GARBERVILLE SANITARY DISTRICT
ROBERTSON/WALLAN/HURLBUTT TANKS REPLACEMENT PROJECT
PROJECT DESCRIPTION

1.0 Project Location and Setting

Regional Setting

The Garberville Sanitary District is located in the unincorporated community of Garberville in northern California, approximately 52 miles south-southeast of Eureka along the south fork of the Eel River and adjacent to U.S. Highway 101 in Humboldt County (Figure 1; USGS Garberville 7.5-minute Quadrangle, Township 4 South, Range 3 East, Section 24, Township 4 South, Range 4 East, Sections 18 and 19, Humboldt Meridian). Garberville has a temperate Mediterranean climate characterized by mild, wet winters and warm, dry summers.

Project Location

The project is located within the boundaries of the Garberville Sanitary District (GSD; the District) in the unincorporated community of Garberville in northern California, approximately 52 miles south-southeast of Eureka along the south fork of the Eel River and adjacent to U.S. Highway 101 in Humboldt County (Figure 1; USGS Garberville 7.5-minute Quadrangle, Township 4 South, Range 3 East, Section 24, Township 4 South, Range 4 East, Sections 18 and 19, Humboldt Meridian). The project is located in several separate areas in and around the town of Garberville:

- the Main/Hurlbutt Tank and Upper Maple Lane Pump Station site (Figures 1 and 2),
- the Wallan Tank and Wallan Pump Station site (Figures 1 and 2),
- the Arthur/Alderpoint Pump Stations site (Figures 1 and 2),
- the Robertson Tank site (Figure 1), and
- the Tobin Well site (Figure 1).

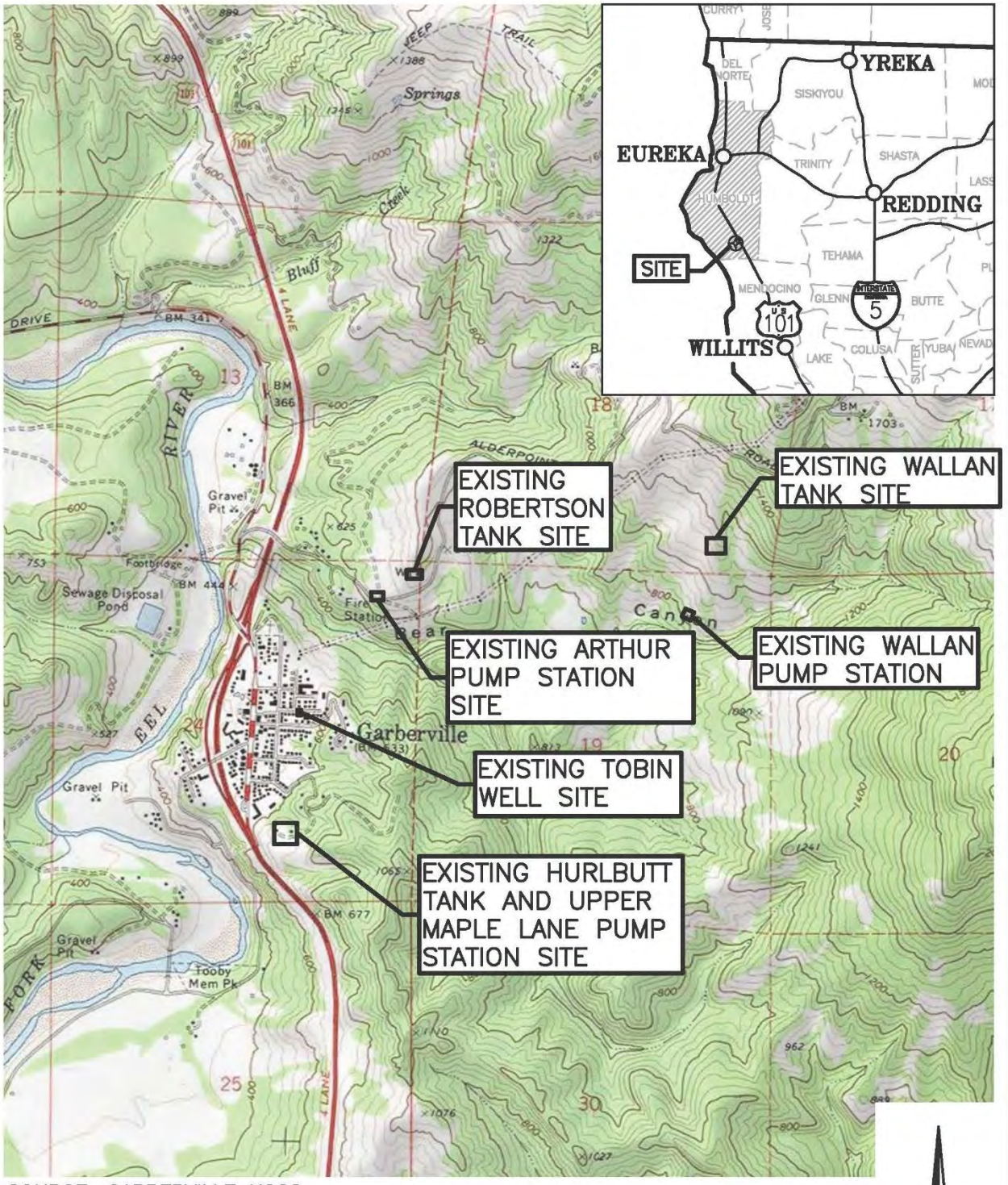
See Table 1 for the project location Assessor's parcel numbers (APNs).

Table 1. Assessor's Parcel Numbers, General Plan, Zoning Designations

Proposed Project Component	APN	General Plan Designation[a]	Zoning Designation[b]
Storage: Existing Main Tank	032-211-011	P	RS-B-5(5)
Storage: Proposed Main Tank	032-211-021	RL	RS-B-5(5)
Storage: Existing Wallan Tank	223-191-006	RE1-5	AE-B-6
Storage: Proposed Wallan Tank	223-191-006	RE1-5	AE-B-6
Storage: Existing Robertson Tank	223-181-020	RA5-20	AE-B-6
Pumping: Existing Upper Maple Lane Pump Station	032-211-011	P	RS-B-5(5)
Pumping: Existing Arthur Pump Station	223-181-025	RA5-20	AE-B-6
Pumping: Proposed Alderpoint Pump Station	223-183-003	PF	AE-B-6
Pumping: Existing Wallan Pump Station	223-191-011	RA40	AE-B-6
Electrical Upgrades: Standby Generators	Various	Various	Various
Standby Generator: Proposed Upper Maple Lane Pump Station	032-211-021	RL	RS-B-5(5)
Standby Generator: Proposed Alderpoint Pump Station	223-183-003	PF	AE-B-6
Standby Generator: Existing Wallan Pump Station	223-191-011	RA40	AE-B-6
Standby Generator: Existing Tobin Well	032-135-002	P	R-1
Instrumentation and Controls Improvements	Various	Various	Various
Distribution Piping	Various	Various	Various

a: General Plan Designations:
P: Public Lands
RL: Residential Low Density
RE: Residential Estates
RA: Residential Agriculture
PF: Public Facility

b: Zoning Designations:
RS: Residential Suburban
AE: Agriculture Exclusive
R-1: Residential One Family



SHN	Garberville Sanitary District Garberville Water System Improvements Garberville, California	Site Location Map Existing Features SHN 022067
	August 2023 | 022067-SITE-LCTN	Figure 1

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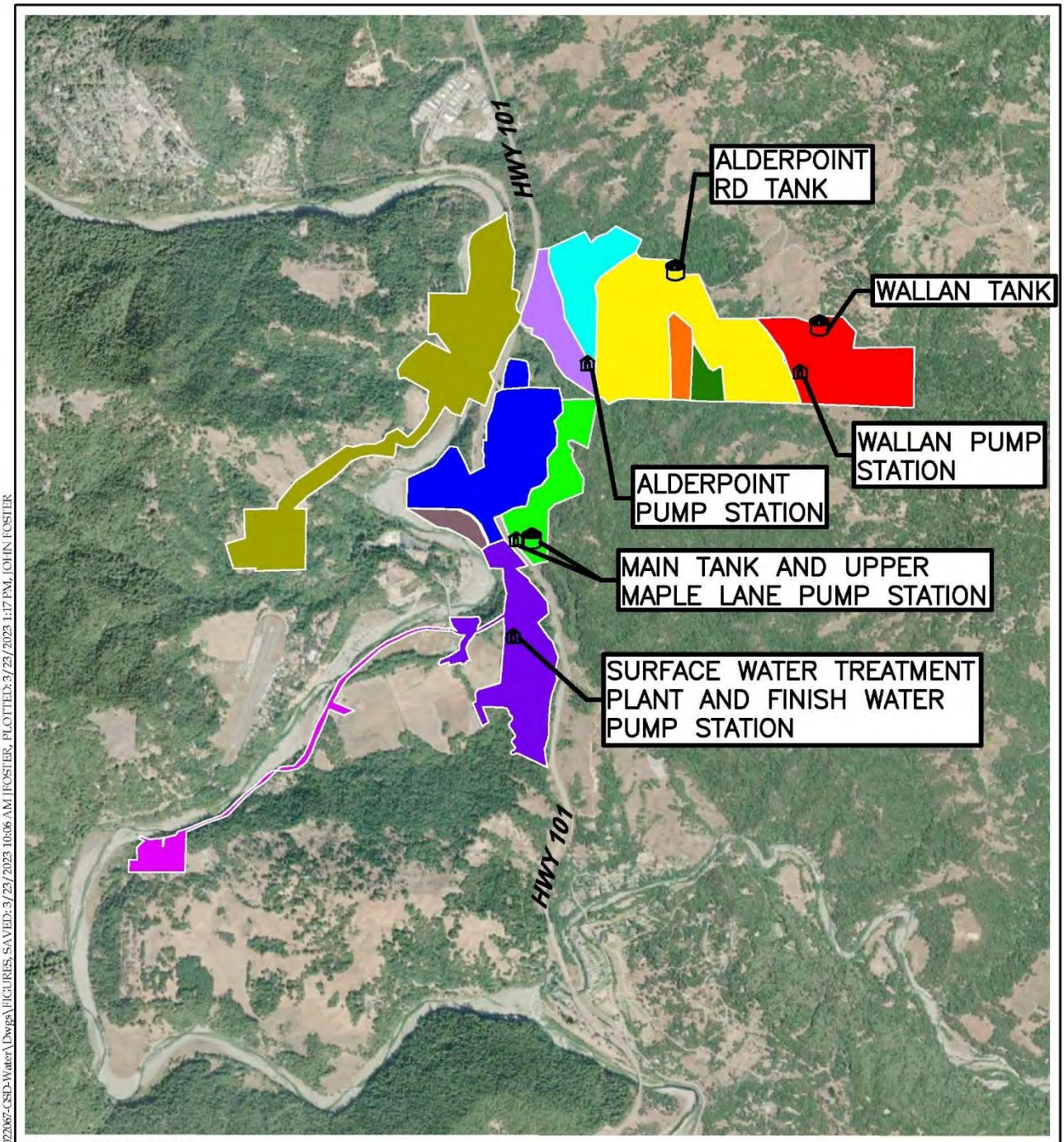

Garberville Sanitary District
Garberville Water System Improvements
Garberville, California

Water System Pressure Zone Map

SHN 022067

March 2023 | 022067-WTR-SYST-PRESS-ZONE | Figure 2

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Surrounding Land Uses and Existing Setting

The project is located east of the South Fork Eel River and U.S. Highway 101. The Main/Hurlbutt Tank and Upper Maple Lane Pump Station site is developed with rural residential uses and existing District water system infrastructure. It is surrounded by timberlands to the east, the urbanized Garberville downtown to the north, and U.S. Highway 101 to the west and south. The Wallan Tank and Wallan Pump Station site is developed with rural residential uses and existing District water system infrastructure. It is surrounded by rural residential and agricultural uses. The Arthur/Alderpoint Pump Stations sites are developed with the existing Arthur Pump Station and a CALFIRE station respectively and are surrounded by rural residential and agricultural uses as well as forested areas. The Robertson Tank site is developed with existing District water system infrastructure and is surrounded by rural residential and agricultural uses as well as forested areas. The Tobin Well site is developed with existing District water system infrastructure and is surrounded by single-family residential development.

2.0 Existing Conditions

Overview

The Garberville community is located in northern California, approximately 52 miles south-southeast of Eureka on the south fork of the Eel River and adjacent to U.S. Highway 101 in Humboldt County (Figure 1). Garberville has a population of 818 people according to the 2020 Decennial Census Program estimate.

The District serves the unincorporated town of Garberville and surrounding area with sewer, wastewater, and water services. The District was formed in 1932 for the purpose of providing sanitary sewer services. After purchasing the privately held Garberville Water Company in 2004, the District began providing drinking water to customers in the district. The District owns, operates, maintains, and manages the public drinking water system (CA1210008), which includes two drinking water sources, water treatment facilities, three finished water storage tanks currently in service, multiple pumping stations, and a distribution piping network. The District's service area covers 581 acres, and the water system serves approximately 1,200 people in the Garberville community through approximately 470 service connections. The California State Water Resources Control Board (SWRCB) Division of Drinking Water (DDW) has jurisdiction over the District's drinking water system.

Water System Facilities

Sources

South Fork Eel River Infiltration

The South Fork of the Eel River Infiltration Gallery, located at N 19222330 E 6059360 CCS83, serves as the primary water source for the District. Originally installed in 1940, the river intake system consists of perforated pipes that run horizontally below the surface of the riverbed. These pipes feed into a 16-inch-diameter steel and polyvinyl chloride (PVC) pipe casing within a vertically oriented 4-foot-diameter corrugated metal pipe (CMP) over 40 feet in height, which extends above the 100-year flood level on the east riverbank. Situated within the 16-inch steel casing are two 20-horsepower (HP) variable speed vertical submersible turbine pumps, each with a rated capacity of 350 gallons per minute (gpm) at 153 feet total dynamic head (TDH). The bottom of the pumps sits at an elevation of 289 feet and they discharge to a common 6-inch pipeline that transports raw water to the District's surface water treatment plant (SWTP) on Tooby Ranch Road. The current raw water pumps were installed in 2014 and only one pump operates at a time. A permanent backup generator at the raw water intake can power the pumps during a utility power outage.

Surface water supply capacity for the District is permitted through both a State Water Resources Control Board Right to Divert and Use Water License 3404 (Permit 5487, Application 9686) and Permit 20789 (Application 29981). Together, these allow the District to divert up to 0.75 cubic feet per second (cfs) and, based on the California Department of Fish and Wildlife Lake or Streambed Alteration Agreement Notification No 1600-2012-0030-R1, is further limited to no more than 10% of stream flow as measured at the United States Geological Survey (USGS) gauge station number 11476500 at Miranda. The total quantity of water permitted to be diverted on an annual basis is 245.5 acre-feet per year.

Tobin Well

The Tobin Well, located at 510 Pine Lane, serves as a backup water source for the District and provides water during periods when the Eel River exhibits high turbidity. In 2014, the District installed a duplex variable speed pump system designed to supply 100 gpm at 173 feet TDH. Level controls vary the pump's output to maintain a preset water surface elevation, based on the recharge capacity of the well. Significant drawdown has been noted in the past. Disinfection of the well water is achieved via 12.5% sodium hypochlorite injection drip dosed of 0.5-1.0 milligrams per liter. This source is used very infrequently, primarily during emergencies, such as in late 2017 when the underground chlorine contact chamber failed at the treatment plant.

Treatment

The District's SWTP is located on Tooby Ranch Road at a finished floor elevation of 388 feet. The SWTP began operating in 2014 to replace the aging water treatment plant that was previously located next to the Hurlbutt finished water storage tank at an elevation of approximately 700 feet. SWTP treatment processes include flocculation, direct filtration, and chlorination, followed by finished water pumping into the distribution system. Polymer is injected as a coagulant and filter aid into the raw water supply pipe upstream of the 5,500-gallon, baffled flocculation tank, which is an 8-foot-diameter, 14-foot-long, horizontal cylindrical pressure tank rated for 150 pounds per square inch, gage.

Downstream of the flocculator are two Loprest 9-foot-diameter vertical pressure filters with 6-foot straight shell length. The filters contain 18 inches of filter sand and 12 inches of anthracite with two grades of media support gravel and include associated piping, valves, controls, and accessories. The filtration system requires periodic backwashing of the filter media with finished water. The spent backwash water is stored in a 35,000-gallon, 18-foot diameter welded steel storage tank. Two backwash recycling pumps draw clearwater from the spent backwash water storage tank and inject it back into the treatment system upstream of the filters. Sediment is periodically pumped from the spent backwash tank and trucked to a disposal site.

After exiting the filters, treated water is disinfected using liquid sodium hypochlorite, which is injected upstream of the chlorine contact chamber. That chamber provides chlorination detention time prior to the water entering the distribution system. Originally, the SWTP was constructed with an underground chlorine contact chamber of 30-inch serpentine pipe. That pipe failed in November 2017 and was replaced in 2018 with an aboveground, 20,000-gallon, steel baffled pressure vessel, which provides disinfection contact time.

Duplex finished water pumps located downstream of the chlorine contact tank operate in series with the raw water pumps and deliver finished water to the distribution system and to the Hurlbutt Tank, which is the main finished water storage tank in the District's water system.

The SWTP has a 60-kilowatt, permanently mounted, diesel generator with a fuel tank capacity that will allow for 72 hours of continuous operation. This generator can power the entire SWTP facility during utility power outages.

Distribution and Storage Facilities

The current distribution system includes three active booster pump stations, three operating finished water storage tanks, and five main pressure zones that supply water to customers throughout the District.

Pressure Zones and Booster Stations

After leaving the treatment plant, finished water is pumped into the distribution system through an 8-inch main that runs up Sprowl Creek Road to the downtown distribution piping network where it also connects to an 8-inch pipe that runs to the Hurlbutt finished water storage tank. The Hurlbutt Tank is located on Assessor's parcel number (APN) 032-211-012 at an elevation of approximately 700 feet. The Hurlbutt Tank supplies water to pressure Zones 1 and 2, which accounts for approximately 85.1% of the District's service connections. The tank gravity feeds Zone 1 connections, including those in the downtown core area and a few subzones at lower elevations, which are fed through pressure reducing valves (PRVs). Two vertical submersible Upper Maple Lane Booster Pumps mounted within the Hurlbutt Tank supply water to Zone 2 customers, which consist of residences on Hillcrest Drive and Maple Lane located at elevations above the Hurlbutt Tank.

Previously, the Oak Street Pump Station pumped water to Zone 2 connections. The corrugated metal pump house for the Oak Street Pump Station is now in very poor condition.

The Hurlbutt Tank also gravity feeds the Arthur Pump Station. Situated at an elevation of 659 feet adjacent to Alderpoint Road near the intersection of Arthur Road, the Arthur Pump Station transfers water to the Alderpoint Tank, sited at a base elevation of 915 feet on the north side of Alderpoint Road. The Alderpoint Tank feeds Zone 3 (through a pressure reducing station) and Zone 4 connections. Zones 3 and 4 account for 13.4% of the District's water service connections. The Alderpoint Tank also supplies water to the Wallan Pump Station, at an elevation of 866 feet on the south side of Wallan Road. The Wallan Pump Station pumps water up to the Wallan Tank, the highest tank in the system at an elevation of 1,155 feet. The Wallan Tank serves Zone 5 customers, which account for the remaining 1.5% of service connections in the District's service area.

Table 2 summarizes the five major pressure zones that supply drinking water to service connections throughout the District's service area. Refer to Figure 2 for a map of the District's service area and pressure zones.

Table 3 lists the three booster pump stations in service within the District's distribution system.

Table 2. Pressure Zones and Associated Parameters, Garberville Sanitary District

Pressure Zone	No. of Connec-tions[a]	Elevation Range[b] of Connections (feet)	Portion of Total Water Consumed	Associated Storage Tank	Notes
1	379	Downtown: 497-614; With PRVs: 326-386	80.98%	Hurlbutt	This zone includes all customers that are served by gravity feed from the Hurlbutt Tank, including sub-zones that have PRVs to decrease the pressure. Zone 1 includes sub-zones 1, 1A, 1B, 1C, 1D, and 1E.
2	21	666-725	2.74%	Hurlbutt	This zone is supplied water from the vertical pumps and pneumatic tanks at the Hurlbutt Tank and includes the houses along Hillcrest Drive and Upper Maple Lane.
3	20	677-688	3.84%	Alderpoint	This zone includes customers located primarily on Arthur Road. The Robertson Tank supplied this zone until spring 2022 when the District removed the tank from service and installed a pressure reducing valve (PRV) at the intersection of Alderpoint Rd and Arthur Rd so this zone could be served by Alderpoint Tank.
4	43	627-870	8.31%	Alderpoint	This zone includes the majority of the residences on the north side of Bear Canyon, and includes sub-zones 4, 4A, and 4B.
5	7	868-1108	4.13%	Wallan	This is the highest-pressure zone in the system.
Total	**470**	**326 - 1108**	**100.00%**		

a. Number of connections were tallied based on unique addresses from 2021 usage data.
b. Elevation ranges are approximated based on Google Earth elevation data for residences in each pressure zone.

Table 3. Existing Distribution System Booster Pump Stations in Operation

Pump Station	Type & No. of Pumps	Number & Duty	Rated capacity (gpm[a])	Rated TDH[b] (feet)	Station elevation (feet)	Water Transfer Destination
Upper Maple Lane	Vertical turbine submersible	2 x 100%	60	175	703	Zone 2 connections
Arthur	Horizontal end suction	2 x 100%	70	330	659	Alderpoint Tank
Wallan	Horizontal inline	2 x 100%	50	300	866	Wallan Tank

a. gpm: gallons per minute
b. TDH: total dynamic head

Water Storage Tanks

Storage capacity for the District's drinking water system is currently provided by three water storage tanks located at varying elevations in the District's service area. With the exception of Zone 2, all service connections are supplied by gravity feed from the storage tanks. The Hurlbutt Tank is the main and oldest finished water storage tank in operation. The below-ground concrete tank has a capacity of approximately 180,000 gallons. This tank is located adjacent to a private residence owned by the Swaffar/Hurlbutt family, which owned and operated the Garberville Water Company before selling it to the District in 2004. The Alderpoint Tank is a 200,000-gallon capacity welded steel tank installed in 2015. The Wallan tank is a 20,000-gallon redwood tank constructed in 1978. The Wallan Tank is leaking, and the District lowered its operating water surface elevation (WSE) in order to minimize leakage. The District installed a vertical polyethylene tank adjacent to the Wallan Tank to serve as temporary backup until a replacement tank can be installed.

Table 4 provides details for the District's three in-service water storage tanks.

Table 4. Existing Water Storage Tanks Currently in Service

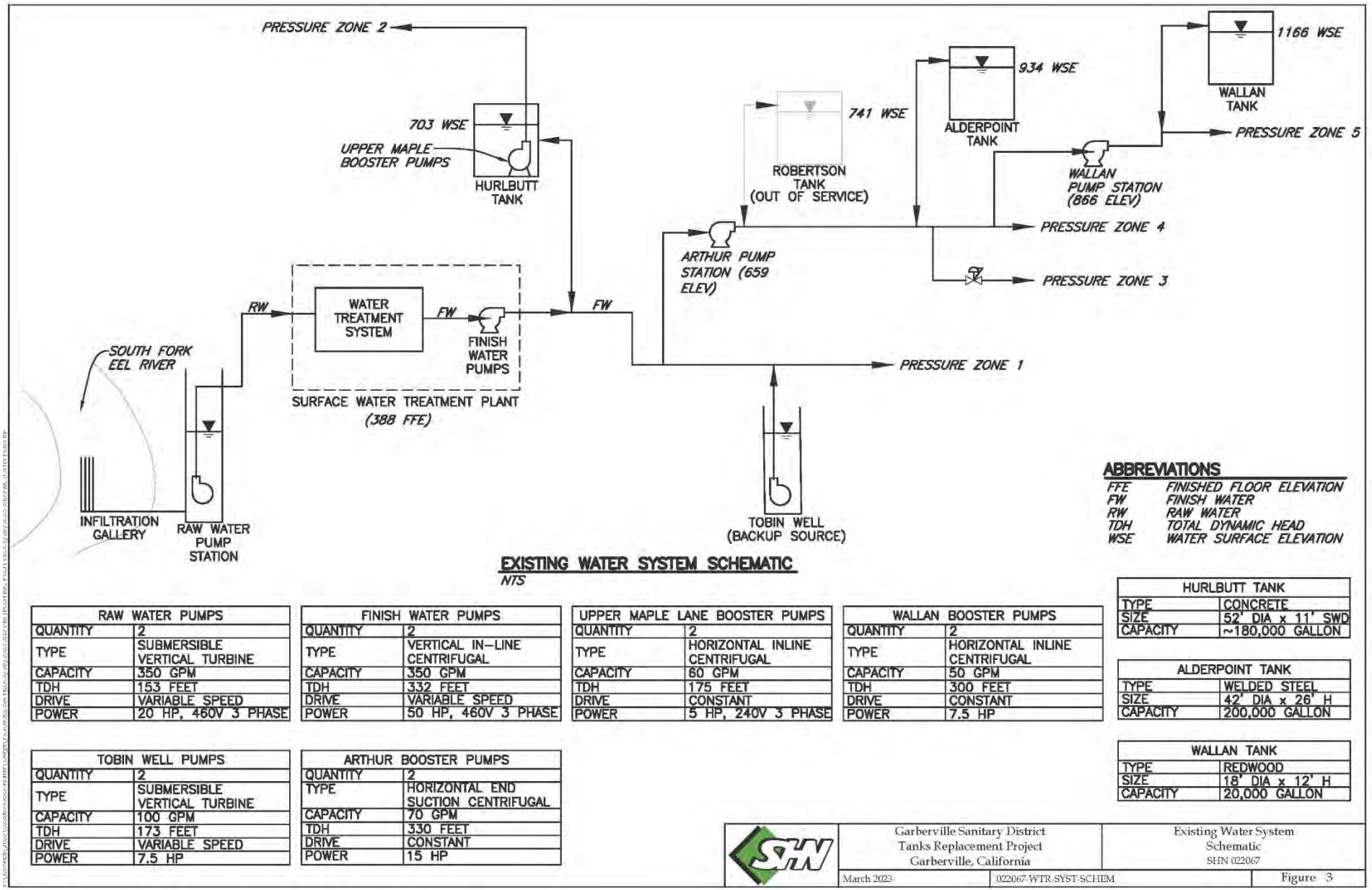
Tank Name	Tank Type	Base Elevation (feet)	Maximum WSE[a] (feet)	Capacity (gallons)	Pressure Zone(s) Served	Comments
Hurlbutt (Main)	In-Ground Concrete	692	703	180,000	1 & 2	Constructed in 1940. Primary storage from treatment plant. All water in the system is stored in this tank prior to being pumped to higher elevation zones.
Alderpoint	Welded Steel	915	934.3	200,000	3 & 4	Installed in 2015. Water for Zone 5 connections passes through this tank before it is transferred to Wallan Tank.
Wallan	Redwood	1,155	1,165.5	20,000	5	Constructed in 1978, operating at reduced water level due to leak. Adjacent poly tank has been installed as temporary backup.
Total Current Storage Tank Capacity				**400,000**	**All**	

a. WSE: water surface elevation

A fourth water storage tank, the Robertson Tank, is a partially buried 50,000-gallon concrete tank installed in 1922 that served pressure Zone 3. The Robertson Tank was taken out of service in February 2022 due to tank failure and slope stability issues adjacent to the tank, and in response to a compliance order from the State Water Resources Control Board. The tank is slated to be demolished as part of the proposed Tanks Replacement Project. The Alderpoint Tank now

serves pressure Zone 3 through a PRV. With the Robertson Tank permanently out of service, the District has a total current finished water storage capacity of 400,000 gallons.

Figure 3 provides an overall schematic of the District's water system facilities. In general, records for the distribution piping network are very lacking. Neither a map of the distribution system nor an accurate record of pipe materials, sizes, and conditions exists for the District's distribution system.



EXISTING WATER SYSTEM SCHEMATIC
NTS

ABBREVIATIONS

FFE	FINISHED FLOOR ELEVATION
FW	FINISH WATER
RW	RAW WATER
TDH	TOTAL DYNAMIC HEAD
WSE	WATER SURFACE ELEVATION

RAW WATER PUMPS	
QUANTITY	2
TYPE	SUBMERSIBLE VERTICAL TURBINE
CAPACITY	350 GPM
TDH	153 FEET
DRIVE	VARIABLE SPEED
POWER	20 HP, 460V 3 PHASE

FINISH WATER PUMPS	
QUANTITY	2
TYPE	VERTICAL IN-LINE CENTRIFUGAL
CAPACITY	350 GPM
TDH	332 FEET
DRIVE	VARIABLE SPEED
POWER	50 HP, 460V 3 PHASE

UPPER MAPLE LANE BOOSTER PUMPS	
QUANTITY	2
TYPE	HORIZONTAL INLINE CENTRIFUGAL
CAPACITY	60 GPM
TDH	175 FEET
DRIVE	CONSTANT
POWER	5 HP, 240V 3 PHASE

WALLAN BOOSTER PUMPS	
QUANTITY	2
TYPE	HORIZONTAL INLINE CENTRIFUGAL
CAPACITY	50 GPM
TDH	300 FEET
DRIVE	CONSTANT
POWER	7.5 HP

HURLBUTT TANK	
TYPE	CONCRETE
SIZE	52' DIA x 11' SWD
CAPACITY	~180,000 GALLON

ALDERPOINT TANK	
TYPE	WELDED STEEL
SIZE	42' DIA x 26' H
CAPACITY	200,000 GALLON

WALLAN TANK	
TYPE	REDWOOD
SIZE	18' DIA x 12' H
CAPACITY	20,000 GALLON

TOBIN WELL PUMPS	
QUANTITY	2
TYPE	SUBMERSIBLE VERTICAL TURBINE
CAPACITY	100 GPM
TDH	173 FEET
DRIVE	VARIABLE SPEED
POWER	7.5 HP

ARTHUR BOOSTER PUMPS	
QUANTITY	2
TYPE	HORIZONTAL END SUCTION CENTRIFUGAL
CAPACITY	70 GPM
TDH	330 FEET
DRIVE	CONSTANT
POWER	15 HP

Garberville Sanitary District Tanks Replacement Project Garberville, California		Existing Water System Schematic SHN 022067
March 2023	022067-WTR-SYST-SCHEM	Figure 3

Electrical and Controls System

The tank sites in the District's system communicate to pump stations via radio signal. The Hurlbutt Tank calls for water by sending a signal to the SWTP on Tooby Ranch Road, which in turn signals to the raw water and finish water pumps to turn on. Alderpoint Tank and Wallan Tank similarly communicate via radio to their respective pump stations to turn on/turn off based on pre-set tank water levels.

The water treatment plant has a permanent backup generator, which has the capacity to provide full electrical backup of the treatment plant during utility outages. The raw water pump station also has a permanently installed backup generator. No other pump stations have a stationary backup generator. The District has a single trailer-mounted generator that the operations staff moves from location to location to back up the other pump stations in the system during power outages.

Water Demand and Required Tank Storage

Existing Water Demand

The District provided monthly water usage data for all water system connection from June 2014 through December 2021 for each pressure zone. From this data, average monthly water usage was calculated by zone and for the total system, as shown in Figure 4. The bar colors in Figure 4 represent water consumption by pressure zone, with Zone 1 connections consuming the majority of the District's water use.

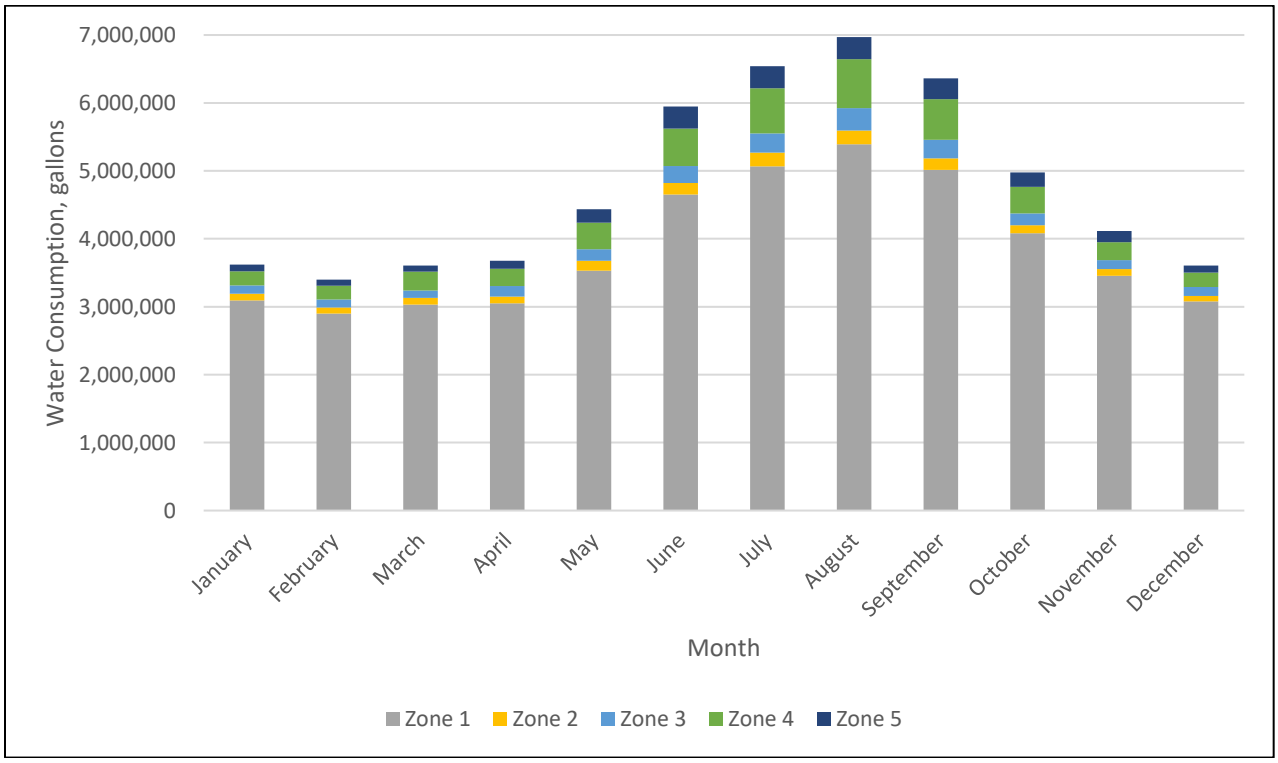


Figure 4. Average Monthly Water Usage, Garberville Sanitary District, 2014-2022.

From the 2014-2021 customer water usage data, maximum month demand was selected for the month of the highest consumption for each pressure zone. Maximum day demand (MDD) was determined using procedures outlined in 22 CCR § 64554, by dividing the maximum monthly usage by number of days in the month and multiplying by a peaking factor of 1.5, the minimum provided in the statute. Table 5 provides the MDD for each of the District's five pressure zones. The total MDD for all five zones combined is 410,585 gallons.

Table 5. Maximum Day Demand for Each Pressure Zone

Pressure Zone	Maximum Monthly Usage (gallons)	Month of Maximum Usage	Peaking Factor	Maximum Day Demand (gallons)
1	6,056,498	June 2014	1.5	302,825
2	253,867	September 2020	1.5	12,693
3	473,392	August 2017	1.5	22,906
4	962,153	August 2017	1.5	46,556
5	512,092	June 2014	1.5	25,605
			Total	**410,585**

The District does not have any industrial customers. Commercial customers like hotels and restaurants have a significant seasonal variation in their consumption. The District increases the flow rate at the raw water intake and SWTP pumps to increase the treatment flow rate during the summer to accommodate the increased demand.

Fire Water Requirements

Pressure Zone 1 includes mixed commercial and residential connections. Zones 2-5 are residential. For residential zones, the Garberville Fire Department requires 1,500 gpm of fire flow for 2 hours, or 180,000 gallons of storage. For commercial facilities, the Fire Department requires 3,500 gpm for 3 hours, which equates to 630,000 gallons of storage for Zone 1.

Required Water Tank Storage Capacity

To determine necessary water storage capacity, the maximum day demand for all zone service connections served by a tank is added to the estimated fire flow requirement. Because the District does not anticipate an increase in population served, growth projections were excluded from tank sizing. Table 6 shows the total storage demand for the Hurlbutt, Alderpoint, and Wallan tanks, which includes MDD plus fire flow requirements.

Table 6. Tank Sizing based on Maximum Day Demand and Fire Protection Requirements

Tank	Zones Served	Maximum Day Demand (MDD) (gallons)	Fire Protection Requirement (gallons)	Combined Capacity (gallons)	3 x MDD (gallons)
Hurlbutt	1 & 2	315,518	630,000	945,518	946,554
Alderpoint	3 & 4	69,462	180,000	249,462	208,386
Wallan	5	25,605	180,000	205,605	76,815

The existing Alderpoint Tank has 200,000 gallons working storage capacity.

Water System Operations & Maintenance Practices

The District's water system operations and maintenance (O&M) practices include weekly visual inspections of tank exteriors and periodic preventative pump maintenance, backwash tank cleaning, filter media replacement at the SWTP, solar panel maintenance, and battery replacement. Instrument calibration is performed at fixed intervals. Raw and finished water turbidimeters are calibrated every 3 months; pH, temperature, and chlorine analyzers are calibrated every 6 months. Operations staff also periodically flush the pumps at the Tobin Well.

The District's maintenance decisions are heavily influenced by available finances, which determine how and when maintenance is completed. Repairs to and replacement of waterlines are generally performed in response to emergencies. Water meters are replaced when they are older and/or broken.

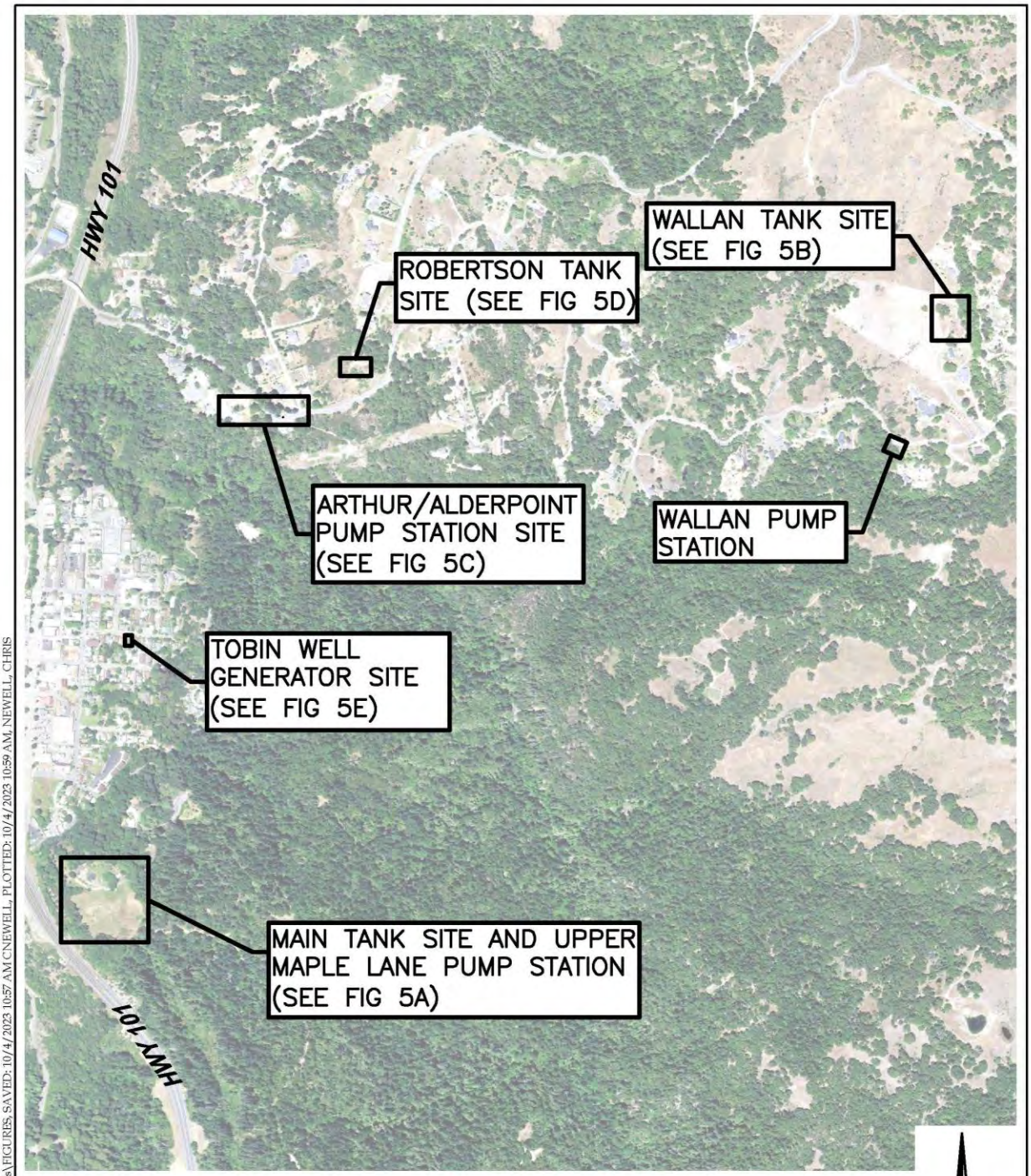
3.0 Proposed Project

Description of Proposed Construction Project

The selected construction project includes the components listed in Table 7 (SHN, 2023a). An overall map of the selected project components is provided in Figure 5. Figures 5A, 5B, 5C, 5D, and 5E show specific project components.

Table 7. Proposed Project Components

Proposed Project Component	Description
Storage: Main Tank	See Figure 5A. Replace the existing, partially underground, 180,000-gallon, concrete storage tank with new, partially underground, 550,000-gallon (approximate) pre-stressed concrete tank at new site approximately 350 feet south of the existing tank. New tank level instrumentation would be installed. The existing Hurlbutt Tank would be demolished as part of this project component. Also, the installation of the new Main Tank would require the installation of a new segment of Zone 1 water main.
Storage: Wallan Tank	See Figure 5B. Replace the existing 20,000-gallon leaking redwood water storage tank with a new, 77,000-gallon, bolted steel, water storage tank at the same site. A new pressure transducer, floats, and radio tower would be installed. The existing redwood tank would be demolished as part of this project component. Also, the installation of the new Wallan Tank would include the installation of a new segment of water main.
Storage: Robertson Tank	See Figure 5D. Existing retired 50,000-gallon concrete storage tank would be demolished along with electrical components, piping, and other appurtenances. The site would be restored to match adjacent ground surfaces. The demolition of this tank would require that a segment of the distribution main near the tank be routed around the tank to maintain service.
Pumping: Upper Maple Lane Pump Station	See Figure 5A. Replace the existing booster pump station with a new pump station at the new Main Tank site. New pumps would include variable speed drives, upgraded bladder tank(s), new electrical service, new pump control panel, and control building. The existing Upper Maple Lane Pump Station would be demolished as part of this project component. Also, the installation of the new Upper Maple Lane Pump Station would require the installation of a new segment of Zone 2 water main and a new service connection to the nearby residence.
Pumping: Alderpoint Pump Station	See Figure 5C. Replace the existing pump station with a new pump station at a lower elevation. A new building with new electrical service would house new higher capacity variable speed drive pumps, new piping, and new motor control panel. The existing Arthur Pump Station would be demolished. Installation of the new Alderpoint Pump Station would require the installation of a new segment of water main and would modify existing radio antenna and/or install an approximately 40-foot-tall unlit communications tower.
Pumping: Wallan Pump Station	Upgrade the existing pump station in the existing building. Upgrades would include new pumps, new pump control panel, and some limited new piping.
Electrical Upgrades: Standby Generators	Appropriately sized, new, permanent, diesel-powered, backup generators would be installed at the Tobin Well (Figure 5E), the Upper Maple Lane Pump Station, and the Alderpoint Pump Station. A trailer-mounted generator would be provided for the Wallan Pump Station.
Instrumentation and Controls Improvements	New instrumentation would be installed at new tanks and pump stations; programmable logic controllers (PLCs) would be replaced or reused, where possible, for system-wide monitoring and controls at the SWTP; radio telemetry would be provided to communicate tank levels to pump stations.



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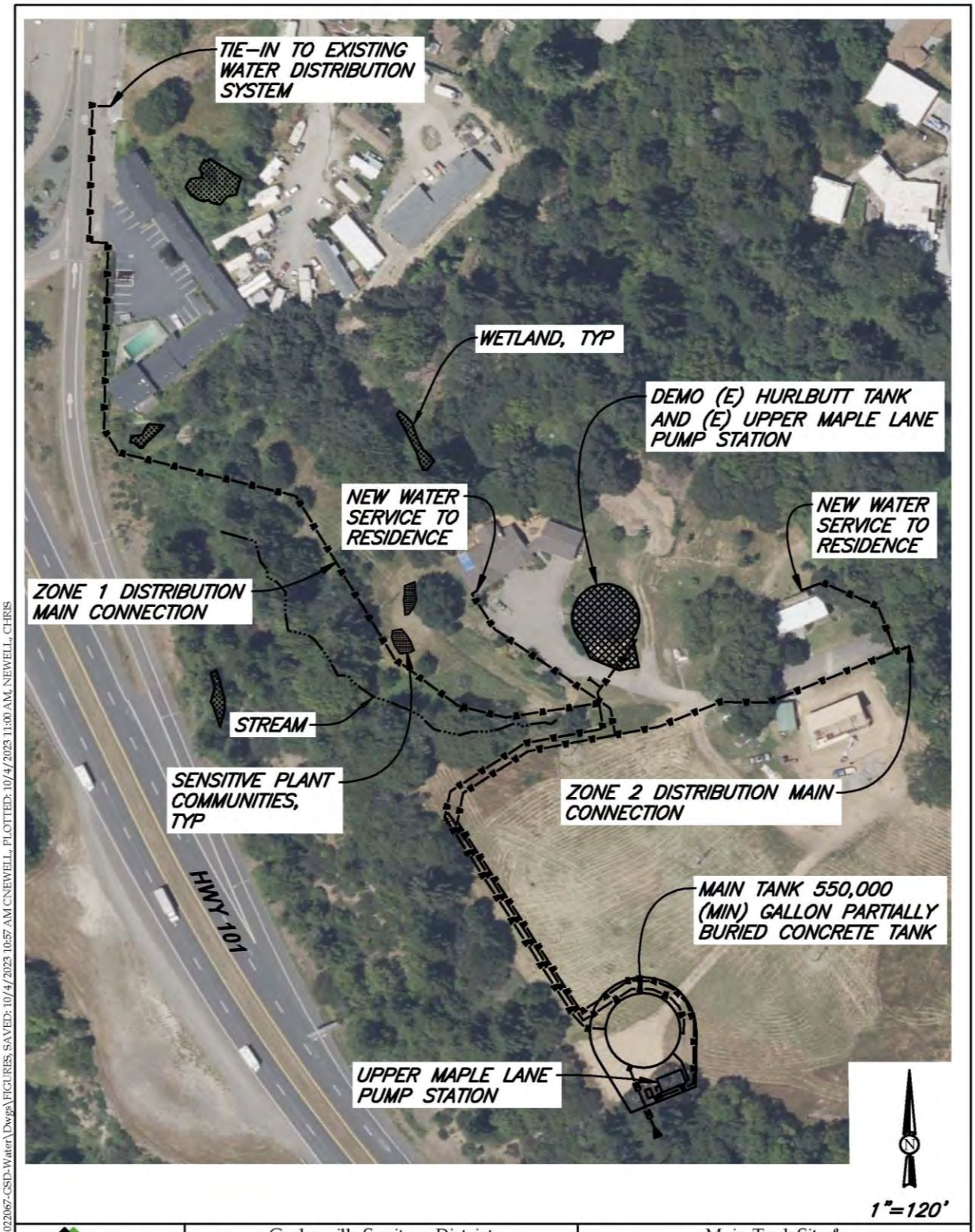
	Garberville Sanitary District Garberville Water System Improvements Garberville, California	Project Overview SHN 022067
	October 2023	022067-PROJ-OVER-FIG	Figure 5



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SHN	Garberville Sanitary District Garberville Water System Improvements Garberville, California	Main Tank Site & Upper Maple Lane Pump Station SHN 022067
	October 2023 | 022067-PROJ-OVER-FIG	Figure 5A

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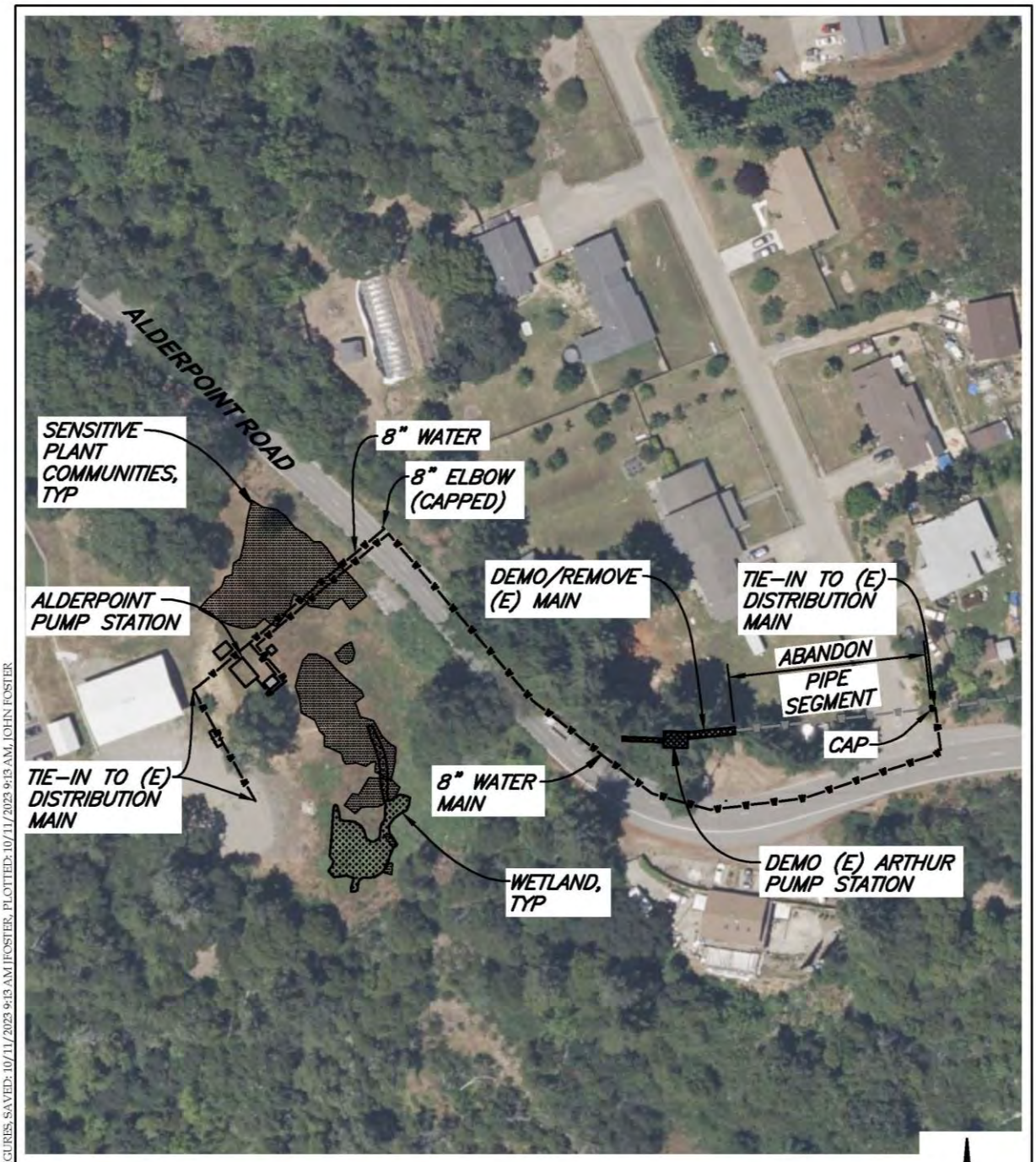
SHN	Garberville Sanitary District Garberville Water System Improvements Garberville, California	Wallan Tank Site SHN 022067
	October 2023 | 022067-PROJ-OVER-FIG	Figure 5B



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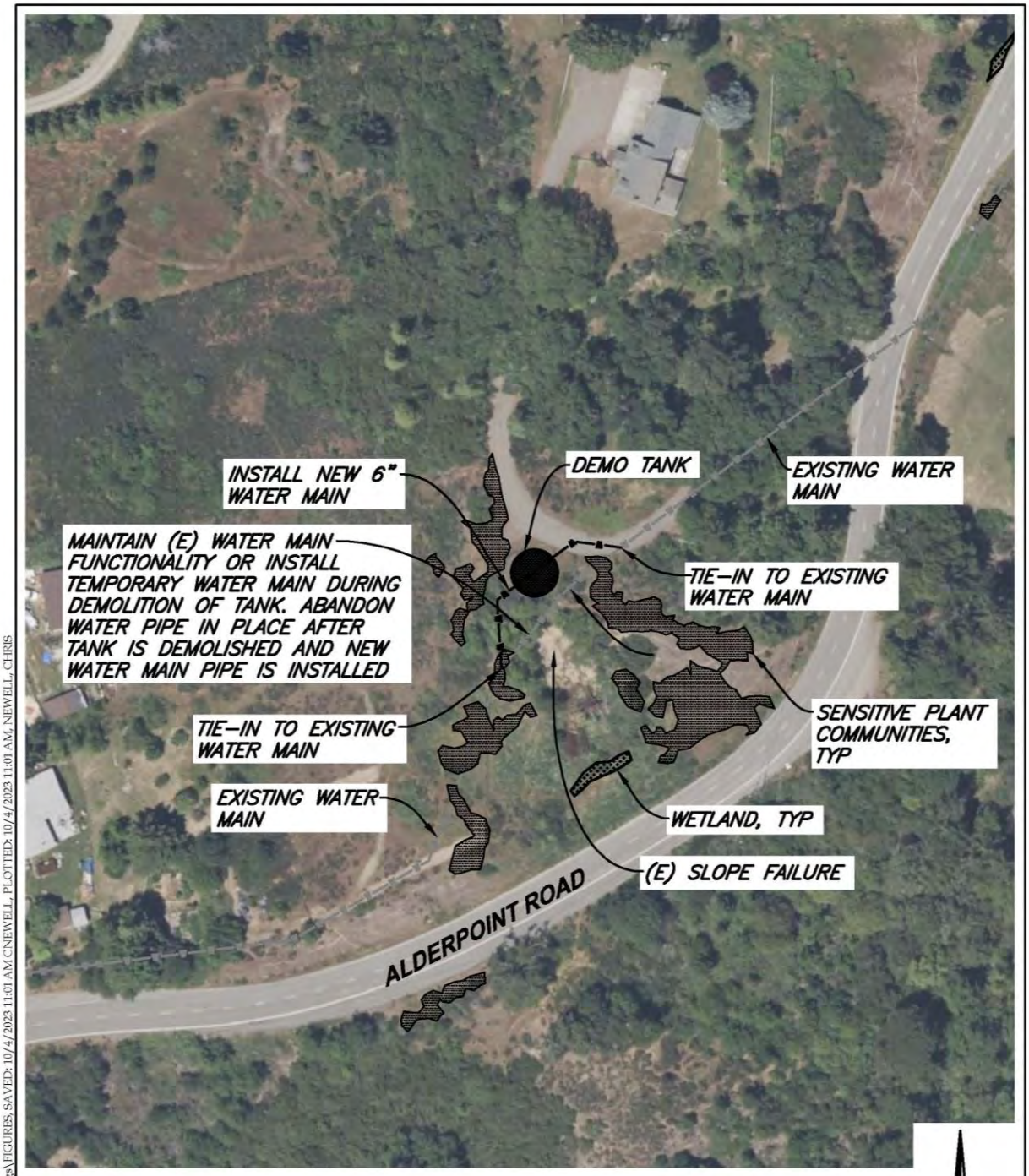
SHN	Garberville Sanitary District Garberville Water System Improvements Garberville, California	Arthur/ Alderpoint Pump Station Sites SHN 022067
	October 2023 | 022067-PROJ-OVER-FIG	Figure 5C



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SHN	Garberville Sanitary District Garberville Water System Improvements Garberville, California	Robertson Tank Site SHN 022067
October 2023	022067-PROJ-OVER-FIG	Figure 5D

SHN	Garberville Sanitary District Garberville Water System Improvements Garberville, California	Tobin Well Generator Site SHN 022067
	August 2023 | 022067-PROJ-OVER-FIG	Figure 5E

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Construction Scope of Work for Selected Project

Main Tank

Scope of work at the new Main Tank site includes the following:

- Prepare site and excavate for new partially underground tank.
- Prepare foundation subgrade.
- Construct new prestressed concrete tank.
- Leak test, disinfect, and perform bacteriological testing on tank to prepare for service.
- Install yard piping, overflow, and tank appurtenances.
- Install new 12-inch piping along new access road to Hillcrest Drive, down the slope to U.S. Highway 101 off-ramp and tie to existing line at Redwood Drive.
- Install new 4” piping along new access road and tie to existing line in Hillcrest Drive.
- Backfill excavation.
- Grade site, re-seed disturbed areas, and install screening vegetation.
- Construct new tank access driveway.
- Install security fencing.
- Install level sensing and remote telemetry panel with radio antenna.

Wallan Tank

Scope of work at the new Wallan Tank site includes the following:

- Demolish existing Wallan Tank, foundation, and appurtenances.
- Prepare site for new tank.
- Excavate and construct new tank foundation.
- Construct new bolted steel tank with appurtenances, cathodic protection, and tank coating.
- Leak test, disinfect, and perform bacteriological testing on tank to prepare for service.
- Install yard piping, valves, and overflow/drain outlet.
- Install new piping along access road and tie to existing piping.
- Install security fencing.
- Install new level sensing equipment, and remote telemetry panel with radio antenna.

Upper Maple Lane Pump Station

Scope of work at the new Upper Maple Lane Pump Station at the new Main Tank site includes the following:

- Construct new pump station and controls building.
- Install new pump station and hydropneumatic tanks.
- Install yard piping and valving associated with pump station.
- Install new electrical service and utility meter, stationary standby diesel generator, and automatic transfer switch (ATS).
- Install tank and pump station instrumentation, PLC, motor control panel, building electrical, and remote telemetry panel with radio antenna to communicate with FW pumps at SWTP.

Alderpoint Pump Station

Scope of work for the new Alderpoint Pump Station, which would replace the Arthur Pump Station, at the proposed CALFIRE site includes the following:

- Install new pump station building and building foundation.
- Install new electrical service and utility meter, stationary standby diesel generator, and ATS.
- Install customized duplex pump system with controls.
- Install station piping and valves.

- Install pump station instrumentation and building electrical; modify existing remote telemetry panel; modify existing radio antenna and/or install an approximately 40-foot-tall unlit communications tower. The existing PLC control panel would be reused to control the pump station.
- Install pump station driveway.

Arthur Road Pump Station

Scope of work at the existing Arthur Road Pump Station, which would be replaced by the new Alderpoint Pump Station, includes the following:

- Demolish existing pump station mechanical and electrical equipment.
- Demolish existing building and foundation.
- Cap existing water lines.
- Restore site to match surrounding surface cover and vegetation.

Wallan Pump Station

Scope of work at the existing Wallan Pump Station building includes the following:

- Demolish existing pumps and control panel.
- Install new metal roof, replace siding with fiber cement lap siding, and repaint building exterior.
- Install new pumps.
- Replace limited piping and valves.
- Install pump station instrumentation, pump motor control panel, and building electrical; modify existing remote telemetry panel and radio antenna; reuse existing Allen-Bradley PLC.
- Provide new portable diesel generator.
- Install new manual transfer switch.

Electrical and Control System Upgrades

Generators

In order to increase the reliability of the District's water system, the following generators are proposed to be included with this project. Generators would be sized to provide backup power in the event of electric utility outages. The backup generators are only turned on 1) for emergency use during an emergency power loss, and 2) for regular weekly testing which occurs for 30 minutes/week during daylight hours.

- Alderpoint Pump Station Generator—This would be a permanent generator with a fully integrated automatic transfer switch. The outdoor generator would be provided in a sound-attenuated National Electrical Manufacturers Association (NEMA)-rated enclosure.
- Upper Maple Lane Pump Station Generator—This would be a permanent generator with a fully integrated automatic transfer switch. The outdoor generator would be provided in a sound-attenuated NEMA-rated enclosure.
- Wallan Pump Station Generator—The existing pump station would be provided with a connection for a temporary (trailer-mounted) generator, a trailer-mounted generator, and a manual transfer switch.
- Tobin Well Generator—The existing well station would be provided a permanent generator with a fully integrated automatic transfer switch. The outdoor generator would be provided in a sound-attenuated NEMA-rated enclosure.

Controls Upgrades

The new pumps and tanks would be provided with control features that would be able to be integrated into the District's overall control system. Tank levels would typically be communicated via radio telemetry to pump stations.

Distribution System Piping Replacement

New segments of distribution piping would need to be installed in order to connect the new facilities to the existing distribution system:

- Installation of a new transmission pipe to supply water to/from the distribution system and the new Main Tank. This alignment would run along the proposed access road for the new Main Tank, continuing along the western boundary of the site, descending the slope on the east side of the U.S. Highway 101 offramp, and then running along Redwood Drive to tie-in to the distribution system on the southern end of downtown. This alternative alignment is preferred over the existing transmission main alignment because the alignment of the existing transmission main runs cross country through a steep forested area on the north end of the site and passes under residential trailers in the trailer park at the bottom of the hill. The existing alignment is largely inaccessible, making it difficult to detect leaks and make repairs. Depending on the contractor bids and the timing of project funding, a temporary alternative alignment for the transmission main may be necessary. This alternative would run along the proposed access road for the new Main Tank, cross the existing driveway, and tie-in to the existing distribution main near the existing Hurlbutt Tank, which would be demolished.
- Zone 2 main from Upper Maple Lane Booster Pump Station. Install a new section of distribution pipe between the new Upper Maple Lane Pump Station, located at the new Main Tank site, and tie into the existing Zone 2 main in Hillcrest Drive.
- Transmission main around the Robertson Tank. Prior to the demolition of the Robertson Tank, a new segment of water main would need to be installed around the north side of the tank so that water service can be maintained while the tank is being demolished. Routing the segment of water main around the north side of the tank would also set it back further from an existing slope failure on the south side of the tank, which would help to ensure the long-term reliability of the water main in this area.
- Transmission main for new Alderpoint Pump Station. A new segment of water main would be needed to connect the new Alderpoint Pump Station to the distribution system. The alignment for the new main would be routed from the proposed new pump station location at the CALFIRE facility, along Alderpoint Road, and tie-in to the existing main at the intersection of Alderpoint Road and Arthur Road. Pipe routing would be finalized during the engineering design phase.
- New transmission main to/from the Wallan Tank site. A new segment of transmission main is proposed to be installed along the alignment of the driveway that leads up to the tank to replace the 50-year-old existing tank supply pipe that has minimal to no cover.

Installation of new distribution piping shall include the following:

- Clearing and grubbing
- Trench preparation and backfill
- Pipe installation with tracer wire and warning tape
- Reconnection of impacted services and hydrants
- Addition of air release and blow off valves where appropriate
- Surface restoration

Demolition of Tank Sites

Hurlbutt Tank Site Demolition

Scope of work at the existing Hurlbutt Tank site includes:

- Demolish roofing and appurtenances
- Demolish existing Hurlbutt Tank walls to 3 feet below grade; drill holes through tank foundation to provide for drainage and backfill with drain rock to 3 feet below finish grade.
- Demolish all surrounding concrete flatwork.
- Remove a select portion of the buried yard piping.
- Remove existing Upper Maple Lane Pump Station and pump controls and panels.

- Demolish fence, shed, piping, equipment, and electrical service.
- Backfill with excavation spoils from the new Main Tank in the lower sections and topsoil for the upper 2 feet, regrade, and restore site with vegetation to match surrounding area.

Robertson Tank Site Demolition

Robertson Tank site demolition shall include the following:

- Demolish roofing and appurtenances.
- Remove tank concrete walls to 3 feet below grade; drill holes through remaining tank floor to allow for drainage.
- Dispose of tank roof, concrete (lead/asbestos testing for materials).
- Backfill with drain rock and/or spoils from construction.
- Restore site and vegetation to match surrounding area.

Construction Equipment and Access

Equipment for construction of the project would include cranes, excavators, backhoes, loaders, small skid-steer loaders, flatbed semi-trucks, dump trucks, hydraulic lifts, personnel transport vehicles, service trucks, cement trucks, compaction equipment, and paving equipment. Construction access for the Main/Hurlbutt Tank and Upper Maple Lane Pump Station site would be from Melville Road, Hillcrest Drive, Redwood Drive, and the private driveway serving that property. Construction access for the Wallan Tank site and Wallan Pump Station site would be from Wallan Road and the private driveway serving that property. Construction access for the Arthur and Alderpoint Pump Station sites would be from Alderpoint Road and Arthur Road as well as from CALFIRE's Northern Region Garberville Station. Construction access for the Robertson Tank site would be from Alderpoint Road and the private driveway serving the tank. Construction access for delivering the backup generator at the Tobin Well site would be from Pine Lane.

Land Requirements

New or modified easements and/or property acquisition would be required at the following sites:

- New Main Tank and Upper Maple Lane Pump Station—The District currently owns the parcel where the existing Hurlbutt Tank is located, so the transfer of ownership and easements associated with replacing the Hurlbutt Tank with the new Main Tank would need to be coordinated between the District and the landowner. The parcel for the existing Hurlbutt Tank would be swapped for a similar parcel at the new Main Tank location.

- New Main Tank Distribution Main—With the installation of the transmission main alignment that encroaches into the Caltrans right of way, new easements and Caltrans approval would be required for the new distribution piping from the Main Tank and down to the shoulder of the U.S. Highway 101 offramp to tie-in to the existing distribution system. Replacement of the water main in areas where there is already existing infrastructure, such as in the downtown area, is not expected to require additional easements, just an encroachment permit from the County.

- New Alderpoint Pump Station and Distribution Main—New easements would be required for the new pump station at the CALFIRE site and an encroachment permit from the County for the new segment of distribution main along Alderpoint Road.

Timing of Construction

The District plans to construct the proposed project as soon as the applicable authorizations are approved. Construction activities are anticipated to occur over approximately 19 months in 2024 and 2025 and would occur between the hours of 8:00 a.m. and 5:00 p.m. Monday through Friday, and between the hours of 9:00 a.m. and 5:00 p.m. on Saturdays and Sundays, with no work on holidays.

Best Management Practices and Avoidance and Minimization Measures

The following construction best management practices (BMPs) and avoidance and minimization measures would be implemented during project construction:

- Limit ground disturbance and vegetation clearing to the minimal extent necessary to accomplish project goals.
- If rainfall is forecasted during the time construction activities are being performed, all onsite stockpiles of soil, gravel, and construction debris shall be covered and secured before the onset of precipitation.
- Stabilize exposed soils at the end of the job, using mulch or other erosion control measures.
- All trash shall be removed from the work site and disposed of on a regular basis.
- All spoils and construction debris will be hauled offsite and disposed of at an appropriately permitted upland disposal facility (landfill or recycling plant).
- All equipment used during construction shall be free of oil and fuel leaks at all times.
- All equipment fueling shall be performed more than 100 feet from any wetlands. BMPs for leak protection and fuel handling/storage shall be maintained.
- Hazardous materials management equipment, including oil containment booms and absorbent pads shall be available and immediately on hand at the project site. A registered first-response, professional, hazardous materials clean-up/remediation service shall be locally available on call. Any accidental spill shall be contained rapidly and cleaned up. In the event of a spill, GSD shall notify the appropriate regulatory agencies immediately.
- To minimize wildlife entanglement and plastic debris pollution, any temporary rolled erosion or sediment control products used (such as fiber rolls, erosion control blankets, and mulch control netting) shall either be netting-free, or shall contain plastic-free biodegradable natural-fiber netting (such as jute, sisal, or coir fiber). Degradable plastic netting is not an acceptable alternative. When no longer required, temporary erosion and sediment control products shall be promptly removed.
- To avoid potential impacts to nesting birds, in accordance with the Migratory Bird Treaty Act, one of the following shall be implemented:
    - Conduct vegetation removal and other ground-disturbance activities associated with any construction activities between September and mid-March, when birds are not typically nesting, or
    - If vegetation removal or ground-disturbing activity is to take place during the nesting season (March 15 to August 31 for most birds), a qualified biologist shall conduct a pre-construction nesting bird survey. Pre-construction surveys for nesting pairs, nests, and eggs shall occur within the construction limits and within 100 feet (200 feet for raptors) of the construction limits. If active nests are encountered, species-specific measures shall be prepared by a qualified biologist in consultation with the USFWS and CDFW and implemented to prevent abandonment of the active nest.
- Where project construction activities occur within close proximity (50 feet) to special-status resources, these resources shall be demarcated by high-visibility construction fencing or flagging during the project construction period in a manner sufficient to avoid unintentional impacts.
- Fully implement all conditions of approval required by permit terms.

Water Efficiency

- Water Loss Reduction
    - Tank Replacement—This project would replace the existing in-ground concrete finished water storage tank (Hurlbutt/Main Tank) and the existing redwood drinking water storage tank (Wallan Tank). Both of these existing tanks are significantly leaking, which results in water losses in the distribution system and additional diversions of water from the South Fork of the Eel River. By replacing these tanks with new tanks, the water losses associated with leaking tanks would be eliminated from the system and would leave more water in the river.
    - Distribution System Upgrades—This project would replace a portion of the existing water distribution piping in the system. The existing distribution piping is nearing the end of its useful life and has experienced breaks and leaks. By replacing the aged distribution piping, water losses associated with leaks and water main breaks would be significantly reduced in areas where new distribution piping is installed and would eliminate the additional diversion of water from the river associated with these leaks.
- Reduced Demand for Raw Water— The South Fork of the Eel River contains protected salmonid species and is a wild and scenic river. By eliminating or reducing sources of water loss in the water storage tanks and distribution piping, the demand for raw water from the river would be reduced, since less water would be wasted through leaks and breaks in the system.

Energy Efficiency

- Reduced Treatment Requirements—By eliminating or reducing sources of water loss in the system, as described above, the demand on the water treatment plant would be reduced because less treated water would be wasted through leaks and breaks. This would result in reduced energy consumption associated with operating the surface water treatment plant.
- Reduced Pumping Efforts—By eliminating or reducing sources of water loss in the system, as described above, the demand on the pumping systems would be reduced because less treated water would be wasted through leaks and breaks. This would result in reduced energy consumption associated with pumping raw and treated water.
- Energy Efficient 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.

Adaptative Measures for Climate Change

The recommended project includes the following adaptive measures in response to climate change vulnerabilities:

- All new tanks for the project would be constructed of steel and concrete with no wood materials.
- The new Alderpoint Pump Station would be constructed of fire-resistant materials.
- As part of the construction project, as much clearing and grubbing would be completed around any new pump station structures.
- The increased storage capacity provided by the new tanks would improve firefighting capacity and also improve availability of water for the community during times of drought.
- The project would replace segments of the distribution system with new pipe that would be in better condition than the existing pipe; this would reduce the amount of water that is lost to leaks in the distribution system and generally conserve water, which is particularly important during times of drought.

- The District participates in the Enersponse demand response program.

Operations

The proposed project would alter the location of and improve GSD's water storage and conveyance infrastructure but would not change the type of ongoing operations nor increase the water service area, water withdrawals, or water entitlements.