis (*Chaenactis suffrutescens*) is a perennial herb in the Asteraceae family. It is neither state nor federally listed, but has a CRPR of 1B.3 and a heritage rank of G2G3/S2S3. Its elevation is reported from 2,460–9,185 ft. Within its range in California, its blooming period is May to September. This species is reported in lower montane coniferous forest and is typically found in sandy or serpentinite areas. There are 10 Rarefind occurrences within the nine-quad search. The most recent observation was reported in 2007, approximately 4.4 miles east of the study area.

Modoc green-gentian (*Frasera albicaulis var. modocensis*) is a perennial herb in the Gentianaceae family. It is neither state nor federally listed, but has a CRPR of 2B.3 and a heritage rank of G5T3T4/S2S3. Its elevation is reported from 2,995–5,740 ft. Within its range in California, its blooming period is May to July. The species is reported in great basin grassland within openings. There are 2 Rarefind occurrences within the nine-quad search, with the most recent finding reported in 1940.

Alkali hymenoxys (*Hymenoxys lemmonii*) is a perennial herb in the Asteraceae family. It is neither state nor federally listed, but has a CRPR of 2B.2 and a heritage rank of G4/S2S3. Its elevation is reported rom 785–11,125 ft. Within its range in California, its blooming period is May to September. This species is reported in Great Basin scrub and lower montane coniferous forest. There are 8 Rarefind occurrences within the nine-quad search with the closest being approximately 7.3 miles southwest of the study area reported in 1997.

Baker's globe mallow (*Iliamna bakeri*) is a perennial herb in the Malvaceae family. It is neither state nor federally listed, but has a CRPR of 4.2 and a heritage rank of G4/S3. Its elevation is reported from 3,280–8,205 ft. Within its range in California, its blooming period is June to September. This species is reported in chaparral, great basin scrub, lower montane coniferous forest, and pinyon and juniper woodland areas that are volcanic. Within the nine-quad search, 1 occurrence from 1969 was reported 3.7 miles east of the study area.

Peck's lomatium (*Lomatium peckianum*) is a perennial herb in the Apiaceae family. It is neither state nor federally listed, but has CRPR of 2B.2 and a heritage rank of G4/S1. Its elevation is reported from 2,295–5,905 ft above sea level. Within its range in California, its blooming period is April to June. This species is reported in chaparral, cismontane woodland, lower montane coniferous forest, and pinyon and juniper woodland with volcanic soil. There are 3 Rarefind occurrences within the nine-quad search, the most recent finding reported in 2012, 3.72 miles southwest of the study area.

Brittle prickly-pear (*Opuntia fragilis*) is a perennial stem in the Cactaceae family. It is neither state nor federally listed, but has a CRPR of 2B.1 and a heritage rank of G5/S1. Its elevation is reported from 2,690–2,885 ft above sea level. Within its range in California, its blooming period is April to July. This species is reported in pinyon and juniper woodland within volcanic areas. There are 2 Rarefind occurrences within the nine-quad search, the closest being approximately 5 miles northwest of the study area in 2005.

Shasta orthocarpus (*Orthocarpus pachystachyus*) is an annual herb in the Orobanchaceae family. It is neither state nor federally listed, but has a CRPR of 1B.1 and a heritage rank of G1/S1. Its elevation is reported from 2,755–2,790 ft above sea level. Within its range, the blooming period is in May. This species is reported in great basin scrub, meadows, seeps, valley and foothill grasslands. There are 2 Rarefind occurrences within the nine-quad search, with the most recent and closest reported 6 miles southwest of the study area in 1998.

Cooke's phacelia (*Phacelia cookei*) is an annual herb in the Hydrophyllaceae family. It is neither state nor federally listed, but has a CRPR of 1B.1 and a heritage rank of G1/S1. Its elevation is reported from 3,595–5,580 ft above sea level. Within its range, its blooming period is June to July. This species is reported in Great Basin scrub and lower montane coniferous forest with sandy and volcanic soils. There are 2 Rarefind occurrences nine-quad search, with the closest being 2 miles east of the study area in 1985.

Hairy Marsh hedge-nettle (*Stachys Pilosa*) is a perennial rhizomatous herb in the Lamiaceae family. It is neither state nor federally listed, but has a CRPR of 2B.3 and a heritage rank of G5/S3. Its elevation is reported from 3,935–5,805 ft above sea level. Within its range, its blooming period is June to August. This species is reported in great basin scrub, meadows, and seeps. There is 1 Rarefind occurrence within the nine-quad search that is approximately 3.70 miles northwest of the study area in 2010.

Henderson's triteleia (*Triteleia hendersonii*) is a perennial herb in the Themidaceae family. It is neither state nor federally listed, but has a CRPR of 2B.2 and a heritage rank of G4/S1. Its elevation is reported from 2,495–3,935 ft above sea level. Within its range, its blooming period is May to July. This species is reported in cismontane woodland. There is 1 Rarefind occurrence within the nine-quad search, 4.70 miles southwest of the study area in 1956.

5.3 Special-status Habitats and Natural Communities

5.3.1 D nated Critical Habitat

The IPaC query resulted in no critical habitats within the project area. The nearest Designated Critical Habitat to the study area is approximately six miles away to the southwest, mapped for Northern Spotted Owl (*Strix occidentalis caurina;* USFWS, 2020).

5.3.2 Vegetation Alliances

Sensitive vegetation communities as defined by the Manual of California Vegetation or CDFW Natural Communities list occurs within the study area (CNPS, 2022b; CDFW, 2022d) with a State rank of S3 or lower, require CEQA analysis if potential impacts may occur due to the proposed project. Sensitive vegetation communities were not surveyed and mapped during the site visit in 2022 and would be part of a pre-construction protocol botanical survey.

5.3.3 Wetland and Riparian Habitats

Streams and seasonal drainage features that flow into waters of the U.S. or State will likely fall under the jurisdiction of the U.S. CWA, California Porter-Cologne Water Quality Control Act, and CFGC 1600. Any potential impacts to aquatic features will be protected by existing regulations. Additional best management practices (BMPs) are included in Section 7.0 Recommendations.

Project components as they relate to distance to water features:

- Lost Lake's (northwest of Lake Shastina) three closest utility upgrades are to fire hydrant #292 at 533 ft to the nearest water feature, fire hydrant #294 at 570 ft to the nearest water feature, and fire hydrant #295 at 590 ft to the nearest water feature.
- Lake Shastina's three closest upgrades are to fire hydrant #293 at 300 ft to the nearest water feature; fire hydrant #286 at 335 ft to the nearest water feature; fire hydrant #294 at 360 ft to the nearest water feature.
- Shasta River's five closest utility upgrades are fire hydrant #277 at 172 ft to the nearest water feature, fire hydrant #266 at 205 ft to the nearest water feature, fire hydrant #265 at 235 ft to the nearest water feature, fire hydrant #267 at 264 ft to the nearest water feature, and fire hydrant #268 at 275 ft to the nearest water feature (See Figure 4).

A formal wetland delineation was not conducted as a part of this study.

5.3.4 Nesting Bird Habitat

All locations with vegetative cover, shrub layer, or tree canopy within the study area may provide suitable habitat for a diverse assemblage of birds, including special-status species. Ground disturbance and vegetation removal proposed as part of the project activities are minimal and localized to the immediate vicinities of existing development.

5.3.5 Wi ors

The northern half of the project site is within the far western edge of the Siskiyou Mule deer (*Odocoileus hemionus*) winter range migration corridor and migration stopovers. Mule deer migrate for winter during mid-November to mid-January which begins in the Dorris, CA area and ends near Day, CA (CNRA, 2022b). Spring migration for mule deer occurs April-May depending on snow levels (CNRA, 2022a). Lake Shastina is also a stopover for migrating birds as it is a large body of water along the pacific flyaway. Migration for waterfowl and songbirds begin in the spring (March-May) with them flying north and then in the fall (September-November) when they fly south.

The project site is approximately 5 miles southwest of the documented 2016-2020 elk migration area in East Shasta Valley. Elk will spend their time during the winter months (December-February) on private ranches in the Shasta Valley and then in the spring (March-May) they will move south and east to the Grass Lake area (Karuk Tribe, 2007). Their summer range includes Grass Lake, Bull Meadows, and Deer Mountain. The elk herd in this area is called the Shasta Valley Herd and is a mix of Rocky Mountain (*Cervus canadensis nelsoni*) and Roosevelt Elk (*Cervus canadensis roosevelti*; Wittmer, et al., 2021).
Water courses and their associated riparian zones, due to complex structure providing cover, are likely the primary movement corridors for smaller mammals within the study area. Additionally, wildlife may use roads and trails that provide openings in areas of dense vegetation.

6.0 Conclusions

The purpose of this report iss to assess the biological resources and habitat available within the study area, and to evaluate project-related impacts. The habitat value and availability were assessed for special-status species that could occur within the study area. See Section 7.0 for recommendations for avoiding and mitigating impacts.

6.1 Special-status Animal Species

Four special-status animal species were observed within the project area during the survey. These species are the double-crested cormorant, California gull, osprey, and Cooper's hawk. An additional nine species have a moderate or high potential to occur within the project area based on habitat suitability.

- The double-crested cormorant has low potential of nesting in the project area as the habitat is not conducive of hosting a colony of cormorants due to the existing residential and recreational human activity in the area.
- The California gull is unlikely to nest in the project area due to high disturbance and lack of suitable nesting habitat.
- The osprey has a moderate potential of nesting along the river or in trees near the lake of the Lake Shastina community. To mitigate disturbance, see recommendations in Section 7.0.
- The Cooper's hawk may have a moderate potential of nesting in the project area as ponderosa pines are present and this is a known tree used by this species. To mitigate disturbance, see recommendations in Section 7.0.

Impacts to special-status species can be reduced to less-than-significant levels by incorporating the recommendations within Section 7.0 of this report.

6.2 Nesting Birds

All locations with a shrub or tree canopy layer especially near a river within the study area may provide suitable nesting for a diverse assemblage of migratory birds. Although direct impacts to nesting birds and their habitat are not expected, noise disturbance may cause an impact during the nesting season. Impacts to nesting birds can be reduced to less-than-significant levels by incorporating the recommendations within Section 7.0 of this report.

6.3 Impacts on Wildlife Movement

Wildlife movement corridors within the study area are expected to be concentrated along shrubby and vegetated areas directed towards Lake Shastina. These vegetated areas are highly disturbed areas from existing residential development. Construction noise and traffic are not likely to impact wildlife movement in these areas. The construction is primarily to upgrade already present utilities, therefore very little habitat will be affected.

7.0 Recommendations

SHN recommends that the following measures be implemented within the project area to reduce impacts to less-than-significant levels for special-status biological resources:

- Conduct seasonally appropriate floristic surveys in accordance with CDFW protocol (CDFW, 2018) prior to ground disturbance.
- If construction activities begin during the bird nesting season (generally February 1 to August 15), a qualified biologist should conduct nest surveys no more than seven days prior to activities, within the construction limits and within 100 ft (200 ft for raptors) of the construction limits.
- Prior to ground disturbance near aquatic features, utilize standard erosion and sediment control BMPs, such as straw wattles, to avoid sediment discharge.

8.0 References

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Photographs

1

Photo 1: Looking west at pump station 53 on Palmer Drive where the location of the temporary water tank outside of the building would be placed as water tank 4 is upgraded to a bigger size. Water tank #4 can be seen on top of the slope. Gravel is observed on the east side of the pump station where the temporary water tank would be placed. Photo taken: 6/22/2022.

Photo 2: Looking east on Elk Trail Road and Hogan Drive by fire hydrant #191. Small sized rabbit brush, small rocks and cheat grass is observed as vegetation that would be disturbed. The ponderosa pines in the picture were observed for nests and zero were found. Photo taken: 6/22/2022.

Photo 3: Looking north west from Stone Crest Drive at water tank #3 which is surrounded by small rocks, gravel, and juniper trees. Water tank #3 will be re-painted. Photo taken: 6/22/2022.

Photo 4: Looking south from the service road to water tank #4 that will be replaced with a larger water tank. Water tank #4 is surrounded by manzanita shrub, gravelly soil, and juniper.

Photo 5: Looking west from the end of Lake Shore Drive where test well #12 would be drilled. Rabbit brush, small rocks, small mounds, and juniper trees can be observed and would be disturbed in the process. No burrows were observed in the mounds and no nests were observed in the trees. Photo taken: 6/22/2022.

Photo 6: Looking North east from the cul-de-sac of Stone Crest Drive at fire hydrant #289 that will be replaced with a new fire hydrant. This fire hydrant is surrounded by asphalt, small rocks, gravelly soil, and juniper trees. The soil directly around the fire hydrant will be disturbed as all parts of the hydrant will be replaced down to the elbow in the ground.

Photo 7: Looking east from Mountain Wood Drive onto fire hydrant #275 that will be replaced with a new fire hydrant. This fire hydrant is surrounded by asphalt, large rocks, gravelly soil, and juniper trees. The soil directly around the fire hydrant will be disturbed as all parts of the hydrant will be replaced down to the elbow in the ground.

Photo 8: Looking east from Jack Rabbit Road onto fire hydrant #175 that will be replaced with a new fire hydrant. This fire hydrant is surrounded by small rabbit brush, gravelly soil, and ponderosa pine. The soil directly around the fire hydrant will be disturbed as all parts of the hydrant will be replaced down to the elbow in the ground.

Photo 9: Looking south west from Indian Island onto fire hydrant #79 that will be replaced with a new fire hydrant. This fire hydrant is surrounded by small rabbit brush, gravelly soil, ponderosa pine, and juniper. The soil directly around the fire hydrant will be disturbed as all parts of the hydrant will be replaced down to the elbow in the ground.

Photo 10: Looking East from Elk Trail Road. Abandoned Pump Station #52 (Figure 3) that is proposed to be a new pump station. The concrete slap that is still present is surrounded by rabbitbrush and manzanita shrub. The soil directly around the concrete will be disturbed when building the pump house. Fire hydrant #190 is the closest to this proposed area (Figure 4).

Special-status Species Scoping Lists

2

Appendix 2 Table 1

Regionally occurring Special-status Animal Scoping List CNDDB, BIOS, IPaC
LSCSD Project, May 20, 2022
Lake Shastina and Surrounding 7.5' Quadrangles

Scientific Name	Common Name	Fed List	Cal List	Other Status	Global Rank	State Rank	General Habitat	Specific Habitat	Potential to Occur
Amphibians									
Rana boylii	foothill yellow-legged frog	None	Endangered (excluding the North Coast Clade population which covers the project area)	SSC, S	G3	S3	Partly-shaded, shallow streams and riffles with a rocky substrate in Aquatic, Chaparral, Cismontane woodland, Coastal scrub, Klamath/North coast flowing waters, Lower montane coniferous forest, Meadow & seep, Riparian forest, Riparian woodland Sacramento/San Joaquin flowing waters.	Needs at least some cobble-sized substrate for egg-laying. Needs at least 15 weeks to attain metamorphosis.	Low.
Rana cascadae	Cascades frog	None	Candidate Endangered		G3G4	S3	Montane aquatic habitats such as mountain lakes, small streams, and ponds in meadows; open coniferous forests.	Standing water required for reproduction. Hibernates in mud on the bottom of lakes and ponds during the winter.	Low.
Birds									
Accipiter cooperii	Cooper's hawk	None	None	WL	G5	S4	Forest and woodland, urban and suburban areas, open fields	Build nests in pines, oaks, Douglas-firs, beeches, and spruces	Present.
Accipiter gentiles	northern goshawk	None	None	S, SSC	G5	S3	North coast coniferous forest, Subalpine coniferous forest, Upper montane coniferous forest.	Usually nests on north slopes, near water. Red fir, lodgepole pine, Jeffrey pine, and aspens are typical nest trees.	Low.

Appendix 2 Table 1

Regionally occurring Special-status Animal Scoping List CNDDB, BIOS, IPaC
LSCSD Project, May 20, 2022
Lake Shastina and Surrounding 7.5' Quadrangles

Scientific Name	Common Name	Fed List	Cal List	Other Status	Global Rank	State Rank	General Habitat	Specific Habitat	Potential to Occur
Antigone canadensis tabida	greater sandhill crane	None	Threatened	S, FP	G5T5	S2	Marsh & swamp, Meadow & seep, Wetland.	Prefers grain fields within 4 miles of a shallow body of water used as a communal roost site; irrigated pasture used as loafing sites.	Low.
Aquila chrysaetos	golden eagle	None	None	S, FP, WL	G5	S3	Rolling foothills, mountain areas, sage-juniper flats, and desert.	Cliff-walled canyons provide nesting habitat in most parts of range; also, large trees in open areas.	Moderate.
Ardea herodias	great blue heron	None	None	S	G5	S4	Brackish marsh, Estuary, Freshwater marsh, Marsh & swamp, Riparian forest, Wetland.	Rookery sites in close proximity to foraging areas: marshes, lake margins, tide-flats, rivers and streams, wet meadows.	Moderate.
Chlidonias niger	black tern	None	None		G4G5	S2	Large freshwater wetlands, dense marshes on the edges of shallow lakes of the open prairies or northern forests, sewage lagoons, river edges, lakes, marshes, beaches, and over open ocean waters, far out to sea.	Nest in areas of shallow, still water sheltered from wind and waves with cattails, bulrushes or other emergent vegetation, some nests are set on muskrat feeding platforms or lodges.	Moderate.

Appendix 2 Table 1

Regionally occurring Special-status Animal Scoping List CNDDB, BIOS, IPaC
LSCSD Project, May 20, 2022
Lake Shastina and Surrounding 7.5' Quadrangles

Scientific Name	Common Name	Fed List	Cal List	Other Status	Global Rank	State Rank	General Habitat	Specific Habitat	Potential to Occur
Coccyzus americanus occidentalis	western yellow-billed cuckoo	Threatened	Endangered	S, RWL	G5T2T3	S1	Riparian forest, nest along the broad, lower flood-bottoms of larger river systems.	Nests in riparian jungles of willow, often mixed with cottonwoods, with lower story of blackberry, nettles, or wild grape.	Low.
Contopus cooperi	olive-sided flycatcher	None	None		G4	S3	Open woodlands, pine forests, rivers, streams and partially logged areas, recent burns, beaver ponds, bogs, and muskegs.	Nest in areas of that have openings or edges in the forest.	None.
Empidonax traillii	willow flycatcher	None	Endangered	S	G5	S1S2	Inhabits extensive thickets of low, dense willows on edge of wet meadows, ponds, Riparian woodlands Riparian scrubs, or backwaters; 2000-8000 ft elevation.	Requires dense willow thickets for nesting/roosting. Low, exposed branches are used for singing posts/hunting perches.	Low.
Falco mexicanus	prairie falcon	None	None	WL	G5	S4	grassland and scrub, dry, open terrain, either level or hilly.	Breeding sites located on cliffs. Forages far afield, even to marshlands and ocean shores.	Moderate.
Haliaeetus leucocephalus	bald eagle	Delisted	Endangered	FP, S, BCC	G5	S3	Ocean shore, lake margins, and rivers for both nesting and wintering. Most nests within 1 mile of water.	Nests in large, old-growth, or dominant live tree with open branches, especially ponderosa pine. Roosts communally in winter.	Moderate.

Appendix 2 Table 1

Regionally occurring Special-status Animal Scoping List CNDDB, BIOS, IPaC
LSCSD Project, May 20, 2022
Lake Shastina and Surrounding 7.5' Quadrangles

Scientific Name	Common Name	Fed List	Cal List	Other Status	Global Rank	State Rank	General Habitat	Specific Habitat	Potential to Occur
Icteria virens	yellow-breasted chat	None	None	SSC	G5	S3	Dense shrubbery, abandoned farm fields, clearcuts, powerline corridors, fencerows, forest edges and openings, swamps, edges of streams and ponds, blackberry bushes.	Nest in low, dense vegetation such as raspberry, blackberry, grapevine, dogwood, hawthorn, cedar, honey suckle, and sumac.	None.
Larus californicus	California gull	None	None	WL, BCC	G5	S4	Littoral waters, sandy beaches, waters and shorelines of bays, tidal mud-flats, marshes, lakes, etc.	Colonial nester on islets in large interior lakes, either fresh or strongly alkaline.	Present.
Nannopterum auritum	double-crested cormorant	None	None	WL	G5	S4	Lakes and ponds with perching areas.	Roosts and form breeding colonies on smaller lagoons or ponds in/near clusters of trees.	Present.
Pandion haliaetus	osprey	None	None	S, WL	G5	S4	Any expanse of shallow, fish-filled water, including rivers, lakes, reservoirs, lagoons, swamps, and marshes.	Nesting habitat must include an adequate supply of accessible fish within a max. of 12 miles to nest; open, elevated nest at the top of trees, phone, or power poles.	Present.
Riparia riparia	bank swallow	None	Threatened	S	G5	S2	Riparian scrub, Riparian woodland, Colonial nester; nests primarily in riparian and other lowland habitats west of the desert.	Requires vertical banks/cliffs with fine-textured/sandy soils near streams, rivers, lakes, ocean to dig nesting hole.	Moderate.

Appendix 2 Table 1

Regionally occurring Special-status Animal Scoping List CNDDB, BIOS, IPaC
LSCSD Project, May 20, 2022
Lake Shastina and Surrounding 7.5' Quadrangles

Scientific Name	Common Name	Fed List	Cal List	Other Status	Global Rank	State Rank	General Habitat	Specific Habitat	Potential to Occur
Setophaga petechia	yellow warbler	None	None		G5	S3S4	Open woodland, bushes, swamp edges, streams below 9,000 ft elevation.	Breeds in streamside thickets and create nests in willow, hawthorn, raspberry, white cedar, dogwood, and honeysuckle, 10-40 ft off ground	Moderate.
Strix nebulosa	great gray owl	None	Endangered		G5	S1	Pine and fir forest adjacent to montane meadows between 2500-7500 feet elevation. In winter they move downslope into oak woodlands and lower elevation mixed deciduous and evergreen forests.	Nest site near an opening in the forest such as a meadow, bog, or field. Use old raptor or raven nests.	Low.
Strix occidentalis caurina	Northern Spotted Owl	Threatened	Threatened	None	G3G4T3	S2	old-growth forests, Douglas fir that are 150-200 years old, high canopy layers, snags and open spaces for flying underneath.	Old hollow trees for nesting sites.	None.
Crustaceans									
Pacifastacus leniusculus klamathensis	Klamath crayfish	None	None		G5T5	S3	Klamath River in Northern Cali and Southern Oregon.	Copulate, molt and lay eggs in brackish water.	None.
Fish									
Cottus klamathensis polyporus	Lower Klamath marbled sculpin	None	None		G4T2T4	S2S4	Aquatic; Prefer water temps of 10-15C, coarse substrates where water velocities ranged from slow	Eggs are deposited in clusters in nests under flat rocks.	Low.

Appendix 2 Table 1

Regionally occurring Special-status Animal Scoping List CNDDB, BIOS, IPaC
LSCSD Project, May 20, 2022
Lake Shastina and Surrounding 7.5' Quadrangles

Scientific Name	Common Name	Fed List	Cal List	Other Status	Global Rank	State Rank	General Habitat	Specific Habitat	Potential to Occur
							to swift, in streams with widths greater than 20 m.		
Oncorhynchus kisutch pop. 2	coho salmon - southern Oregon / northern California ESU	Threatened	Threatened		G5T2Q	S2	Inhibit small coastal streams, large rivers such as the Klamath River system.	Use coastal streams typically associated with low gradient reaches of tributary streams for spawning.	None.
Oncorhynchus mykiss irideus pop. 1	steelhead - Klamath Mountains Province DPS	None	None		G5T3Q	S2	hatch in gravel-bottomed, fast-flowing, well-oxygenated rivers and streams, then migrate to the ocean. They will return to fresh water to spawn.	Prefer water temps from 46-52F.	None.
Insects									
Atractelmis wawona	Wawona riffle beetle	None	None		G3	S1S2	Aquatic; found in riffles of rapid, small to medium clear mountain streams; 2000-5000 ft elev.	Strong preference for inhabiting submerged aquatic mosses.	Low.
Bombus caliginosus	obscure bumble bee	None	None	VU	G2G3	S1S2	relatively humid and often foggy areas, Coastal areas from Santa Barbara County to north to Washington state.	Food plant genera include *Baccharis, Cirsium, Lupinus, Lotus, Grindelia* and *Phacelia.*	Low.
Bombus occidentalis	western bumble bee	None	None	S	G2G3	S1	Prefer elevations lower than 3000 m, open grassy areas, prairie, urban parks and gardens, sagebrush steppe, mountain meadows to alpine tundra.	Food plant genera include *Acontium, Allium, Arnica, Astragalus, Balsamorhiza, Brassica, Calypso, Castilleja,*	None.

Appendix 2 Table 1

Regionally occurring Special-status Animal Scoping List CNDDB, BIOS, IPaC
LSCSD Project, May 20, 2022
Lake Shastina and Surrounding 7.5' Quadrangles

Scientific Name	Common Name	Fed List	Cal List	Other Status	Global Rank	State Rank	General Habitat	Specific Habitat	Potential to Occur
								Ceanothus, Centaurea, Chionophila, Chrysothamnus.	
Mammals									
Aplodontia rufa californica	Sierra Nevada mountain beaver	None	None		G5T3T4	S2S3	Riparian forest, Riparian scrub, Riparian woodland.	Needs dense understory for food and cover. Burrows into soft soil. Needs abundant supply of water.	Low.
Canis lupus	gray wolf	Endangered	Endangered		G5	S1	Minimal disturbance from humans in areas of 100 sq. mi. with road densities less than 1 mi. of linear road sq. mi., Douglas-fir, ponderosa pine and western larch forests.	Dens are typically situated in underground burrows, rock crevices, ledges, hollow logs, overturned stumps, and debris piles.	None.
Corynorhinus townsendii	Townsend's big-eared bat	None	None	SSC, S	G4	S2	Chaparral, Chenopod scrub, Great Basin grassland & scrub, Joshua tree woodland, Broadleaved upland & Lower & Upper montane coniferous forest, Meadow & seep, Mojavean desert scrub, Riparian forest & woodland, Sonoran desert scrub & thorn woodland, Valley & foothill grassland.	Roosts in the open, hanging from walls and ceilings. Roosting sites limiting. Extremely sensitive to human disturbance.	Low.

Appendix 2 Table 1

Regionally occurring Special-status Animal Scoping List CNDDB, BIOS, IPaC
LSCSD Project, May 20, 2022
Lake Shastina and Surrounding 7.5' Quadrangles

Scientific Name	Common Name	Fed List	Cal List	Other Status	Global Rank	State Rank	General Habitat	Specific Habitat	Potential to Occur
Erethizon dorsatum	North American porcupine	None	None	None	G5	S3	Forested habitats in the Sierra Nevada, Cascade, and Coast ranges, with scattered observations from forested areas in the Transverse Ranges.	Wide variety of coniferous and mixed woodland habitat.	High.
Gulo gulo	wolverine	None	Threatened		G4	S1	Alpine, Alpine dwarf scrub, Meadow & seep, Montane dwarf scrub, North coast coniferous forest, Riparian forest, Subalpine coniferous forest, Upper montane coniferous forest, Wetland, high elevation	Needs water source. Uses caves, logs, burrows for cover and den area. Hunts in more open areas. Can travel long distances.	Low.
Lasionycteris noctivagans	silver-haired bat	None	None		G3G4	S3S4	Primarily a coastal and montane forest dweller, feeding over streams, ponds and open brushy areas.	Roosts in hollow trees, beneath exfoliating bark, abandoned woodpecker holes, and rarely under rocks. Needs drinking water.	Low.
Martes caurina	Pacific marten	None	None		G4G5	S3	Coniferous forest types including redwood, sierran mixed conifer, lodgepole pine, white fir, California red fir, Douglas-fir, ponderosa pine, Jeffrey pine, western white pine, whitebark pine and mountain hemlock.	Nest in dens located in branches, cavities or broken tops of live trees, snags, stumps, logs, woody debris piles, witch's brooms, and rock piles.	Low.

Appendix 2 Table 1

Regionally occurring Special-status Animal Scoping List CNDDB, BIOS, IPaC
LSCSD Project, May 20, 2022
Lake Shastina and Surrounding 7.5' Quadrangles

Scientific Name	Common Name	Fed List	Cal List	Other Status	Global Rank	State Rank	General Habitat	Specific Habitat	Potential to Occur
Myotis evotis	long-eared myotis	None	None	S	G5	S3	Found in all brush, woodland and forest habitats from sea level to about 9000 ft. Prefers coniferous woodlands and forests.	Nursery colonies in buildings, crevices, spaces under bark, and snags. Caves used primarily as night roosts.	Low.
Ochotona princeps schisticeps	gray-headed pika	None	None		G5T4	S2S4	Talus and scree slope, Mountainous areas, generally at higher elevations, often above the treeline up to the limit of vegetation. At lower elevations found in rocky areas within forests or near lakes.	Talus slopes, occasionally on mine tailings. Prefers talus-meadow interface.	Low.
Ovis canadensis nelsoni	desert bighorn sheep	None	None		G4T4	S3	Alpine meadows, grassy mountain slopes and foothill country in proximity to rugged, rocky cliffs and bluffs.	Required drier slopes where annual snowfall is less than 60 inches a year.	None.
Taxidea taxus	American badger	None	None		G5	S3	Most abundant in drier open stages of most shrub, forest, and herbaceous habitats, with friable soils.	Needs sufficient food, friable soils and open, uncultivated ground. Preys on burrowing rodents. Digs burrows.	Low.
Vulpes vulpes necator pop. 1	Sierra Nevada red fox - southern Cascades DPS	None	Threatened		G5TNR	S1	Use multiple habitat types in the alpine and subalpine zones including high-elevation conifer dominated by whitebark pine and mountain	May descend in winter to below subalpine zone consisting of red and white fir; as low as 1,400 meters (4,600 feet).	None.

Appendix 2 Table 1

Regionally occurring Special-status Animal Scoping List CNDDB, BIOS, IPaC
LSCSD Project, May 20, 2022
Lake Shastina and Surrounding 7.5' Quadrangles

Scientific Name	Common Name	Fed List	Cal List	Other Status	Global Rank	State Rank	General Habitat	Specific Habitat	Potential to Occur
							hemlock, as well as meadows and fell-fields.		
Mollusks									
Vespericola sierranus	Siskiyou hesperian	None	None		G3	S1S2	Found under logs in a swampy meadow in Siskiyou County (Roth, 1972).		Low.
Gonidea angulata	western ridged mussel	None	None		G3	S1S2	Aquatic; Primarily creeks and rivers and less often lakes. Originally in most of state, now extirpated from Central and Southern California.		Low.
Reptile									
Emys marmorata	western pond turtle	None	None	SSC, VU, S	G3G4	S3	Ponds, marshes, rivers, streams, and irrigation ditches, usually with aquatic vegetation, below 6000 ft elevation.	Needs basking sites and suitable (sandy banks or grassy open fields) upland habitat up to 0.5 km from water for egg-laying.	Moderate.

1. Species indicator status as assigned by Federal Endangered Species Act (FESA), California Endangered Species Act (CESA), and California Department of Fish and Wildlife (CDFW)

C: candidate	FP: fully protected
CT: candidate threatened	NT: near threatened
D: delisted	PT: proposed threatened
DPS: distinct population segment	SSC: species of special concern

Appendix 2 Table 1

Regionally occurring Special-status Animal Scoping List CNDDB, BIOS, IPaC
LSCSD Project, May 20, 2022
Lake Shastina and Surrounding 7.5' Quadrangles

Scientific Name	Common Name	Fed List	Cal List	Other Status	Global Rank	State Rank	General Habitat	Specific Habitat	Potential to Occur

E: endangered
T: threatened
ESU: evolutionarily significant unit
WL: watch list

2. Species Heritage rank as assigned by California Department of Fish and Wildlife (CDFW)

G1/S1: critically imperiled
G2/S2: imperiled
G3/S3: vulnerable
G4/S4: apparently secure
G5/S5: secure

Appendix 2 Table 2

Regionally-occurring Special-status Plant Scoping List CNDDB, BIOS, IPaC
LSCSD Project, May 20, 2022
Lake Shastina and Surrounding 7.5' Quadrangles

Scientific Name	Common Name	Family	Fed List	State List	Grank	Srank	Plant Rank	Bloom Period	General Habitat	Micro-Habitat	Potential of Occurrence
Alisma gramineum	grass alisma	Alimataceae	None	None	G5	S3	2B.2	June-Aug	Marsh & Swamp, Wetland	Freshwater marsh	Low
Arnica viscosa	Mt. Shasta arnica	Asteraceae	None	None	G4	S3	4.3	Aug-Sept	Subalpine coniferous forest, Upper montane coniferous forest	Rocky	None
Balsamorhiza lanata	woolly balsamroot	Asteraceae	None	None	G3	S3	1B.2	Apr-Jun	Cismontane woodland	Rocky, Volcanic	Moderate
Botrychium pumicola	pumice moonwort	Ophioglossales	None	None	G3	S1	2B.2	Jul-Aug	Alpine boulder and rock field, subalpine coniferous forest	Loose pumice gravel, at high elevations of 2750 m	Low
Calochortus greenei	Greene's mariposa-lily	Liliaceae	None	None	G3	S2S3	1B.2	Jun-Aug	Meadows and seeps, cismontane woodland, pinyon and juniper woodland, upper montane coniferous forest	On volcanic outcrops and open, dry, gravelly soils. 1035-1890 m	Moderate
Campanula wilkinsiana	Wilkin's harebell	Campanulaceae	None	None	G2	S2	1B.2	Jul-Sep	Meadows and seeps, upper montane coniferous forest, subalpine coniferous forest.	Often on streambanks in meadows. 1265-2590 m.	None
Cardamine bellidifolia var. pachyphylla	fleshy toothwort	Brassicaceae	None	None	G5T4	S3	4.3	Jun-Aug	Alpine boulder and rock field, subalpine coniferous forest, upper montane coniferous forest.	rocky, scree, talus	None
Carex atherodes	wheat sedge	Cyperaceae	None	None	G5	S3	2B.2	Jun-Jul	Meadows and seeps, marshes and swamps, pinyon and juniper woodland.	1300-1540 m.	Low

Appendix 2 Table 2

Regionally-occurring Special-status Plant Scoping List CNDDB, BIOS, IPaC
LSCSD Project, May 20, 2022
Lake Shastina and Surrounding 7.5' Quadrangles

Scientific Name	Common Name	Family	Fed List	State List	Grank	Srank	Plant Rank	Bloom Period	General Habitat	Micro-Habitat	Potential of Occurrence
Chaenactis suffrutescens	Shasta chaenactis	Asteraceae	None	None	G2G3	S2S3	1B.3	May-Sep	Lower & upper montane coniferous forest.	Sandy or serpentine soils. 730-2255 m.	High
Claytonia obovata	Rydberg's spring beauty	Portulacaceae	None	None	G4	S1	4.3	May-Jul	Subalpine coniferous forest	Openings, rocky, talus	None
Cordylanthus tenuis ssp. Pallescens	pallid bird's-beak	Orobanchaceae	None	None	G4G5T1	S1	1B.2	Jun-Sep	Lower montane coniferous forest.	Gravelly openings in brush patches next to coniferous forest; on volcanic alluvium. 1070-1615 m.	Low
Cypripedium californicum	California lady's-slipper	Orchidaceae	None	None	G4	S4	4.2	April-August	Streambanks, moist slopes, fens	30-2750 m elevation	Low
Cypripedium fasciculatum	clustered lady's-slipper	Orchidaceae	None	None	G4	S4	4.2	Apr-Jul	Mixed evergreen woods through mid-elevations		None
Cypripedium montanum	mountain lady's-slipper	Orchidaceae	None	None	G4	S4	4.2	Mar-Jun	Moist areas, dry slopes, mixed-evergreen or conifer forest	200-2200 m	None
Draba carnosula	Mt. Eddy draba	Brassicaceae	None	None	G2	S2	1B.3	Jul-Aug	Subalpine coniferous forest, Upper montane coniferous forest	Rocky, Serpentinite	None
Erigeron nivalis	snow fleabane daisy	Asteraceae	None	None	G5	S3	2B.3	Jul-Aug	Alpine boulder and rock field, meadows and seeps, subalpine coniferous forest.	On volcanic rock outcrops in cracks and crevices. 1780-2895 m.	None
Eriogonum pyrolifolium var. pyrolifolium	pyrola-leaved buckwheat	Polygonaceae	None	None	G4T4	S3	2B.3	Jul-Sep	Alpine boulder and rock field.	Sandy or gravelly sites; on pumice. 1885-3170 m.	None

Appendix 2 Table 2

Regionally-occurring Special-status Plant Scoping List CNDDB, BIOS, IPaC
LSCSD Project, May 20, 2022
Lake Shastina and Surrounding 7.5' Quadrangles

Scientific Name	Common Name	Family	Fed List	State List	Grank	Srank	Plant Rank	Bloom Period	General Habitat	Micro-Habitat	Potential of Occurrence
Eriogonum umbellatum var. humistratum	Mt. Eddy buckwheat	Polygonaceae	None	None	G5T4	S4	4.3	May-Oct	Gravelly serpentine slopes and ridges, montane conifer woodlands, meadows		None
Eriophorum gracile	slender cottongrass	Cyperaceae	None	None	G5	S4	4.3	Jun-Aug	Wet meadows, bogs	600 - 2900m	None
Erythronium revolutum	coast fawn lily	Liliaceae	None	None	G4G5	S3	2B.2	Mar-Jul	Streambanks, wet places in woodland	< 1350 m	None
Eurybia merita	subalpine aster	Asteraceae	None	None	G5	SH	2B.3	Jul-Aug	Upper montane coniferous forest.	1300-2000 m.	None
Frasera albicaulis var. modocensis	Modoc green-gentian	Gentianaceae	None	None	G5T3T4	S2S3	2B.3	May-Jul	Great Basin scrub, upper montane coniferous forest.	Openings. 900-1750 m.	Moderate
Hesperocyparis bakeri	Baker cypress	Cupressaceae	None	None	G3	S3	4.2	none	Chaparral, Lower montane coniferous forest	Serpentinite (sometimes), Volcanic (sometimes)	None
Hulsea nana	little hulsea	Asteraceae	None	None	G4	S3	2B.3	Jun-Sep	Alpine boulder and rock field, subalpine coniferous forest.	Rocky or gravelly sites; on volcanic substrates. 1705-3170 m.	None
Hymenoxys lemmonii	alkali hymenoxys	Asteraceae	None	None	G4	S2S3	2B.2	(May)Jun-Aug(Sep)	Great Basin scrub, Lower montane coniferous forest, Meadows and seeps		Moderate
Iliamna bakeri	Baker's globe mallow	Malvaceae	None	None	G4	S3	4.2	Jun-Sep	Chaparral, Great Basin scrub, Lower montane coniferous forest, Pinyon and juniper woodland	Burned areas (often), Volcanic	Moderate
Ivesia pickeringii	Pickering's ivesia	Rosaceae	None	None	G2	S2	1B.2	Jul-Aug	Lower montane coniferous forest, meadows and seeps.	Mesic clay; usually serpentine seeps. 850-1525 m.	Low

Appendix 2 Table 2

Regionally-occurring Special-status Plant Scoping List CNDDB, BIOS, IPaC
LSCSD Project, May 20, 2022
Lake Shastina and Surrounding 7.5' Quadrangles

Scientific Name	Common Name	Family	Fed List	State List	Grank	Srank	Plant Rank	Bloom Period	General Habitat	Micro-Habitat	Potential of Occurrence
Lomatium peckianum	Peck's lomatium	Apiaceae	None	None	G4	S1	2B.2	May	Chaparral, cismontane woodland, lower montane coniferous forest, pinyon and juniper woodland.	Rocky slopes, flats, and sometimes grassy openings, in yellow pine-black oak woodland, on volcanic soils. 685-1180 m.	Moderate
Meesia uliginosa	broad-nerved hump moss	Meesiaceae	None	None	G5	S3	2B.2	none	Meadows and seeps, bogs and fens, upper montane coniferous forest, subalpine coniferous forest.	Moss on damp soil. Often found on the edge of fens or raised above the fen on hummocks/shrub bases. 1095-2805 m.	None
Opuntia fragilis	brittle prickly-pear	Cactaceae	None	None	G5	S1	2B.1	Apr-Jul	Pinyon and juniper woodland.	Volcanic soils. 785-820 m.	Moderate
Orthocarpus bracteosus	rosy orthocarpus	Orobanchaceae	None	None	G3	S1	2B.1	Jun-Aug	Meadows and seeps.	1000-2000 m.	None
Orthocarpus pachystachyus	Shasta orthocarpus	Orobanchaceae	None	None	G1	S1	1B.1	May	Great Basin scrub, Meadows and seeps, Valley and foothill grassland		Moderate
Penstemon cinicola	ash beardtongue	Plantaginaceae	None	None	G4	S3	4.3	Jun-Aug	1250-2700 m elevation, igneous soils		None
Penstemon heterodoxus var. shastensis	Shasta beardtongue	Plantaginaceae	None	None	G5T3	S3	4.3	Jun-Aug	Montane meadows	900-2400 m	None
Phacelia cookei	Cooke's phacelia	Hydrophyllaceae	None	None	G1	S1	1B.1	Jun-Jul	Great Basin scrub, Lower montane coniferous forest	Sandy, Volcanic	Moderate
Polemonium pulcherrimum var. shastense	Mt. Shasta sky pilot	Polemoniaceae	None	None	G5T2	S2	1B.2	Jul-Sep	Alpine boulder and rock fields, subalpine and upper and lower montane coniferous forests.	Sometimes volcanic. 2190-3780 m.	None

Appendix 2 Table 2 Regionally-occurring Special-status Plant Scoping List CNDDB, BIOS, IPaC LSCSD Project, May 20, 2022 Lake Shastina and Surrounding 7.5’ Quadrangles											
Scientific Name	Common Name	Family	Fed List	State List	Grank	Srank	Plant Rank	Bloom Period	General Habitat	Micro-Habitat	Potential of Occurrence
Potentilla newberryi	Newberry's cinquefoil	Rosaceae	None	None	G3G4	S2S3	2B.3	May-Aug	Marshes and swamps, vernal pools.	Receding shorelines; drying wetland margins. 1285-1930 m.	None
Silene suksdorfii	Cascade alpine campion	Caryophyllaceae	None	None	G4	S3	2B.3	Jun-Sep	Alpine boulder and rock field, subalpine coniferous forest, upper montane coniferous forest.	Rocky, volcanic soils. 1745-3050 m.	None
Stachys pilosa	hairy marsh hedge-nettle	Lamiaceae	None	None	G5	S3	2B.3	Jun-Sep	Great Basin scrub, meadows and seeps.	Mesic sites. 785-2045 m.	Moderate
Thelypodium brachycarpum	short-podded thelypodium	Brassicaceae	None	None	G3	S3	4.2	Apr-Aug	Alkaline soils, adobe flats, pond margins	800-2320 m	Low
Triteleia grandiflora	large-flowered triteleia	Themidaceae	None	None	G4G5	S1	2B.1	Apr-Jun	Great Basin scrub, pinyon and juniper woodland.	In rocky areas in sagebrush scrub, and in woodland. 210-1405 m.	Low
Triteleia hendersonii	Henderson's triteleia	Themidaceae	None	None	G4	S1	2B.2	May-Jul	Cismontane woodland.	Open slopes and roadbanks. 760-1200 m.	Moderate

1. Species indicator status as assigned by Federal Endangered Species Act (FESA), California Endangered Species Act (CESA), and California Department of Fish and Wildlife (CDFW)

C: candidate	FP: fully protected
CT: candidate threatened	PT: proposed threatened
D: delisted	SSC: species of special concern
DPS: distinct population segment	T: threatened
E: endangered	WL: watch list
ESU: evolutionarily significant unit	FP: fully protected

Appendix 2 Table 2

Regionally-occurring Special-status Plant Scoping List CNDDB, BIOS, IPaC
LSCSD Project, May 20, 2022
Lake Shastina and Surrounding 7.5' Quadrangles

Scientific Name	Common Name	Family	Fed List	State List	Grank	Srank	Plant Rank	Bloom Period	General Habitat	Micro-Habitat	Potential of Occurrence
2. Species Heritage rank as assigned by California Department of Fish and Wildlife (CDFW) G1/S1: critically imperiled G2/S2: imperiled G3/S3: vulnerable G4/S4: apparently secure G5/S5: secure											

Observed Species List

3

Appendix 3, Table 1
Animal Species Observed 6/22/2022
Lake Shastina Community Services Infrastructure Improvement Project

Scientific Name	Common Name	Nest Habitat	Status
Birds			
Cathertes aura	turkey vulture	Usually rock crevices, caves, ledges, also fallen logs.	NL[a]
Buteo jamaicensis	red-tailed hawk	crowns of tall trees, cliff, ledge, or artificial structure	NL
Passer domesticus	house sparrow	Holes in buildings, streetlights, roofs, overhanging fixtures, vines that climb walls	NL (non-native)
Streptopelia decaocto	Eurasian-collared dove	low canopy in trees or on buildings	NL (non-native)
Poecile atricapillus	black-capped chickadee	small natural cavities, nest boxes, abandoned downy woodpecker cavities	NL
Aphelocoma californica	western scrub jay	low canopy of oak, laurel sumac, madrone, or poison oak	NL
Chordeiles minor	common nighthawk	gravel beaches, rocky outcrops, and open forest floors near logs, boulders, and shrubs	NL
Sturnus vulgaris	European starling	cavity in a building or structure, old woodpecker hole, or a nest box	NL (non-native)
Contopus sordidulus	western wood-peewee	nest in cottonwood, aspen, pinyon pine, walnut, sycamore trees near the ground to more than 80 feet above	NL
Turdus migratorius	American robin	within lower canopy, April-July	NL
Colaptes auratus	northern flicker	Excavate nest holes in dead or diseased tree trunks or branches 6-15 feet off the ground	NL
Spinus psaltria	lesser goldfinch	fork of a branch in cottonwoods or willows along rivers, 4-8 ft or higher off the ground	NL
Junco hyemailis	dark eyed junco	depression or niche on sloping ground, rock face, or amid tangled roots of an upturned tree	NL
Larus californicus	California gull	on the ground in the open or at the based of a small shrub	NL
Larus delawarensis	ring-billed gull	on the ground near freshwater and sparsely vegetated terrain	NL
Thyromanes bewickii	Bewick's wren	nest in cavities or on ledges within 30 ft off the ground	NL
Gymnorhinus cyanocephalus	pinyon jay	nest in ponderosa pine, pinyon pine, and junipers from 3-115 feet above the ground	NL
Haemorphous mexicanus	house finch	nest is various deciduous and coniferous trees as well as on cactus and rock ledges, buildings, and light structures	NL

Appendix 3, Table 1
Animal Species Observed 6/22/2022
Lake Shastina Community Services Infrastructure Improvement Project

Scientific Name	Common Name	Nest Habitat	Status
Branta canadensis	Canada goose	on the ground slightly elevated near water	NL
Accipiter cooperii	Cooper's hawk	build nest in pines, oaks, Douglas-firs, beeches, and spruces, 25-50 ft off the ground	NL
Pelecanus erythrorhynchos	American white pelican	nest site on gravel, sand, or soil among sparse vegetation or under shrubs or trees, near other pelicans	NL
Nannopterum auritum	double crested cormorant	ground, rocks, or reefs with no vegetations, or atop trees in colonies	NL
Fulica americana	American coot	Built over water on floating platforms with dense stand of vegetations of reeds, cattails, bulrushes, sedges, and grasses	NL
Leucophaeus pipixcan	Franklin's gull	A platform of wet vegetation with a central depression	NL
Psaltriparus minimus	bushtit	nests are on branches or trucks of trees at any height about 3-100 feet	NL
Charadrius vociferus	killdeer	placed on slight rises in open habitats on bare ground	NL
Baeolophus inornatus	oak titmouse	natural cavity in a tree up to 40 ft off the ground	NL
Euphagus cyanocephalus	Brewer's blackbird	Nest in colonies in low shrubs or trees near water, or reeds and cattails	NL
Circus hudsonius	northern harrier	on the ground in a dense clump of vegetation such as willows, grasses, sedges, reeds, bulrushes, and cattails	NL
Pandion haliaetus	osprey	Nests are usually built on snags, treetops, or large cavities between large branches and trunks, human-built platforms, on cliffs	NL
Agelaius phoeniceus	red-winged blackbird	Build nest in marsh vegetation, shrubs, or trees	NL
Zenaida macroura	mourning dove	Nest in dense foliage of evergreen, orchard tree, mesquite, cottonwood, or vine. Also nests on the ground.	NL
Aythya affinis	lesser scaup	Nest on the ground in tall vegetation in prairies, hayfields, fresh and brackish marshes, and lakes with sedges, bulrushes, and cattails. Sometimes build nests on floating mats of vegetation.	NL

Appendix 3, Table 1
Animal Species Observed 6/22/2022
Lake Shastina Community Services Infrastructure Improvement Project

Scientific Name	Common Name	Nest Habitat	Status
Melospiza melodia	song sparrow	Hidden in grasses or low vegetation.	NL
Pipilo maculatus	spotted towhee	Nests can be on the ground or near it (up to 12 ft high). Often choose a clump of grass next to a log or base of a shrub to conceal their nest.	NL
Molothrus ater	brown-headed cowbird	Lay eggs in other birds' nests. Most common: yellow warbler, song and chipping sparrows, spotted towhees, and red-winged blackbird	NL
Callipepla californica	California quail	Hide nests on the ground amid grasses or at the bases of shrubs and trees.	NL
Mammals			
Lepus californicus	black-tailed jackrabbit	Use a shallow excavation in the ground near mixed grasses, forbs, and shrubs	NL
Odocoileus hemionus	mule deer	Tall grasses for fawns to hide in.	NL
Sciurus griseus	western gray squirrel	Use cavities in snags and trees of oak, fir, or pine trees. Nests are lined with shredded bark, grass, moss, and lichen.	NL
Otospermophilus beecheyi	California ground squirrel	underground burrows	NL

[a] NL: Not listed

4 Soil Map

United States Department of Agriculture

NRCS

Natural Resources Conservation Service

A product of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local participants

Custom Soil Resource Report for

Siskiyou County, California, Central Part

Lake Shastina Soil Types

July 12, 2022

Preface

Soil surveys contain information that affects land use planning in survey areas. They highlight soil limitations that affect various land uses and provide information about the properties of the soils in the survey areas. Soil surveys are designed for many different users, including farmers, ranchers, foresters, agronomists, urban planners, community officials, engineers, developers, builders, and home buyers. Also, conservationists, teachers, students, and specialists in recreation, waste disposal, and pollution control can use the surveys to help them understand, protect, or enhance the environment.

Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. Soil surveys identify soil properties that are used in making various land use or land treatment decisions. The information is intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://www.nrcs.usda.gov/wps/portal/nrcs/main/soils/health/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (https://offices.sc.egov.usda.gov/locator/app?agency=nrcs) or your NRCS State Soil Scientist (http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/contactus/?cid=nrcs142p2_053951).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. Some are too unstable to be used as a foundation for buildings or roads. Clayey or wet soils are poorly suited to use as septic tank absorption fields. A high water table makes a soil poorly suited to basements or underground installations.

The National Cooperative Soil Survey is a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service (NRCS) has leadership for the Federal part of the National Cooperative Soil Survey.

Information about soils is updated periodically. Updated information is available through the NRCS Web Soil Survey, the site for official soil survey information.

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Contents

How Soil Surveys Are Made

Soil surveys are made to provide information about the soils and miscellaneous areas in a specific area. They include a description of the soils and miscellaneous areas and their location on the landscape and tables that show soil properties and limitations affecting various uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They observed and described many soil profiles. A soil profile is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed or from the surface down to bedrock. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one or more MLRA.

The soils and miscellaneous areas in a survey area occur in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, a soil scientist develops a concept, or model, of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted soil color, texture, size and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile. After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

The objective of soil mapping is not to delineate pure map unit components; the objective is to separate the landscape into landforms or landform segments that have similar use and management requirements. Each map unit is defined by a unique combination of soil components and/or miscellaneous areas in predictable proportions. Some components may be highly contrasting to the other components of the map unit. The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The delineation of such landforms and landform segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, onsite investigation is needed to define and locate the soils and miscellaneous areas.

Soil scientists make many field observations in the process of producing a soil map. The frequency of observation is dependent upon several factors, including scale of mapping, intensity of mapping, design of map units, complexity of the landscape, and experience of the soil scientist. Observations are made to test and refine the soil-landscape model and predictions and to verify the classification of the soils at specific locations. Once the soil-landscape model is refined, a significantly smaller number of measurements of individual soil properties are made and recorded. These measurements may include field measurements, such as those for color, depth to bedrock, and texture, and laboratory measurements, such as those for content of sand, silt, clay, salt, and other components. Properties of each soil typically vary from one point to another across the landscape.

Observations for map unit components are aggregated to develop ranges of characteristics for the components. The aggregated values are presented. Direct measurements do not exist for every property presented for every map unit component. Values for some properties are estimated from combinations of other properties.

While a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management are assembled from farm records and from field or plot experiments on the same kinds of soil.

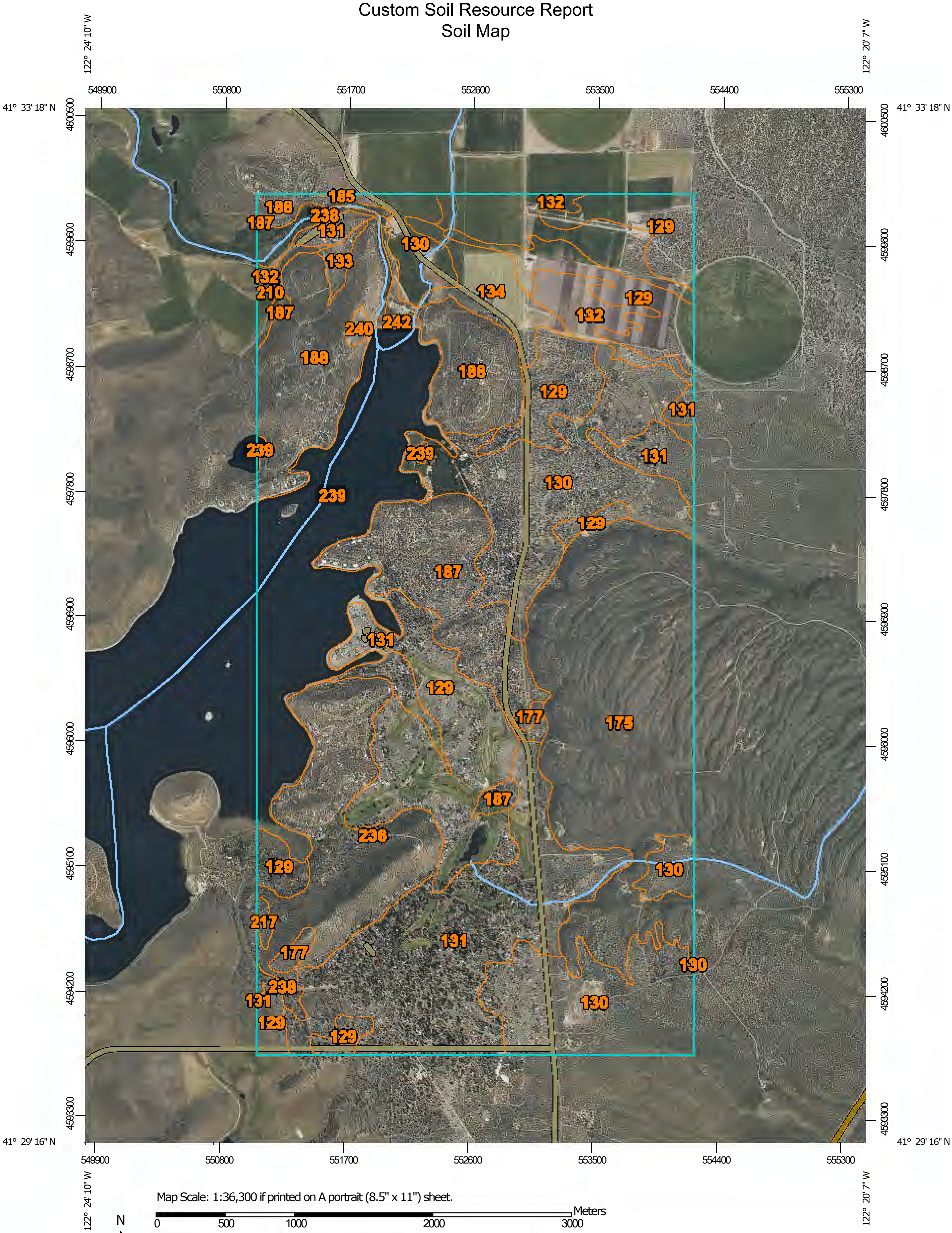
Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can predict with a fairly high degree of accuracy that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

Soil Map

The soil map section includes the soil map for the defined area of interest, a list of soil map units on the map and extent of each map unit, and cartographic symbols displayed on the map. Also presented are various metadata about data used to produce the map, and a description of each soil map unit.

Soil Map



Map Scale: 1:36,300 if printed on A portrait (8.5" x 11") sheet.

Meters: 0, 500, 1000, 2000, 3000

Feet: 0, 1500, 3000, 6000, 9000

N

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 10N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Siskiyou County, California, Central Part
Survey Area Data: Version 13, Sep 6, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 2, 2019—Jun 21, 2019

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
129	Delaney sand, 0 to 9 percent slopes	703.8	14.5%
130	Delaney gravelly sand, 0 to 9 percent slopes	763.3	15.7%
131	Delaney stony sand, 0 to 15 percent slopes	657.0	13.5%
132	Delaney sandy loam, 0 to 2 percent slopes	197.9	4.1%
133	Delaney sandy loam, 2 to 5 percent slopes	16.6	0.3%
134	Delaney variant silt, 0 to 2 percent slopes	94.8	1.9%
175	Lava flows	726.1	14.9%
177	Lithic Haploxerolls-Rock outcrop complex, 0 to 65 percent slopes*	19.5	0.4%
185	Mary loam, 2 to 9 percent slopes	0.8	0.0%
187	Mary stony loam, 2 to 50 percent slopes	282.1	5.8%
188	Mary-Rock outcrop complex, 2 to 50 percent slopes	427.3	8.8%
210	Redola loam, 0 to 2 percent slopes	17.8	0.4%
217	Salisbury clay loam, 0 to 2 percent slopes	7.6	0.2%
236	Uhlig variant stony loam, 5 to 50 percent slopes	350.0	7.2%
238	Xerofluvents, nearly level	54.6	1.1%
239	Water	530.8	10.9%
240	Gravel pits	7.8	0.2%
242	Dams	6.8	0.1%
Totals for Area of Interest		**4,864.6**	**100.0%**

Map Unit Descriptions

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some minor components that belong to taxonomic classes other than those of the major soils.

Most minor soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Siskiyou County, California, Central Part

129—Delaney sand, 0 to 9 percent slopes

Map Unit Setting

National map unit symbol: hdnp
Elevation: 2,800 to 4,500 feet
Mean annual precipitation: 10 to 16 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 100 to 140 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Delaney and similar soils: 85 percent
Minor components: 14 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Delaney

Setting

Landform: Outwash fans
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Glaciofluvial deposits derived from igneous rock

Typical profile

H1 - 0 to 9 inches: sand
H2 - 9 to 68 inches: sand

Properties and qualities

Slope: 0 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.6 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: R021XE088CA - SANDY
Hydric soil rating: No

Minor Components

Plutos

Percent of map unit: 10 percent
Hydric soil rating: No

Rubble land

Percent of map unit: 2 percent
Hydric soil rating: No

Riverwash

Percent of map unit: 1 percent
Landform: Drainageways
Hydric soil rating: Yes

Xerofluvents

Percent of map unit: 1 percent
Landform: Drainageways
Hydric soil rating: Yes

130—Delaney gravelly sand, 0 to 9 percent slopes

Map Unit Setting

National map unit symbol: hdnq
Elevation: 2,800 to 4,500 feet
Mean annual precipitation: 10 to 16 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 100 to 140 days
Farmland classification: Not prime farmland

Map Unit Composition

Delaney and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Delaney

Setting

Landform: Outwash fans
Landform position (two-dimensional): Summit, shoulder
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Glaciofluvial deposits derived from igneous rock

Typical profile

H1 - 0 to 9 inches: gravelly sand
H2 - 9 to 44 inches: gravelly sand
H3 - 44 to 68 inches: very gravelly sand

Properties and qualities

Slope: 0 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)

Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 3.0 inches)

Interpretive groups
Land capability classification (irrigated): 4s
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: R021XE088CA - SANDY
Hydric soil rating: No

Minor Components

Plutos
Percent of map unit: 8 percent
Hydric soil rating: No

Rubble land
Percent of map unit: 5 percent
Hydric soil rating: No

Xerofluvents
Percent of map unit: 1 percent
Landform: Drainageways
Hydric soil rating: Yes

Riverwash
Percent of map unit: 1 percent
Landform: Drainageways
Hydric soil rating: Yes

131—Delaney stony sand, 0 to 15 percent slopes

Map Unit Setting
National map unit symbol: hdnr
Elevation: 2,800 to 4,500 feet
Mean annual precipitation: 10 to 16 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 100 to 140 days
Farmland classification: Not prime farmland

Map Unit Composition
Delaney and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Delaney

Setting
Landform: Outwash fans
Landform position (two-dimensional): Summit, shoulder, backslope

Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Glaciofluvial deposits derived from igneous rock

Typical profile

H1 - 0 to 9 inches: stony sand
H2 - 9 to 45 inches: gravelly sand
H3 - 45 to 49 inches: unweathered bedrock

Properties and qualities

Slope: 0 to 15 percent
Surface area covered with cobbles, stones or boulders: 2.0 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Drainage class: Somewhat excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: R021XE104CA - STONY SANDS
Hydric soil rating: No

Minor Components

Plutos

Percent of map unit: 10 percent
Hydric soil rating: No

Lava flows

Percent of map unit: 3 percent
Hydric soil rating: No

Xerofluvents

Percent of map unit: 1 percent
Landform: Drainageways
Hydric soil rating: Yes

Riverwash

Percent of map unit: 1 percent
Landform: Drainageways
Hydric soil rating: Yes

132—Delaney sandy loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: hdns
Elevation: 2,800 to 4,500 feet
Mean annual precipitation: 10 to 16 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 100 to 140 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Delaney and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Delaney

Setting

Landform: Outwash fans
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Glaciofluvial deposits derived from igneous rock

Typical profile

H1 - 0 to 9 inches: sandy loam
H2 - 9 to 68 inches: sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Negligible
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: R021XE160CA - COARSE LOAMY
Hydric soil rating: No

Minor Components

Plutos

Percent of map unit: 10 percent
Hydric soil rating: No

Riverwash

Percent of map unit: 3 percent
Landform: Drainageways
Hydric soil rating: Yes

Xerofluvents

Percent of map unit: 2 percent
Landform: Drainageways
Hydric soil rating: Yes

133—Delaney sandy loam, 2 to 5 percent slopes

Map Unit Setting

National map unit symbol: hdnt
Elevation: 2,800 to 4,500 feet
Mean annual precipitation: 10 to 16 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 100 to 140 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Delaney and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Delaney

Setting

Landform: Outwash fans
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Glaciofluvial deposits derived from igneous rock

Typical profile

H1 - 0 to 9 inches: sandy loam
H2 - 9 to 68 inches: sand

Properties and qualities

Slope: 2 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Negligible

Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 3.8 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: A
Ecological site: R021XE160CA - COARSE LOAMY
Hydric soil rating: No

Minor Components

Plutos

Percent of map unit: 10 percent
Hydric soil rating: No

Riverwash

Percent of map unit: 3 percent
Landform: Drainageways
Hydric soil rating: Yes

Xerofluvents

Percent of map unit: 2 percent
Landform: Drainageways
Hydric soil rating: Yes

134—Delaney variant silt, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: hdnv
Elevation: 2,800 to 4,500 feet
Mean annual precipitation: 10 to 16 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 100 to 140 days
Farmland classification: Prime farmland if irrigated and either protected from flooding or not frequently flooded during the growing season

Map Unit Composition

Delaney variant and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Delaney Variant

Setting

Landform: Outwash plains
Landform position (two-dimensional): Summit

Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Glaciofluvial deposits derived from igneous rock

Typical profile

H1 - 0 to 7 inches: silt
H2 - 7 to 14 inches: loamy fine sand
H3 - 14 to 22 inches: silt
H4 - 22 to 34 inches: loamy sand
H5 - 34 to 53 inches: sandy loam
H6 - 53 to 60 inches: coarse sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: NoneFrequent
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.9 inches)

Interpretive groups

Land capability classification (irrigated): 4w
Land capability classification (nonirrigated): 4w
Hydrologic Soil Group: C
Ecological site: R021XE131CA - LOAMY
Hydric soil rating: No

Minor Components

Plutos

Percent of map unit: 5 percent
Hydric soil rating: No

Delaney

Percent of map unit: 5 percent
Hydric soil rating: No

Riverwash

Percent of map unit: 3 percent
Landform: Alluvial fans
Hydric soil rating: Yes

Xerofluvents

Percent of map unit: 2 percent
Landform: Drainageways
Hydric soil rating: Yes

175—Lava flows

Map Unit Composition

Lava flows: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lava Flows

Setting

Landform: Lava fields
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Pahoehoe lava

Typical profile

H1 - 0 to 60 inches: fragmental material

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydrologic Soil Group: D
Hydric soil rating: No

Minor Components

Unnamed

Percent of map unit: 5 percent
Hydric soil rating: No

Mart

Percent of map unit: 5 percent
Hydric soil rating: No

Jilson

Percent of map unit: 5 percent
Hydric soil rating: No

177—Lithic Haploxerolls-Rock outcrop complex, 0 to 65 percent slopes*

Map Unit Setting

National map unit symbol: hdq7
Elevation: 2,000 to 6,000 feet
Mean annual precipitation: 20 to 50 inches
Mean annual air temperature: 48 to 52 degrees F

Frost-free period: 60 to 125 days
Farmland classification: Not prime farmland

Map Unit Composition

Lithic haploxerolls, very stony loam, and similar soils: 40 percent
Rock outcrop: 30 percent
Minor components: 29 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Lithic Haploxerolls, Very Stony Loam

Setting

Landform: Mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Residuum weathered from igneous and metamorphic rock

Typical profile

H1 - 0 to 3 inches: very stony sandy loam
H2 - 3 to 10 inches: very stony sandy loam
H3 - 10 to 10 inches: unweathered bedrock

Properties and qualities

Slope: 0 to 65 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Excessively drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 0.6 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: F022BF201CA - Ash-influenced, warm (FFD>100) rocky mountains
Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Mountains
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Mountainflank
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Igneous and metamorphic rock

Typical profile

H1 - 0 to 10 inches: unweathered bedrock

Properties and qualities

Slope: 0 to 65 percent

Depth to restrictive feature: 0 to 4 inches to lithic bedrock
Drainage class: Excessively drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 in/hr)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8
Hydric soil rating: No

Minor Components

Unnamed

Percent of map unit: 14 percent
Hydric soil rating: No

Rubble land

Percent of map unit: 10 percent
Hydric soil rating: No

Riverwash

Percent of map unit: 5 percent
Landform: Drainageways
Hydric soil rating: Yes

185—Mary loam, 2 to 9 percent slopes

Map Unit Setting

National map unit symbol: hdqh
Elevation: 2,500 to 4,500 feet
Mean annual precipitation: 18 inches
Mean annual air temperature: 50 degrees F
Frost-free period: 110 to 140 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Mary and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mary

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from igneous rock

Typical profile

H1 - 0 to 10 inches: loam
H2 - 10 to 24 inches: clay loam
H3 - 24 to 28 inches: sandy clay loam
H4 - 28 to 32 inches: unweathered bedrock

Properties and qualities

Slope: 2 to 9 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.4 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: C
Ecological site: R022AF032CA - LOAMY
Hydric soil rating: No

Minor Components

Hilt

Percent of map unit: 5 percent
Hydric soil rating: No

Kuck

Percent of map unit: 5 percent
Hydric soil rating: No

Terwilliger

Percent of map unit: 3 percent
Hydric soil rating: No

Rock outcrop

Percent of map unit: 2 percent
Hydric soil rating: No

187—Mary stony loam, 2 to 50 percent slopes

Map Unit Setting

National map unit symbol: hdqk
Elevation: 2,500 to 4,500 feet
Mean annual precipitation: 18 inches
Mean annual air temperature: 50 degrees F
Frost-free period: 110 to 140 days

Farmland classification: Not prime farmland

Map Unit Composition

Mary and similar soils: 80 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mary

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from igneous rock

Typical profile

H1 - 0 to 10 inches: stony loam
H2 - 10 to 24 inches: clay loam
H3 - 24 to 28 inches: sandy clay loam
H4 - 28 to 32 inches: unweathered bedrock

Properties and qualities

Slope: 2 to 50 percent
Surface area covered with cobbles, stones or boulders: 2.0 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: R022AF068CA - STONY LOAM
Hydric soil rating: No

Minor Components

Terwilliger

Percent of map unit: 5 percent
Hydric soil rating: No

Rock outcrop

Percent of map unit: 5 percent
Hydric soil rating: No

Hilt

Percent of map unit: 5 percent
Hydric soil rating: No

188—Mary-Rock outcrop complex, 2 to 50 percent slopes

Map Unit Setting

National map unit symbol: hdql
Elevation: 2,500 to 4,500 feet
Mean annual precipitation: 18 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 110 to 140 days
Farmland classification: Not prime farmland

Map Unit Composition

Mary and similar soils: 40 percent
Rock outcrop: 25 percent
Minor components: 29 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Mary

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Residuum weathered from igneous rock

Typical profile

H1 - 0 to 10 inches: stony loam
H2 - 10 to 24 inches: clay loam
H3 - 24 to 28 inches: sandy clay loam
H4 - 28 to 32 inches: unweathered bedrock

Properties and qualities

Slope: 2 to 50 percent
Surface area covered with cobbles, stones or boulders: 2.0 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.57 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 4.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: C
Ecological site: R022AF068CA - STONY LOAM

Hydric soil rating: No

Description of Rock Outcrop

Setting

Landform: Hills
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Side slope
Down-slope shape: Convex
Across-slope shape: Convex
Parent material: Residuum weathered from igneous rock

Typical profile

H1 - 0 to 4 inches: unweathered bedrock

Properties and qualities

Slope: 2 to 50 percent
Depth to restrictive feature: 0 to 4 inches to lithic bedrock
Drainage class: Excessively drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 in/hr)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 8s
Hydric soil rating: No

Minor Components

Unnamed

Percent of map unit: 14 percent
Hydric soil rating: No

Hilt

Percent of map unit: 10 percent
Hydric soil rating: No

Terwilliger

Percent of map unit: 5 percent
Hydric soil rating: No

210—Redola loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: hdr9
Elevation: 2,500 to 4,000 feet
Mean annual precipitation: 13 inches
Mean annual air temperature: 50 degrees F
Frost-free period: 125 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Redola and similar soils: 85 percent
Minor components: 11 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Redola

Setting

Landform: Alluvial fans
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from igneous, metamorphic and sedimentary rock

Typical profile

H1 - 0 to 13 inches: loam
H2 - 13 to 39 inches: stratified sandy loam to clay loam
H3 - 39 to 60 inches: stratified gravelly sand to gravelly loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 7.5 inches)

Interpretive groups

Land capability classification (irrigated): 2s
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: B
Ecological site: R021XE160CA - COARSE LOAMY
Hydric soil rating: No

Minor Components

Delaney variant

Percent of map unit: 5 percent
Hydric soil rating: No

Delaney

Percent of map unit: 5 percent
Hydric soil rating: No

Riverwash

Percent of map unit: 1 percent
Landform: Drainageways
Hydric soil rating: Yes

217—Salisbury clay loam, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: hdrj
Elevation: 2,500 to 4,500 feet
Mean annual precipitation: 13 inches
Mean annual air temperature: 48 degrees F
Frost-free period: 125 days
Farmland classification: Farmland of statewide importance

Map Unit Composition

Salisbury and similar soils: 85 percent
Minor components: 15 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Salisbury

Setting

Landform: Terraces
Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from igneous, metamorphic and sedimentary rock

Typical profile

H1 - 0 to 4 inches: clay loam
H2 - 4 to 24 inches: clay
H3 - 24 to 32 inches: indurated
H4 - 32 to 60 inches: stratified sand to stony sand

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: 20 to 40 inches to duripan
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Very low (0.00 to 0.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 3.7 inches)

Interpretive groups

Land capability classification (irrigated): 3s
Land capability classification (nonirrigated): 3s
Hydrologic Soil Group: D
Ecological site: R021XE074CA - FINE LOAMY

Hydric soil rating: No

Minor Components

Kuck

Percent of map unit: 5 percent
Hydric soil rating: No

Lassen

Percent of map unit: 5 percent
Hydric soil rating: No

Mary

Percent of map unit: 3 percent
Hydric soil rating: No

Medford

Percent of map unit: 2 percent
Hydric soil rating: No

236—Uhlig variant stony loam, 5 to 50 percent slopes

Map Unit Setting

National map unit symbol: hds4
Elevation: 2,500 to 4,000 feet
Mean annual precipitation: 13 inches
Mean annual air temperature: 50 degrees F
Frost-free period: 125 days
Farmland classification: Not prime farmland

Map Unit Composition

Uhlig variant and similar soils: 75 percent
Minor components: 20 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Uhlig Variant

Setting

Landform: Terraces
Landform position (two-dimensional): Backslope
Landform position (three-dimensional): Riser
Down-slope shape: Concave
Across-slope shape: Convex
Parent material: Alluvium derived from igneous rock

Typical profile

H1 - 0 to 14 inches: stony loam
H2 - 14 to 42 inches: stony loam
H3 - 42 to 46 inches: weathered bedrock

Properties and qualities

Slope: 5 to 50 percent

Surface area covered with cobbles, stones or boulders: 2.0 percent
Depth to restrictive feature: 40 to 60 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: High
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.57 to 1.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 5.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: B
Ecological site: R022AF068CA - STONY LOAM
Hydric soil rating: No

Minor Components

Unnamed

Percent of map unit: 10 percent
Hydric soil rating: No

Redola

Percent of map unit: 5 percent
Hydric soil rating: No

Delaney

Percent of map unit: 5 percent
Hydric soil rating: No

238—Xerofluvents, nearly level

Map Unit Setting

National map unit symbol: hds6
Elevation: 2,020 to 5,080 feet
Mean annual precipitation: 17 to 50 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 100 days
Farmland classification: Not prime farmland

Map Unit Composition

Xerofluvents and similar soils: 75 percent
Minor components: 24 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Xerofluvents

Setting

Landform: Flood plains

Landform position (two-dimensional): Summit
Landform position (three-dimensional): Tread
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from igneous, metamorphic and sedimentary rock

Typical profile

H1 - 0 to 10 inches: gravelly loamy sand
H2 - 10 to 60 inches: stratified gravelly sand to gravelly loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Excessively drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High (1.98 to 5.95 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: FrequentNone
Frequency of ponding: None
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: Low (about 5.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7w
Hydrologic Soil Group: A
Hydric soil rating: No

Minor Components

Riverwash

Percent of map unit: 14 percent
Landform: Flood plains
Hydric soil rating: Yes

Deetz

Percent of map unit: 4 percent
Hydric soil rating: No

Rock outcrop

Percent of map unit: 2 percent
Hydric soil rating: No

Diyou

Percent of map unit: 2 percent
Landform: Flood plains
Hydric soil rating: Yes

Rubble land

Percent of map unit: 1 percent
Hydric soil rating: No

Unnamed

Percent of map unit: 1 percent
Landform: Drainageways
Hydric soil rating: Yes

239—Water

Map Unit Composition

Water: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

240—Gravel pits

Map Unit Composition

Gravel pits: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Gravel Pits

Setting

Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Igneous, metamorphic and sedimentary rock

242—Dams

Map Unit Composition

Dams: 100 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

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Attachment D
Cultural Resources Inventory Report

NOTE TO REVIEWER

The *Phase I Cultural Resource Inventory Report for the Lake Shastina Community Services District Drinking Water Improvement Project* (DZC, 2023) is not available for public distribution. This report identifies the locations of cultural resource sites. Disclosure of this information to the public may be in violation of both federal and State laws. Applicable United States laws include, but may not be limited to, Section 304 of the National Historic Preservation Act (16 U.S.C. 470w-3). In California, such laws include, but may not be limited to, Government Code Section 6254.10. Site location information should be kept confidential and is not for public disclosure.

Additionally, records maintained or in the possession of the Native American Heritage Commission or State and local agencies that are exempt from public disclosure include those that contain information on Native American graves, cemeteries, and sacred places, and include records obtained during consultation with Native Americans (California Government Code Section 6254(r) and Section 6254.10).

Information contained in the above referenced reports related on the specific location of prehistoric and historic sites is confidential and exempt from the Freedom of Information Act (FOIA) and the California Public Records Act (CPRA); therefore, site specific cultural resource investigations are not appended to this Initial Study. Professionally qualified individuals, as determined by the California Office of Historic Preservation, may contact the Lake Shastina Community Services District directly in order to inquire about its availability.