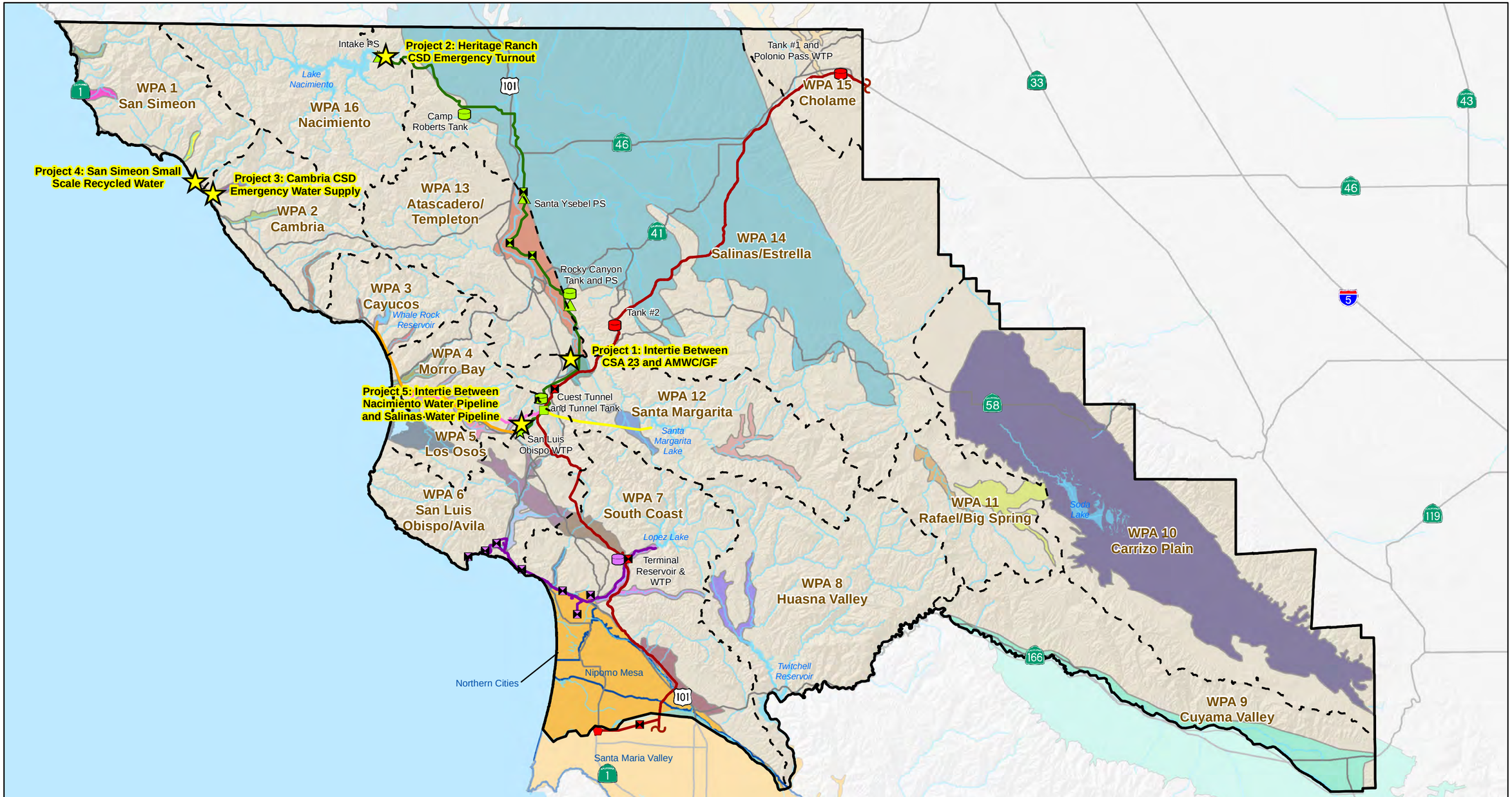
ATTACHMENT 3: PROJECT JUSTIFICATION

PROJECT SUMMARY TABLE

Table 4 – 2014 IRWM Drought Solicitation Project Summary Table						
Drought Project Element		**P1 CSA 23 Intertie**	**P2 Heritage Ranch**	**P3 Cambria CSD**	**P4 San Simeon CSD**	**P5 Nacimiento Intertie**
D.1	Provide immediate regional drought preparedness	X	X	X	X	X
D.2	Increase local water supply reliability and the delivery of safe drinking water	X	X	X	X	X
D.3	Assist water suppliers and regions to implement conservation programs and measures that are not locally cost-effective					
D.4	Reduce water quality conflicts or ecosystem conflicts created by the drought					
IRWM Project Element						
IR.1	Water supply reliability, water conservation, and water use efficiency	X	X	X	X	X
IR.2	Stormwater capture, storage, clean-up, treatment, and management					
IR.3	Removal of invasive non-native species, the creation and enhancement of wetlands, and the acquisition, protection, and restoration of open space and watershed lands					
IR.4	Non-point source pollution reduction, management, and monitoring					
IR.5	Groundwater recharge and management projects			X		
IR.6	Contaminant and salt removal through reclamation, desalting, and other treatment technologies and conveyance of reclaimed water for distribution to users			X		
IR.7	Water banking, exchange, reclamation, and improvement of water quality	X		X		X
IR.8	Planning and implementation of multipurpose flood management programs					
IR.9	Watershed protection and management					
IR.10	Drinking water treatment and distribution	X				X
IR.11	Ecosystem and fisheries restoration and protection					

REGIONAL MAP

Figure 3.1 on the following page shows the IRWM regional boundary and the location of the five projects contained within the proposal.



Legend

Water Facilities
- WTP
- Reservoir/Tank and/or WTP
- Local Facility
- Pump Station
- Turnout
- Tunnel Unit
- Water Transmission Line

Color Scheme
- California State Coastal Branch
- Lopez Water System
- Lake Nacimiento Water Project
- Salinas Reservoir System
- Whale Rock Reservoir System
- Chorro Valley Pipeline
- Project Locations
- Highways
- Major Rivers/Streams
- Management Areas
- Water Planning Area
- IRWM Regional Boundary
- Groundwater Basins
- Waterbodies

Text:

Water Planning Area
Water Facility
Management Area
Hydrography

0 5 10 Miles

Regional Map
IRWM 2014 Expedited Drought Grant
San Luis Obispo County

PROJECT 1: INTERTIE BETWEEN CSA 23 (SANTA MARGARITA) AND ATASCADERO MUTUAL WATER COMPANY (AMWC) AND GARDEN FARMS COMMUNITY SERVICES DISTRICT (GFCSD)

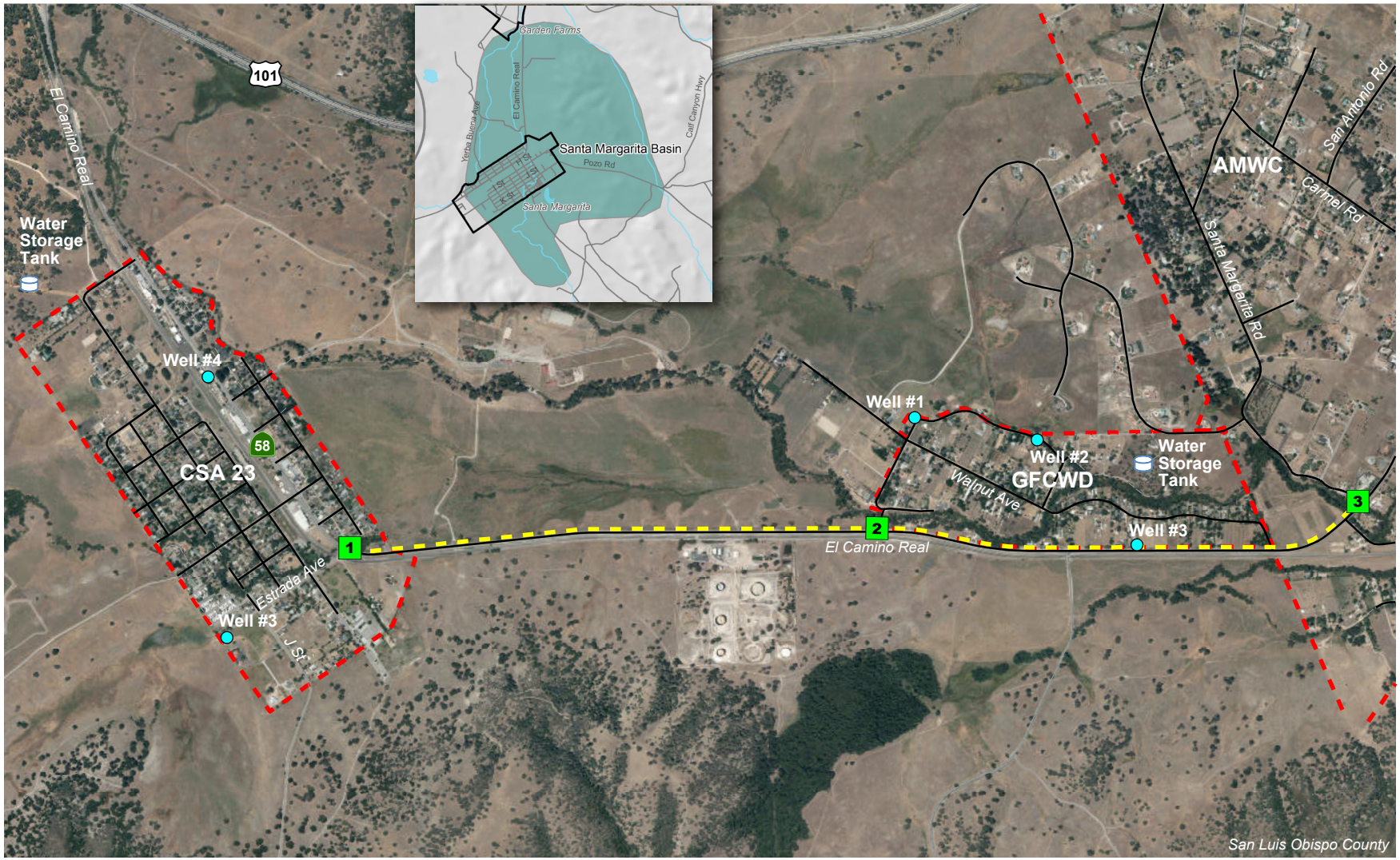
1.1 Brief Project Description

Agency: San Luis Obispo County Flood Control and Water Conservation District (District)

Construct an intertie between Santa Margarita, GFCSD, and AMWC to provide emergency water from AMWC to communities relying completely on shallow groundwater basins.

1.2 Project Map

Figure 3.2 on the following page shows Project 1's geographical location, all project facilities, affected water resources, and the proposed monitoring locations.



LEGEND

- Well
- Storage Tank
- CSA 23/AMWC/GFCWD Intertie (Proposed)
- Service Areas
- 1 Tie-in with CSA 23 (Monitoring Location)
- 2 Tie-in with GFCWD (Monitoring Location)
- 3 Tie-in with AMWC (Monitoring Location)

N

0 0.125 0.25 0.5
Miles

Note: Project overlays the Santa Margarita Valley Groundwater Basin, but project does not affect the basin.

PROJECT 1: CSA 23-ATASCADERO MWC-GARDEN FARMS CWD EMERGENCY INTERTIE

FIGURE 3.2

SAN LUIS OBISPO COUNTY
IRWM DROUGHT GRANT PROPOSAL

V:\Client86\SLOCounty\9353\slo0714\slo0714f3-9353.ai

1.3 Project Description

Eligible Project Type: Immediate Drought Preparedness / Increase Local Water Supply Reliability

How Drought Impact is Alleviated. San Luis Obispo County Service Area 23 (CSA 23) is the water purveyor for the community of Santa Margarita, which depends on groundwater as their only drinking water source. This groundwater supply is shallow and greatly affected by the 2014 drought. The proposed intertie project would provide the Santa Mrgarita community with an additional, more reliable emergency water supply, which would be avalible should CSA 23's wells continue to decline and run dry. Without this emergency supply, CSA 23's ability to reliably provide drinking water and thus fulfill the human right to water during the 2014 drought is at risk. The emergency intertie would be used as the last and final step in the overall water delivery, supply, and water conservation decision-making process.

Providing Immediate Drought Relief (D.1). CSA 23's groundwater is highly impacted by drought and seasonal fluctuations. The community's highest producing well is especially impacted since it is only 50 feet deep and influenced by the Santa Margarita Creek. CSA 23's smaller producing well was drilled to provide a deeper groundwater source in a different formation. It was hoped that this well would not be as affected by drought, but use of the well has shown that it has a much lower production. Since CSA 23's well production has historically decreased during droughts and other seasonal fluctuations, the system may not always be able to provide its customers with an adequate, dependable water supply.

Construction of the AMWC and GFCWD Intertie will provide CSA 23 access to treated water from AMWC and GFCWD during drought. AMWC has access to water sources that CSA 23 cannot currently access, including Salinas River underflow, Paso Robles Groundwater Basin, and the Nacimiento Reservoir. Currently, the Nacimiento Reservoir has 6096 AFY of reserve water for purchase by communities within the District. GFCWD also has access to the southern tip of the Paso Robles Groundwater Basin, which is not as drought impacted as CSA 23's groundwater. Construction of the proposed intertie would provide immediate drought preparedness by providing access to these alternate water sources.

Water Supply Reliability (IR.1). The proposed connections will also give CSA 23 access to multiple water supply sources that can supplement or supply drinking water to Santa Margarita in the event of an emergency other than drought that threatenes existing water supply reliability. Access to these water sources would provide system redundancy. Currently, CSA 23 relies solely on two groundwater wells, both of which run nearly continuously. The larger well's capacity meets the CSA 23's maximum day demand. The smaller well does not provide adequate redundancy with its capacity at 44% of maximum day demand, which is in violation of California Code of Regulations, Title 22, Section 64554, which requires community water systems be capable of meeting maximum day demand with the highest capacity source offline. The proposed interties add needed redundancy to the water supply system, fulfilling both a drought and IRWM Project Element.

CSA 23's two wells are also vulnerable to damage or contamination. Well shutdown could occur due to pump failure, well casing collapse, or power loss. Contamination is also a risk. The entire Santa Margarita community captures its wastewater with septic tank/leach field systems, which are notorious for viral, microbial, and nitrate contamination of groundwater. Additionally, train transport of contaminants routinely run within 100 yards of the community's largest producing and shallowest well. A train wreck or spill would undoubtedly impact the shallow groundwater. If CSA 23's wells were out of commission for an extended period of time, the ability to provide safe drinking water to fulfill the right to human water would be at risk.

Need for Expedited Funding. To achieve the project benefits described above, expedited funding is necessary. Currently, the 3-year average rainfall amounts are approximately 50% below the local average, causing groundwater levels to drop below normal. This apparent risk to water supply has triggered an ALERT status. If the drought continues, CSA 23 may not be able to provide its customers with an adequate, dependable water supply, putting the ability of CSA 23 to fulfill the Human Right to Water in jeopardy. The completion of the proposed intertie project is needed now, during this prolonged drought, and would provide needed water security for the community.

1.4 Project Physical Benefits

The CSA 23 Intertie Project will only be operated during drought years and therefore project benefits are only shown during expected drought years. For the proposed intertie project, project benefits include **water supply through the intertie during drought years** and **water quality improvement of the new supply as compared to the existing supply**. Refer to Tables 5-1A and 5-1B for a summary of the primary and secondary physical benefits. For the physical benefits tables, it was assumed that drought conditions would occur every 8 years and last for 3 years. This assumption is based on historical rainfall data from the region going back to 1870. Drought was defined as any three consecutive years with below average rainfall. With this definition, on average a drought occurred every 8 years. This definition encompasses the majority of the droughts defined by DWR (1918-20, 1923-26, 1928-35, 1947-50, 1959-62, 1976-77, 1987-92, 2001-02, and 2007-09). Additionally, using only DWR defined droughts, the drought cycle is also 8 years. Furthermore, this definition of drought roughly matches historical state water allocations. However, State Water allocations tend to lag droughts by a couple of years. Given this, it was assumed that a drought affecting regional groundwater levels, regional reservoir levels, and state water allocations would occur every 8 years and last for 3 years. During these drought years, it was assumed that the full demands of the community would be served by the emergency supply (intertie).

Table 5-1A – Annual Project Physical Benefits

Project Name: Intertie Between CSA 23 (Santa Margarita) and Atascadero Mutual Water Company (AMWC) and Garden Farms Community Services District (GFCSD)
Type of Benefit Claimed: Water Supply
Units of the Benefit Claimed: Acre-Feet of Water per Year Delivered through Intertie
Additional Information About this Benefit: N/A

(a)	(b)	(c)	(d)
	Physical Benefits		
Year	**Without Project (No Water from Intertie)**	**With Project (Water Supplied from Intertie)**	**Change Resulting from Project (c) – (b)**
2014	N/A	N/A	Project Not Yet Built
2015[5]	0	CSA 23[1]: Up to 175[3] GF[2]: Up to 75	CSA 23: Up to 175 GF: Up to 75
2016	0	0[4]	0
2017	0	0[4]	0
2018	0	0[4]	0
2019	0	0[4]	0
2020	0	0[4]	0
2021	0	0[4]	0
2022	0	0[4]	0
2023	0	0[4]	0
2024[6]	0	CSA 23: Up to 175[4] GF: Up to 75	CSA 23: Up to 175 GF: Up to 75
2025[6]	0	CSA 23: Up to 175[4] GF: Up to 75	CSA 23: Up to 175 GF: Up to 75
2026[6]	0	CSA 23: Up to 175[4] GF: Up to 75	CSA 23: Up to 175 GF: Up to 75
2027	0	0[4]	0
2028	0	0[4]	0
2029	0	0[4]	0

Table 5-1A – Annual Project Physical Benefits **Project Name:** Intertie Between CSA 23 (Santa Margarita) and Atascadero Mutual Water Company (AMWC) and Garden Farms Community Services District (GFCSD) **Type of Benefit Claimed:** Water Supply **Units of the Benefit Claimed:** Acre-Feet of Water per Year Delivered through Intertie **Additional Information About this Benefit:** N/A			
(a)	**(b)**	**(c)**	**(d)**
	Physical Benefits		
Year	**Without Project (No Water from Intertie)**	**With Project (Water Supplied from Intertie)**	**Change Resulting from Project (c) – (b)**
2030	0	0[4]	0
2031	0	0[4]	0
2032	0	0[4]	0
2033	0	0[4]	0
2034	0	0[4]	0
2035[6]	0	CSA 23: Up to 175[4] GF: Up to 75	CSA 23: Up to 175 GF: Up to 75
2036[6]	0	CSA 23: Up to 175[4] GF: Up to 75	CSA 23: Up to 175 GF: Up to 75
2037[6]	0	CSA 23: Up to 175[4] GF: Up to 75	CSA 23: Up to 175 GF: Up to 75
2038	0	0[4]	0
2039	0	0[4]	0
2040	0	0[4]	0
2041	0	0[4]	0
2042	0	0[4]	0
2043	0	0[4]	0
2044	0	0[4]	0
2045	0	0[4]	0
2046[6]	0	CSA 23: Up to 175[4] GF: Up to 75	CSA 23: Up to 175 GF: Up to 75
2047[6]	0	CSA 23: Up to 175[4] GF: Up to 75	CSA 23: Up to 175 GF: Up to 75
2048[6]	0	CSA 23: Up to 175[4] GF: Up to 75	CSA 23: Up to 175 GF: Up to 75
2049	0	0[4]	0
2050	0	0[4]	0
2051	0	0[4]	0

Table 5-1A – Annual Project Physical Benefits			
Project Name: Intertie Between CSA 23 (Santa Margarita) and Atascadero Mutual Water Company (AMWC) and Garden Farms Community Services District (GFCSD) **Type of Benefit Claimed:** Water Supply **Units of the Benefit Claimed:** Acre-Feet of Water per Year Delivered through Intertie **Additional Information About this Benefit:** N/A			
(a)	**(b)**	**(c)**	**(d)**
	Physical Benefits		
Year	**Without Project (No Water from Intertie)**	**With Project (Water Supplied from Intertie)**	**Change Resulting from Project (c) – (b)**
2052	0	0(4)	0
2053	0	0(4)	0
2054	0	0(4)	0
2055	0	0(4)	0
2056	0	0(4)	0
2057(6)	0	CSA 23: Up to 175(4) GF: Up to 75	CSA 23: Up to 175 GF: Up to 75
2058(6)	0	CSA 23: Up to 175(4) GF: Up to 75	CSA 23: Up to 175 GF: Up to 75
2059(6)	0	CSA 23: Up to 175(4) GF: Up to 75	CSA 23: Up to 175 GF: Up to 75
2060	0	0(4)	0
2061	0	0(4)	0
2062	0	0(4)	0
2063	0	0(4)	0
2064(7)	0	0(4)	0

Comments:
(1) CSA 23 is Community Service Area 23.
(2) GF is Garden Farms.
(3) "With Project" benefits based on average annual water usage by CSA 23 and Garden Farms. Actual water use will vary depending upon level of drought emergency, water use restrictions, conservation measures, etc.
(4) During years where there is no drought, the intertie will not be used to provide additional water.
(5) It was assumed that the current drought continues through 2015.
(6) Based on historical rainfall data in SLO County, a drought is likely to occur every 8 years and last for 3 years.
(7) This project has a 50-year useful life.

Table 5-1B – Annual Project Physical Benefits

Project Name: Intertie Between CSA 23 (Santa Margarita) and Atascadero Mutual Water Company (AMWC) and Garden Farms Community Services District (GFCSD)

Type of Benefit Claimed: Water Quality Improvement due to Use of Intertie

Units of the Benefit Claimed: mg/L (Nitrate) and ug/L (Arsenic)

Additional Information About this Benefit: N/A

(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project[3]	With Project	Change Resulting from Project (c) – (b)
2014	N/A	N/A	Project Not Yet Built
2015[4]	Arsenic: 4.1[1] Nitrate: 2.45	Arsenic: < 0.24[2] Nitrate: <1.54	Arsenic: -3.86 Nitrate: -0.91
2016	-	-	0
2017	-	-	0
2018	-	-	0
2019	-	-	0
2020	-	-	0
2021	-	-	0
2022	-	-	0
2023	-	-	0
2024[5]	Arsenic: 4.1[1] Nitrate: 2.45	Arsenic: < 0.24[2] Nitrate: <1.54	Arsenic: -3.86 Nitrate: -0.91
2025[5]	Arsenic: 4.1[1] Nitrate: 2.45	Arsenic: < 0.24[2] Nitrate: <1.54	Arsenic: -3.86 Nitrate: -0.91
2026[5]	Arsenic: 4.1[1] Nitrate: 2.45	Arsenic: < 0.24[2] Nitrate: <1.54	Arsenic: -3.86 Nitrate: -0.91
2027	-	-	0
2028	-	-	0
2029	-	-	0
2030	-	-	0
2031	-	-	0
2032	-	-	0
2033	-	-	0
2034	-	-	0
2035[5]	Arsenic: 4.1[1] Nitrate: 2.45	Arsenic: < 0.24[2] Nitrate: <1.54	Arsenic: -3.86 Nitrate: -0.91
2036[5]	Arsenic: 4.1[1] Nitrate: 2.45	Arsenic: < 0.24[2] Nitrate: <1.54	Arsenic: -3.86 Nitrate: -0.91
2037[5]	Arsenic: 4.1[1] Nitrate: 2.45	Arsenic: < 0.24[2] Nitrate: <1.54	Arsenic: -3.86 Nitrate: -0.91
2038	-	-	0
2039	-	-	0
2040	-	-	0
2041	-	-	0

Table 5-1B – Annual Project Physical Benefits

Project Name: Intertie Between CSA 23 (Santa Margarita) and Atascadero Mutual Water Company (AMWC) and Garden Farms Community Services District (GFCSD)

Type of Benefit Claimed: Water Quality Improvement due to Use of Intertie

Units of the Benefit Claimed: mg/L (Nitrate) and ug/L (Arsenic)

Additional Information About this Benefit: N/A

(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project(3)	With Project	Change Resulting from Project (c) – (b)
2042	-	-	0
2043	-	-	0
2044	-	-	0
2045	-	-	0
2046(5)	Arsenic: 4.1(1) Nitrate: 2.45	Arsenic: < 0.24(2) Nitrate: <1.54	Arsenic: -3.86 Nitrate: -0.91
2047(5)	Arsenic: 4.1(1) Nitrate: 2.45	Arsenic: < 0.24(2) Nitrate: <1.54	Arsenic: -3.86 Nitrate: -0.91
2048(5)	Arsenic: 4.1(1) Nitrate: 2.45	Arsenic: < 0.24(2) Nitrate: <1.54	Arsenic: -3.86 Nitrate: -0.91
2049	-	-	0
2050	-	-	0
2051	-	-	0
2052	-	-	0
2053	-	-	0
2054	-	-	0
2055	-	-	0
2056	-	-	0
2057(5)	Arsenic: 4.1(1) Nitrate: 2.45	Arsenic: < 0.24(2) Nitrate: <1.54	Arsenic: -3.86 Nitrate: -0.91
2058(5)	Arsenic: 4.1(1) Nitrate: 2.45	Arsenic: < 0.24(2) Nitrate: <1.54	Arsenic: -3.86 Nitrate: -0.91
2059(5)	Arsenic: 4.1(1) Nitrate: 2.45	Arsenic: < 0.24(2) Nitrate: <1.54	Arsenic: -3.86 Nitrate: -0.91
2060	-	-	0
2061	-	-	0
2062	-	-	0
2063	-	-	0
2064(6)	-	-	0

Comments:

(1) "Without Project" benefits assume existing groundwater quality.
(2) "With Project" benefits assume 100% of the water used by CSA 23 and Garden Farms comes from the new Emergency Intertie.
(3) During times of no drought no water quality improvement would be seen.
(4) It was assumed that the current drought continues through 2015.
(5) Based on historical rainfall data in SLO County, a drought is likely to occur every 8 years and last for 3 years.
(6) This project has a 50-year useful life.

1.5 Technical Analysis of Physical Benefits Claimed

1.5.1 Recent and Historical Conditions

The Santa Margarita community currently relies solely on groundwater from both the low-yield Santa Margarita Formation and the high-yield alluvium of Santa Margarita Creek. The Santa Margarita Formation is at the upper end of what DWR consideres the Paso Robles Basin; however, local delineations separate out this formation. Regardless of name, groundwater in this region is shallow and highly affected by drought. Up until the 1990s, only two groundwater wells, Well No. 1 and Well No. 2, were in service and both drew water from the high-yield Santa Margarita Creek alluvium. In 1991, after five years of significant drought, the water levels in Well No. 1 and Well No. 2 dropped very low. In response, the San Luis Obispo County Board of Supervisors declared a water supply emergency, establishing severe restrictions on water use, which included mandatory water conservation measures. The emergency declaration prohibited all outdoor water usage and included adoption of a County Ordinance (#2496) with penalties for anyone that violated the emergency requirements. Fortunately, the "miracle March rains" of 1991 resulted in 18.94 inches of rainfall in Santa Margarita during the month. Water levels in the Santa Margarita creek alluvium soon recovered and the emergency requirements were repealed in 1992.

The 1991 drought brought attention to the need for an additional water supply that was not in the same Santa Margarita alluvium as the existing wells, which were subject to seasonal fluctuations. Thus, in 1991 Well No. 3, a deep well, was drilled. In 1997, Wells No. 1 and 2 were shut down since they did not meet the Department of Public Health's (DPH) current well construction standards and were at risk of contamination. To replace these wells, Well No. 4 was drilled into the high-yield alluvium of Santa Margarita Creek. See Figure 3.3 for the location of these wells.

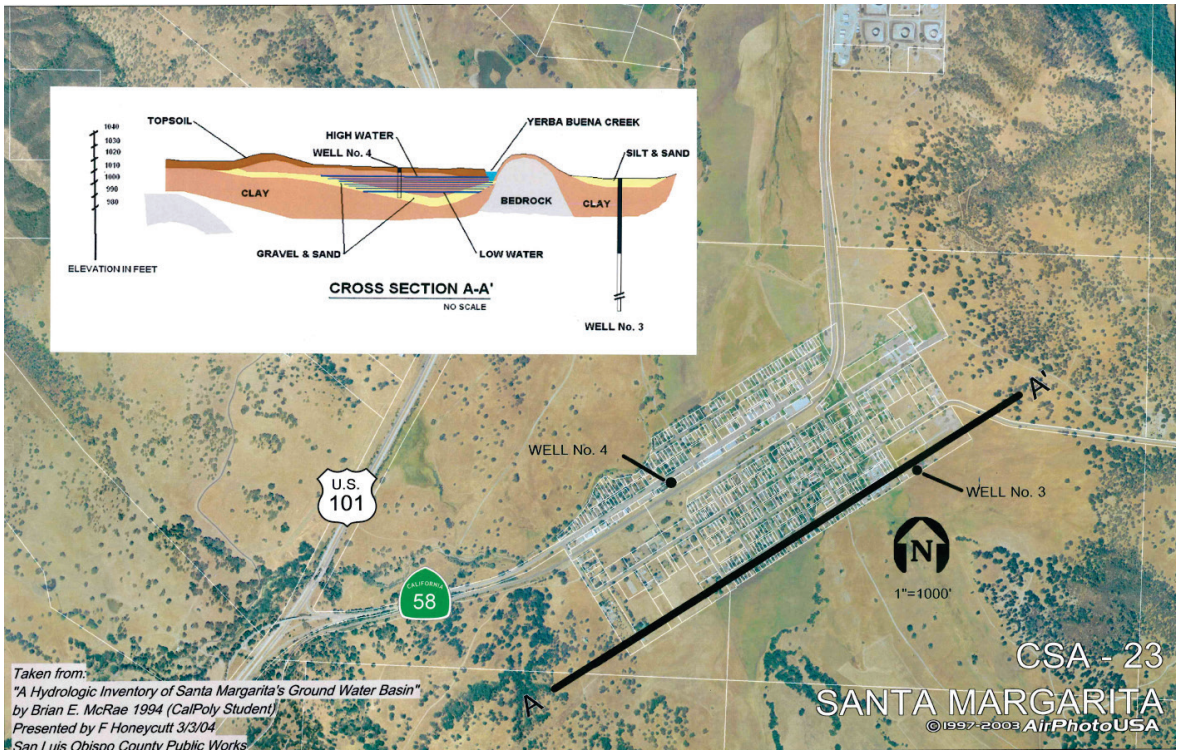


Figure 3.3: Existing Groundwater Supply Wells for CSA 23

As of 2014, these two wells still provide the community's water supply. Well No. 3 is a deep well (780 feet) located in the low yield Santa Margarita Formation near the east end of town and supplies

approximately 25% of the community supply. Well No. 4 is a shallow well (50 feet) located in the high-yield alluvium of Santa Margarita Creek near the west end of town and provides approximately 75% of the supply. However, this water supply system does not comply with the California Department of Public Health , Title 22, Section 64554 which states:

> (a) *At all times a public water system's water sources shall have the capacity to meet the system's maximum day demand;*
>
> (b) *Community water systems using only groundwater shall have a minimum of two approved sources. The system shall be capable of meeting the maximum day demand with the highest capacity source off line.*

The system is not in compliance with DPH standards because in the event that the main well (No. 4) shuts down due to low water levels, water quality issues, or mechanical issues, the back up well (No. 3) does not have sufficient capability to meet community demands during its highest use period. It is under these conditions that the Santa Margarita community faces the current 2014 drought.

Demonstrating the severe nature of the impacts from the 2014 drought, Figure 3.4 below shows how 2014 well levels and precipitation compare to previous well levels and precipitation during other periods when ALERT status has been declared. This figure clearly demonstrates that the current drought is worse than what has been seen in recent history. Providing an intertie between CSA23 and AMWC would provide an alternative water source during drought years and would bring the system into compliance with Title 22 standards.

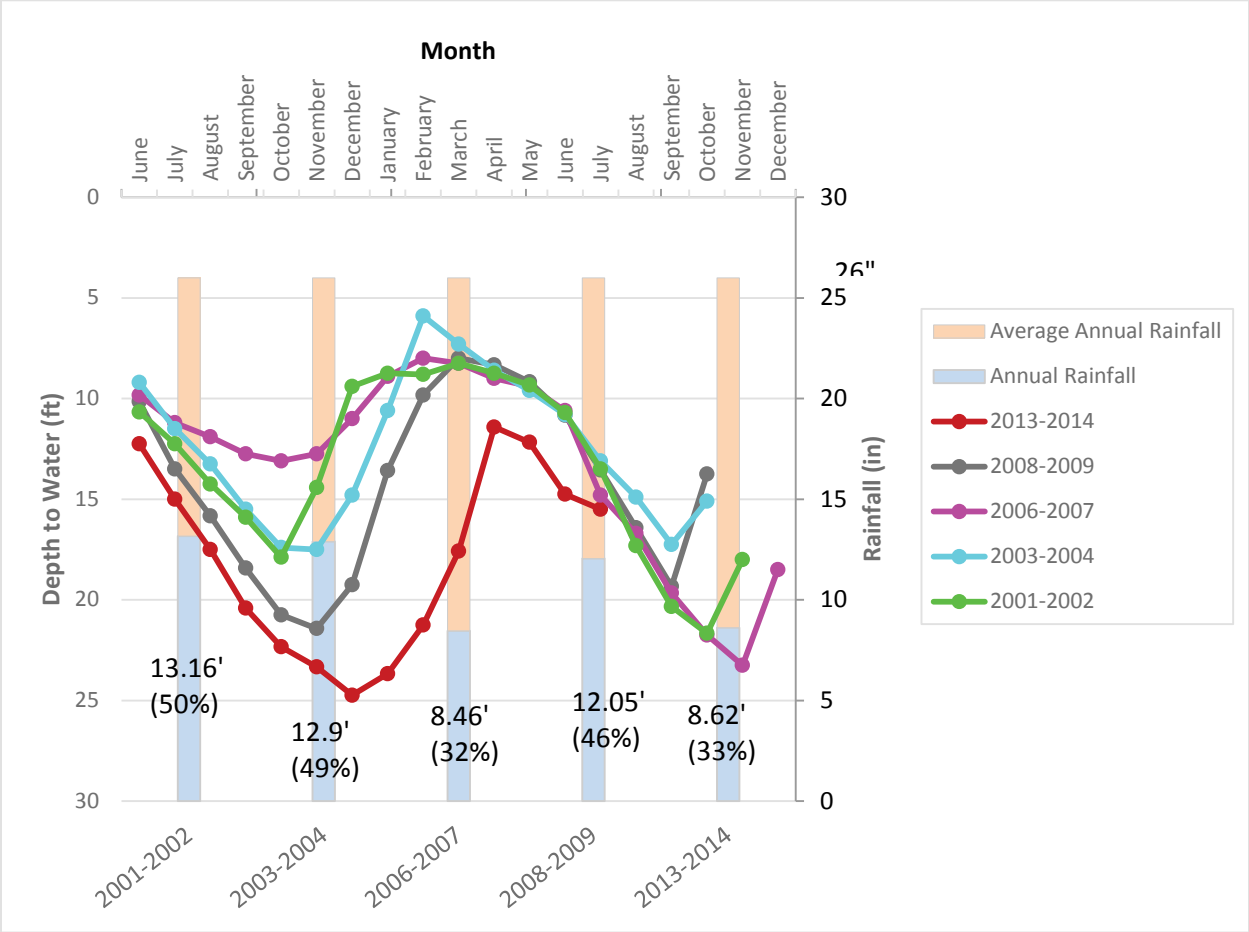


Figure 3.4: CSA 23: Depth to Water in Well #4 in ALERT Years

In addition to water quantity concerns, the community also faces water quality concerns. As noted in the County's 2010-2012 Resource Summary Report[1], the community relies on individual septic systems for wastewater service. Septic failures have occurred in areas of town subject to high groundwater levels. While none of these failures have caused unacceptable levels of contamination at the drinking water supply wells, the possibility of such a contamination exists. Providing an alternative supply that is not subject to this risk is important. Furthermore, during drought conditions, if well levels drop below the intake screens, the groundwater quality drops significantly. Providing an intertie between CSA23 and AMWC would provide a clean, reliable water source not subject to potential pollution or contamination from wastewater systems.

1.5.2 Project Performance Measures (to estimate physical benefits)

To estimate the primary physical benefit described in Table 5, historical water usage by CSA 23 and Garden Farms was tabulated. Attached as Appendix 3-1A is the CSA 23 Historical Water Consumption table from 1999-2013. Based on the last decade of water usage, water consumption has ranged from a low of 139 AF in 2011-2012 to a peak of 175 AF in 2006-2007. Additionally the Garden Farms Community Water District annually provides water use information to the Department of Public Works. Recent water consumption has ranged from a low of 64 AF in 2011-2012 to a peak of 80 AF in 2005-2006, with an average of 75 AF. The proposed intertie will have the capacity to deliver the historical peak water demand from CSA 23 as well as the peak water demand for Garden Farms.

To measure performance once the proposed project is implemented, the County of San Luis Obispo will continue to receive annual updates on water system usage from CSA 23 and GF to track "Total Water into the System" (production) and "Water Deliveries" (consumption or metered use). Tracking flow through the intertie system will be through meter vaults at all three connection locations. The AMWC meter would track supply flow while the CSA 23 and GF meters would track water usage during use of the intertie.

To estimate the secondary physical benefit described in Table 5, historical water quality data was tabulated and the anticipated improvement in water quality concentrations of arsenic and nitrate were shown assuming all the water supplied during a drought year would be from the intertie. The County Water Quality Lab issues an annual Water Quality Report for the CSA 23 water system. The wells and water system are routinely monitored for contaminants and the results are reported to the CA Department of Public Health. The water delivered to Santa Margarita customers meets the Federal and State drinking water requirements. Constituents within the existing water system (note that all constituents are below Federal/State drinking water requirements) include:

- Arsenic (4.1 mg/L): results from the erosion of natural deposits
- Nitrate (2.45 mg/L): leaching from fertilizer use, septic tanks and sewage; erosion of natural deposits
- Lead & Copper: internal corrosion of household water plumbing systems
- Coliform Bacteria (in 3.7% of samples; below): naturally present in the environment

The Atascadero MWC also releases their annual water quality results:

- Arsenic (0.24 mg/L): erosion of natural deposits; runoff from orchards; glass and electronics production wastes
- Nitrate (1.54 mg/L): runoff and leaching from fertilizer use; leaching from septic tanks and sewage; erosion of natural deposits
- Lead & Copper: internal corrosion of household water plumbing systems

To measure performance post-project implementation, water quality monitoring of both water supplies will continue. The CSA 23 wells are routinely sampled under a CDPH approved monitoring plan and as discussed within Section 8.0 Water Quality of the CSA 23 Santa Margarita Watershed Sanitary Survey Update (January 2011). The present water quality monitoring program, along with quarterly inspections of

[1] 2010-2012 Resource Summary Report, San Luis Obispo County General Plan, March 201, http://www.slocounty.ca.gov/Assets/PL/RMS/2010-2012_RMS.pdf

the watershed, should help ensure drinking water and would be routinely reviewed and updated by staff as needed.

1.5.3 Project Facilities and Actions

Implementation of the CSA 23 / AMWC / GF Intertie project will add new facilities to the regional water systems and provide infrastructure for the delivery of water from AMWC to GF and CSA 23 during emergency situations. The required infrastructure is shown in the project map and includes approximately 2.5 miles of piping and three tie-ins. 30% design plans are included as Appendix 3-1B

In addition to the physical facilities, policies and actions necessary to obtain the project's physical benefits include the development of exchange agreements between water partners. The Atascadero MWC is connected to the Nacimiento Water Project and utilizes water from the Salinas River underflow, neither of which is normally available to CSA 23 or GF.

An exchange agreement can be negotiated in many ways, but is essentially a contract with one or more water partners that establish rules on how to share water resources during a drought or emergency situation. Developing exchange agreements between the SLO County Flood Control and Water Conservation District, CSA 23, AMWC, and GF will be developed in parallel to the CSA 23 intertie infrastructure project. Development of these agreements is included in the work summary, schedule, and budget of this grant proposal. On-going discussions with the various water system stakeholders are also underway. Attached as Appendix 3-1C are letters of support for this project from AMWC and GF. Completion of the infrastructure and exchange agreements can be very beneficial to small water supply agencies through regional flexibility, system redundancy and improved water quality.

1.5.4 Alternatives

To address the need for water supply reliability of both quality and quantity, CSA 23 has considered a number of alternatives. The following section summarizes the alternatives that were considered as well as why the proposed project is the favored alternative.

1.5.4.1 Alternative #1 – Obtain Supplemental Water

This alternative involves obtaining a new, permanent supplemental water supply for CSA 23. Projects to obtain permanent water rights from the two nearest water supplies, SWP and Nacimiento Water Project, were considered. After detailed analysis, it was determined that, even without consideration of necessary capital costs, the long term annual costs of supplemental water were far too costly for the community of 2,700 people to support. To buy into the Nacimiento Water Project it would cost CSA 23 $2,540,000 with an additional annual cost of $87,000 ($500 per acre-foot). These costs are much higher than the proposed project costs. Although alternatives to obtain and access a permanent supplemental water source would greatly improve CSA 23's ability to safely and reliably provide water in emergencies and droughts, the ongoing costs make the alternative cost-prohibitive and, thus, infeasible.

1.5.4.2 Alternative #2 – Water System Consolidation

This alternative involves consolidation of the CSA 23 water system with other nearby water systems. Only consolidation of CSA 23 with Garden Farms Community Water District (CWD) or Atascadero Mutual Water Company (MWC) was considered since all other communities and water purveyors are not located close enough to be economically feasible. This alternative is not considered feasible for the resons outlined below.

1.5.4.2.1 Consolidation with Garden Farms CWD

Garden Farms CWD is a small water company that supplies drinking water to the small community of Garden Farms. The Garden Farms CWD service area is located approximately 2 miles north of Santa

Margarita, adjacent to Santa Margarita Creek and overlying the southern tip of the Paso Robles Groundwater Basin. It has three groundwater wells and relies solely on groundwater as its water supply source. Although Garden Farms CWD has access to a groundwater basin that CSA 23 cannot access, its supply is still limited. For example, during droughts, the residents located within the Garden Farms CWD service area have to implement water conservation measures so that the system can continue to provide drinking water to the community. Furthermore, neither the Garden Farms CWD system nor the CSA 23 system is appropriately sized to supply the other community's normal water demands should either community's wells fail or be contaminated. Since the limited water supplies and inadequate sizing of the two systems will not improve water supply reliability, consolidation of the two systems is not considered beneficial.

1.5.4.2.2 Consolidation with Atascadero MWC

Atascadero MWC is a large water purveyor that distributes drinking water to approximately 8,700 service connections in the Atascadero area. Its water supply sources include Salinas River underflow, Paso Robles Groundwater Basin and Nacimiento Water Project water. The southern extents of Atascadero MWC's service area are located nearly three miles north of Santa Margarita.

In order for CSA 23 to consolidate with Atascadero MWC, the entire CSA 23 service area would have to be "annexed" into the Atascadero MWC service area, a process that involves issuance of shares to Santa Margarita properties. All shareholders are required to deed their individual property's water rights to Atascadero MWC. This provides stability and reliability for Atascadero MWC's water supply, but removes water rights from the individual. In order to be issued shares of the Water Company the individual property owners within CSA 23 would have to designate Atascadero MWC as having authority to exercise their overlying water rights.

Consolidation of Atascadero MWC with CSA 23 would allow Santa Margarita residents to benefit from multiple water sources that they currently cannot access. Overall, improved reliability would result and the community's water rights position, as a whole, would be strengthened. Despite these valuable benefits, consolidation with Atascadero MWC is not considered to be the preferred option for the following reasons:

1. Loss of Individual's Water Rights. Consolidation would require Santa Margarita residents to designate their individual property water rights to Atascadero MWC. This process would require a vote that would likely not pass since the community has already expressed that it does not support joining Atascadero MWC. The proposed Project provides alternative sources of water for emergency situations as well as preserves individual's property water rights.

2. Additional Water Sources Primarily Needed for Emergency. CSA 23's two active wells are currently capable of sufficiently meeting Santa Margarita's water demands. Only in emergency situations and severe droughts does CSA 23 require additional water sources. Consolidation with Atascadero MWC would provide permanent and normal access to other water sources, but the process of consolidation, if accepted by the community, would likely take years and be a very costly process. The proposed Project could be fully implemented in the short term and be much less costly. Providing emergency access to additional water sources to be used on an as needed basis is a much quicker and affordable solution to CSA 23's water supply deficiencies.

3. Limited Benefit to Atascadero MWC. The CSA 23 water system would provide little benefit to Atascadero MWC. After system consolidation, the CSA 23 water system would remain unchanged and would continue to provide water solely to Santa Margarita. Atascadero MWC's other water sources would be available for Santa Margarita, but would likely only be needed during emergencies and droughts. It is unlikely that Atascadero MWC would utilize Santa Margarita's water to supply drinking water to the residents within their existing service area in non-emergency situations because Atascadero MWC's system operates at a higher pressure than CSA 23's system. In order to deliver Santa Margarita's water to the existing Atascadero MWC service area, Atascadero would

need to construct and maintain a booster pump station, which would add significant cost to the project, while providing minimal benefit.

1.5.4.3 Alternative #3 –Truck Water from Outside Sources during Emergencies

This alternative does not provide for any new water system improvements. CSA 23 would remain completely reliant on groundwater with the same two wells providing water supply. In the event the CSA 23 water system could not supply adequate water due to intentional or unintentional damage or contamination or due to drought conditions, emergency measures such as boil water orders and trucking water from outside sources would be required. Although this alternative would not have any immediate capital or maintenance costs, trucking drinking water during an emergency would be extremely expensive and only feasible in short term emergencies. Additionally, trucked water would only provide for drinking needs. Other water needs, such as sanitation, would not be met, resulting in potential health risks.

This alternative is not considered feasible because it does not improve CSA 23's ability to safely and reliably deliver water and it puts the public's health at risk.

1.5.4.4 Alternative #4 – Nacimiento Water Project Emergency Intertie

This alternative would include construction of a turnout facility to connect the CSA 23 water system to the Nacimiento Water Project (NWP) pipeline, which runs along the northern CSA 23 service area boundary. Connection to the NWP pipeline also would require construction of a new water treatment plant, since the NWP pipeline conveys raw water from a surface water source. The tables below present an estimated project cost summary and a pros and cons analysis of the alternative.

Alternative #4 Estimated Costs

Capital Project Costs	Annual Operations & Maintenance Costs
$1,996,000	$342,000

Alternative #4 Evaluation Summary

Pros	Cons
• Provides water supply redundancy by giving CSA 23 access to a reliable surface water source. • Enables CSA 23 to meet Title 22 regulations • Improves CSA 23's ability to provide water in the event of intentional or unintentional water system damage or contamination • Improves CSA 23's ability to provide water during drought conditions	• NWP does not supply water one month per year • High capital costs to obtain access to one water source. • Annual operation and maintenance costs for the new water treatment plant are cost prohibitive for CSA 23.

Alternative #4 is not considered a viable alternative because it is too costly to maintain and is comparatively expensive for access to only one water source.

1.5.4.5 Alternative #5 – New Groundwater Well

This alternative consists of constructing a new deep well near Well #3 to provide additional water supply production. A new high producing, shallow alluvium well similar to Well #4 was not considered because its production is significantly impacted by seasonal water level fluctuations during drought conditions. Constructing the new well would require filtration and disinfection equipment for the well water, test well(s) to ensure well production, and final location determinations since well site availability within town is limited due to existing leach fields from septic systems. The tables below present an estimated project cost summary and a pros and cons analysis of the alternative.

Alternative #5 Estimated Costs

Capital Project Costs	Annual Operations & Maintenance Costs
$864,000	$60,000

Alternative #5 Evaluation Summary

Pros	Cons
• Potentially provides enough water, in conjunction with Well #3, to supply CSA 23's maximum daily demand and average yearly use in the event that Well #4 is intentionally or unintentionally damaged or contaminated. • Potentially enables CSA 23 to provide a supply in drought conditions. • Potentially enables CSA 23 to meet Title 22 requirements.	• Does not provide water supply redundancy and CSA 23 would remain completely dependent on groundwater. • Does not ensure safe and reliable water deliveries in the event that the new well or Well #3 are intentionally or unintentionally damaged or contaminated during drought years. • Does not ensure safe and reliable water deliveries in the event that the all CSA wells are intentionally or unintentionally damaged or contaminated. • Annual operation and maintenance costs are cost prohibitive for CSA 23.

Alternative #5 is not considered a viable alternative because it is too costly to maintain and does not ensure safe and reliable water deliveries in an emergency. In addition there is a high probability that a new deep well would have similar problems as Well #3 with capacity limited by poor geology.

1.5.4.6 Proposed Project – Santa Margarita Emergency Intertie Project

The proposed project includes construction of water system improvements to connect the CSA 23 water system to two other water systems for emergency purposes: Atascadero MWC and Garden Farms CWD. The table below presents an estimated project cost summary of the alternative.

Proposed Project Estimated Cost Summary

Capital Project Costs	Annual Operations & Maintenance Costs
$1,988,000[1]	$1,000

[1] Project costs assume construction of the Atascadero MWC Intertie

1.5.5 Without Project Conditions

Without the intertie project between CSA 23 and AMWC/GF the communities of Santa Margarita and Garden Farms would:

- Be dependent on existing, limited groundwater supplies;
- Have a lack of supply redundancy and out of compliance with DPH standards;
- Be vulnerable to intentional/unintentional well damage or contamination; and
- Continue being vulnerable to drought conditions.

If the proposed project is not constructed, it is likely that CSA 23 would consider Alternative #4 (Nacimiento Water Project Emergency Intertie) or Alternative #3 (Truck Water from Outside Sources during Emergencies). Both of these alternatives are much more costly than the proposed project. Alternative #4 includes the construction of a new water treatment plant, since the NWP pipeline conveys raw water from a surface water source. Alternative #3 does not provide water security since it is simply an emergency measure.

1.5.6 Potential Adverse Effects

The largest adverse effects will occur if the proposed project is not implemented and drought conditions continue. If the project does not proceed, then CSA 23 will not have a reliable source of water. If drought conditions continue, CSA 23 may need to raise their drought status to CRITICAL. Declaration of a CRITICAL status would require the following action by the Board of Supervisors:

- Conduct a public hearing and declare Water Shortage Emergency Condition

- Adopt an emergency ordinance imposing a surcharge for water use above normal domestic indoor use and changing to a monthly billing cycle.

As with the 1991 drought, it is possible that water levels in the existing wells could drop well below sustainable levels and threaten the Human Right to Water in this community. Unlike the 1991 drought, the CSA 23 community does not want to leave their emergency water supply up to the chance of rain. The proposed intertie project would provide a necessary emergency water supply that is more reliable in quantity and better in quality than their existing supply.

If the project is implemented, there will be temporary impacts during construction related to installing 2.5 miles of pipelines and interties. Water shutdowns will be required during connection of the interties. The most likely impact is temporary traffic impacts during construction.

1.6 Cost Effectiveness Analysis

SLO County has pursued available alternatives to the proposed Project. The five alternatives along with the proposed project are listed in Table 6-1.

Table 6-1 – Cost Effective Analysis **Project name: Project 1 Intertie Between CSA 23 (Santa Margarita) and Atascadero Mutual Water Company (AMWC) and Garden Farms Community Services District (GFCSD)**	
Question 1	**Types of benefits provided as shown in Table 5:** *(Primary) Water Supply and (Secondary) Water Quality Improvement*
Question 2	**Have alternative methods been considered to achieve the same types and amounts of physical benefits as the proposed project been identified?** *Yes*
	If no, why? *N/A*
	If yes, list the methods (including the proposed project) and estimated costs: ***Alternative 1:*** *Obtain permanent water rights from the State Water Project and Nacimiento Water Project (Capital cost: $863,500; Annual O&M cost: $125,000; Price of Water: TBD). Deemed infeasible due to unreliability of State Water, non-support by the local community and the cost of State Water delivery (new connection).* ***Alternative 2:*** *Consolidate CSA 23 with nearby water systems (no cost determined because deemed infeasible due to lack of water source diversity if CSA 23 were to consolidate with Garden Farms and loss of individual's water rights if CSA 23 were to consolidate with AMWC)* ***Alternative 3****: Truck water from outside sources during emergencies (no cost determined because only feasible for short term emergencies)* ***Alternative 4:*** *Nacimiento Water Project Emergency Intertie (Capital cost: $ 1,996,000; Annual O&M cost: $342,000; Price of Water: TBD). Deemed infeasible due to need to treat Nacimiento water (treatment plant) prior to delivery and the cost of Nacimiento water delivery (new connection).* ***Alternative 5:*** *Construct a deep groundwater well (Capital cost: $864,000; Annual O&M cost: $60,000). Deemed infeasible because does not provide water supply redundancy or ensure safe and reliable water deliveries during drought or emergency*

Table 6-1 – Cost Effective Analysis	
	situations. ***Proposed Project:*** *Construct an intertie to connect CSA 23 with Garden Farms and Atascadero MWC (Capital cost: $1,988,000; Annual O&M cost: $1,000).*
Question 3	**If the proposed project is not the least cost alternative, why is it the preferred alternative? Provide an explanation of any accomplishments of the proposed project that are different from the alternative project or methods:** *While Alternatives 1 and 5 have a lower capital cost than the proposed project, they are not considered viable alternatives because they are more costly to maintain, do not ensure safe and reliable water deliveries in a drought or emergency situation, have unknown costs for State or Nacimiento water deliveries, and the local community was not previously supportive of a State Water connection.*

PROJECT 2: HERITAGE RANCH COMMUNITY SERVICES DISTRICT (HRCSD) EMERGENCY WATER TURNOUT

1.7 Brief Project Description

Agency: Heritage Ranch Community Services District (HRCSD)

This project provides an emergency turnout from the Nacimiento Water Pipeline allowing HRCSD's water treatment plant to receive lake water during extreme drought conditions.

1.8 Project Map

Figure 3.5 on the following page shows Project 2's geographical location, all project facilities, affected water resources, and the proposed monitoring locations.

N

PROJECT 2: HERITAGE RANCH COMMUNITY SERVICES DISTRICT EMERGENCY WATER TURNOUT

Note: HRCSD does not overlay any Groundwater Basin.

(1) Meter in turnout will be used for monitoring performance (volume delivered).

FIGURE 3.5

SAN LUIS OBISPO COUNTY
IRWM DROUGHT GRANT PROPOSAL

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1.9 Project Description

Eligible Project Type: Immediate Drought Preparedness / Increase Local Water Supply Reliability

How Drought Impact is Alleviated. HRCSD's sole water source is the Nacimiento Reservoir via the Nacimiento River. HRCSD has pursued other water supply options in recent years to improve the reliability of their water supply. However, there is no groundwater available in the area and Camp Roberts (the only feasible nearby agency with available water) has denied HRCSD's request to work on an emergency water service agreement. Therefore, HRCSD's focus is on their existing water source to serve as a clean, affordable, and accessible source for human consumption, cooking, and sanitary purposes (Human Right to Water). This project will allow access to the existing water allocation of Nacimiento Water during periods of drought or low to zero flow from Nacimiento Dam (i.e., when HRCSD's existing gallery wells cannot access river water) providing a more reliable water supply. The flow of water to the river is controlled by Monterey County Water Resouces Agency (MCWRA) until the reservoir reaches the upper minimum pool boundary of 687.8 feet, at which time all reservoir releases may stop. The reservoir is currently at 721 feet as of July 2014 and levels are anticipated to drop with summer temperatures. The HRCSD community has come very close to running out of water, most recently with discussions in 2009 between MCWRA and SLO County regarding reduced/no flow in the river. HRCSD is under mandate by the CDPH to implement an emergency water turnout from the Nacimiento Water Pipeline to ensure an alternative water supply during drought conditions.

Providing Immediate Drought Relief (D.1).HRCSD's existing water intake facilities consist of three well screens laid under the Nacimiento River bed. This surface water is treated at the HRCSD's water treatment plant. HRCSD holds entitlement to 1,100 acre-feet per year (AFY) of Nacimiento water, under contract with the San Luis Obispo (SLO) County Flood Control and Water Conservation District (District). Currently, HRCSD utilizes approximately 550 AFY to serve its customers. During drought/low lake level, known as "dead pool" elevation, lake water cannot physically be released (i.e., gravity fed) through the outlet works of the dam and in to the river. Under this condition, HRCSD cannot supply any of their 3,500 residents water needed for life, health and safety. While HRCSD's water cannot be accessed via the river, there is water available in the reservoir in drought conditions. This is a result of SLO County having entitlement to the last 17,500 AF of water in the reservoir, of which there is 6095 AF available for emergency purposes anywhere in the county. Therefore, this project would allow access to the water directly from the District's Nacimiento Water Project pipeline, thereby alleviating drought impacts to the HRCSD. Without this Project, the community of Heritage Ranch would have no water supply whatsoever during drought conditions, and residents would need to relocate.

Water Supply Reliability (IR.1). This emergency water project allows HRCSD to access their entitlement of Nacimiento water through the Nacimiento Pipeline, which draws lake water from below dead pool elevation. The proposed project allows HRCSD direct access to their entitled water from Lake Nacimiento, thus allowing HRCSD to continue to serve customers with potable water and fire protection services during drought conditions.

Need for Expedited Funding. To achieve the project benefits described above, expedited funding is necessary. If the drought continues, HRCSD may not be able to provide its customers with an adequate, dependable water supply, putting the ability of HRCSD to fulfill the Human Right to Water in jeopardy. The completion of the proposed emergency water turnout project is needed now, during this current drought, and will provide needed water security for the community both now and in the future.

1.10 Project Physical Benefits

This section provides the measurable accomplishments/benefits for HRCSD's Project. HRCSD yields immediate benefit from this Project by allowing the HRCSD to **access its sole potable water supply source during drought conditions**. Without this Project, the HRCSD will have no water for health, safety and sanitation purposes, and the community would cease to exist. This project also provides **fire protection** for the current and future Heritage Ranch population. Refer to Tables 5-2A and 5-2B for a summary of the primary and secondary physical benefits. For the physical benefits tables, it was assumed that drought conditions would occur every 8 years and last for 3 years. This assumption is based on historical rainfall data from the region going back to 1870. Drought was defined as any three consecutive years with below average rainfall. With this definition, on average a drought occurred every 8 years. This definition encompasses the majority of the droughts defined by DWR (1918-20, 1923-26, 1928-35, 1947-50, 1959-62, 1976-77, 1987-92, 2001-02, and 2007-09). Additionally, using only DWR defined droughts, the drought cycle is also 8 years. Furthermore, this definition of drought roughly matches historical state water allocations. However, State Water allocations tend to lag droughts by a couple of years. Given this, it was assumed that a drought affecting regional groundwater levels, regional reservoir levels, and state water allocations would occur every 8 years and last for 3 years. During these drought years, it was assumed that the full demands of the community would be served by the emergency turnout.

Table 5-2A – Annual Project Physical Benefits
Project Name: Heritage Ranch Community Services District (HRCSD) Emergency Water Turnout
Type of Benefit Claimed: Access to potable water supply
Units of the Benefit Claimed : Acre-Feet Per Year
Additional Information About this Benefit: N/A

(a)	(b)	(c)	(d)
Physical Benefit - Potable Water For Life, Health and Safety			
Year	**Without Project**	**With Project (Use of emergency turnout)**	**Change Resulting From Project (c)-(b)[1]**
2014[2,4]	0	215	215
2015[2,4]	0	222	222
2016[3]	0	0	0
2017[3]	0	0	0
2018[3]	0	0	0
2019[3]	0	0	0
2020[3]	0	0	0
2021[3]	0	0	0
2022[3]	0	0	0
2023[3]	0	0	0
2024[4]	0	287	287
2025[4]	0	294	294
2026[4]	0	301	301
2027[3]	0	0	0
2028[3]	0	0	0
2029[3]	0	0	0
2030[3]	0	0	0
2031[3]	0	0	0
2032[3]	0	0	0
2033[3]	0	0	0
2034[3]	0	0	0
2035[4]	0	358	358
2036[4]	0	358	358
2037[4]	0	358	358
2038[3]	0	0	0

Table 5-2A – Annual Project Physical Benefits			
Project Name: Heritage Ranch Community Services District (HRCSD) Emergency Water Turnout **Type of Benefit Claimed:** Access to potable water supply **Units of the Benefit Claimed :** Acre-Feet Per Year **Additional Information About this Benefit:** N/A			
(a)	**(b)**	**(c)**	**(d)**
Physical Benefit - Potable Water For Life, Health and Safety			
Year	**Without Project**	**With Project (Use of emergency turnout)**	**Change Resulting From Project (c)-(b)(1)**
2039(3)	0	0	0
2040(3)	0	0	0
2041(3)	0	0	0
2042(3)	0	0	0
2043(3)	0	0	0
2044(3)	0	0	0

Comments:

(1) Physical benefit as a result of the Project implementation, allowing HRCSD to access Nacimiento Lake water for production and distribution of potable water to the community (current population 3,500, projected to be 5,800 in 2034, then held constant through the end of the 30-year project life ending in 2044 since there are no population estimates for these years). Benefit is estimated based on the minimum amount of potable water required per person for health and sanitation (55 gal/person/day) that would likely be in effect during drought conditions.

(2) Assumes the current drought continues through 2015.

(3) During non-drought years, it is assumed water will be obtained from the Nacimiento Lake under the existing entitlement.

(4) Based on historical rainfall data in SLO County, a drought is likely to occur every 8 years and persist for 3 consecutive years.

Table 5-2B – Annual Project Physical Benefits			
Project Name: Heritage Ranch Community Services District (HRCSD) Emergency Water Turnout **Type of Benefit Claimed:** Fire protection for existing population of 3,500, and up to 5,800 in 2044 **Units of the Benefit Claimed :** Population **Additional Information About this Benefit:** N/A			
(a)	**(b)**	**(c)**	**(d)**
Physical Benefit - Fire Protection for Protection of Life and Property			
Year	**Without Project**	**With Project (Fire Protection provided by Turnout)**	**Change Resulting From Project (c)-(b)1**
2014(2,4)	0	3500	3500
2015(2,4)	0	3615	3615
2016(3)	0	0	0
2017(3)	0	0	0
2018(3)	0	0	0
2019(3)	0	0	0
2020(3)	0	0	0
2021(3)	0	0	0
2022(3)	0	0	0
2023(3)	0	0	0
2024(4)	0	4650	4650
2025(4)	0	4765	4765
2026(4)	0	4880	4880
2027(3)	0	0	0
2028(3)	0	0	0
2029(3)	0	0	0

Table 5-2B – Annual Project Physical Benefits **Project Name:** Heritage Ranch Community Services District (HRCSD) Emergency Water Turnout **Type of Benefit Claimed:** Fire protection for existing population of 3,500, and up to 5,800 in 2044 **Units of the Benefit Claimed :** Population **Additional Information About this Benefit:** N/A			
(a)	(b)	(c)	(d)
Physical Benefit - Fire Protection for Protection of Life and Property			
Year	Without Project	With Project (Fire Protection provided by Turnout)	Change Resulting From Project (c)-(b)[1]
2030(3)	0	0	0
2031(3)	0	0	0
2032(3)	0	0	0
2033(3)	0	0	0
2034(3)	0	0	0
2035(4)	0	5800	5800
2036(4)	0	5800	5800
2037(4)	0	5800	5800
2038(3)	0	0	0
2039(3)	0	0	0
2040(3)	0	0	0
2041(3)	0	0	0
2042(3)	0	0	0
2043(3)	0	0	0
2044(3)	0	0	0

Comments:

(1) Physical benefit as a result of the Project implementation, allowing HRCSD to access Nacimiento Lake water for production and distribution of fire protection water to the community (current population 3,500, projected to be 5,800 in 2034, then held constant through the end of the 30-year project life ending in 2044 since there are no population estimates for these years).

(2) Assumes the current drought continues through 2015.

(3) During non-drought years, it is assumed water will be obtained from the Nacimiento Lake under the existing entitlement.

(4) Based on historical rainfall data in SLO County, a drought is likely to occur every 8 years and persist for 3 consecutive years.

1.11 Technical Analysis of Physical Benefits Claimed

1.11.1 Recent and Historical Conditions

The flow of water to the river is controlled by MCWRA until the reservoir reaches the upper minimum pool boundary of 687.8 feet at which time all reservoir releases may stop, and access to water for human consumption and fire protection ceases. Any release of water at the minimum pool elevation requires the authorization of San Luis Obispo County. This is a result of San Luis Obispo County having entitlement to the last 17,500 acre-feet of water in the reservoir. The community has come very close in the recent past with discussions in 2009 between MCWRA and San Luis Obispo County regarding reduced/no flow in the river. Dead pool conditions have never existed since the reservoir was constructed in 1958. However, it has come close during several multi-year drought periods. These include 1960 (671 feet) 1977 (674 feet), 1989/90 (672 feet), and the most recent in December 2009 when the reservoir lowered to 700 feet in elevation. In addition to dead pool, MCWRA always has the option to stop releases down the river whenever they repair or maintain the lower outlet works of the dam. This situation occurred in the summer of 2013 when major work on the hydroelectric plant at the base of the dam required MCWRA to close off the lower outlet works preventing any water from flowing into the river. Bypass pumping of minimum flow water over the spillway occurred at the direction of National Oceanic and Atmospheric Administration

(NOAA) Fisheries during MCWRA's hydroelectric plant work; if this had not occurred, HRCSD would not have been able to access its water entitlement.

The vulnerability of the HRCSD's sole water supply has been long recognized by agencies as a serious concern. On September 22, 2009, the California Department of Public Health (CDPH) issued a letter directing the HRCSD to identify options for a permanent backup/emergency water supply for Heritage Ranch. The CDPH's focus is for HRCSD to provide an emergency water supply to maintain the health and safety of the community during dead pool conditions when there is no water in the river. The Nacimiento Water Project (NWP) Environmental Impact Report (EIR) concluded that reservoir levels may fall below both the minimum pool and the dead pool during prolonged droughts with the operation of both the Nacimiento and Salinas Water Projects (WQ.3, EIR page 5.1-36).[2] The EIR also states that HRCSD would not be capable of supplying water to the community without the historical release of water to the Nacimiento River. The discussion of the Hydrological and Water Quality Class II Impact (WQ.4, EIR page 5.1-38) specified that Heritage Ranch should develop an alternative supply of lake water during minimum pool conditions. This Project and proposed turnout would achieve this recommendation for an emergency short-term water supply for Heritage Ranch. The HRCSD would only utilize the turnout or valve in the event of no water release from the existing outlet works on the Nacimiento Dam. For purposes of calculating the project benefits, it is assumed that a minimum pool or dead pool could persist for the entire drought period and therefore the new turnout would be used to supply water for fire protection and the health and safety of the community.

1.11.2 Project Performance Measures (to estimate physical benefits)

The primary physical benefit of the HRCSD project is expressed in terms of quantity of potable water required to sustain the community to meet the minimum life, health and safety requirements for sanitation, drinking, and fire protection. The estimates of water needed in Table 5-2A were calculated by projecting population over the planning period, and using a minimum water quantity of 55 gallons per day per person.

The secondary physical benefit presented in Table 5-2B is expressed in terms of population that would be displaced due to lack of ability of HRCSD to provide necessary potable water for sanitation, drinking, and fire protection for life, health and safety. Population forecasts are based on the HRCSD's projected build-out over the next 20 years as presented in the 2008 HRCSD Water Master Plan (Appendix 3-2A).

Upon confirmation of grant award, HRCSD will develop a detailed monitoring plan to assess project performance. The monitoring to be required is described as follows:

- Metering of Delivered Water. HRCSD and County of SLO will monitor the amount of water delivered by a physical meter placed in the turnout. HRCSD will be required to install this meter and measure the amount of water delivered to HRCSD's WTP. This meter will be used to keep track of the amount of water consumed during the drought. HRCSD's turnout will be hydraulically restricted to deliver no more than 491 AFY.
- Individual Meter Reading. HRCSD will be closely monitoring the water consumption by each household and water service connection during the drought condition, to ensure that there is no wasting of, or excessive and unnecessary consumption of water. HRCSD will contact home owners and/or inspect homes where excessive water use has been determined based on meter readings.

1.11.3 Project Facilities and Actions

HRCSD has identified all necessary steps, physical improvements/facilities, policies and actions required to implement this Project and obtain the estimated physical benefits:

Facilities Required:

- Turnout on the Nacimiento Pipeline. Refer to Appendix 3-2B for completed/approved drawings.

[2]The EIR is online at:
http://www.slocounty.ca.gov/PW/NacWP/General_Project_Information/reports/EIRFinal.htm

- Pipeline crossing Nacimiento River from Turnout to the HRCSD's water treatment plant intake facility. Refer to Appendix 3-2C for the 50% plans of the pipeline crossing.

Policies and Actions Required:

- Agreement for Emergency Water Provisions between SLO County and HRCSD. This Agreement has been in progress since March 2013, and will be finalized and complete by September 30, 2014.
- Private Property easement for pipeline crossing (in progress). Refer to Appendix 3-2C for 50% plans of the pipeline crossing, showing the 4 feet wide easement location.

Other Requirements and Permits:

- Pipeline Crossing Environmental Review and Regulatory Permits. See Appendix 3-2D for the contract of services between SWCA and HRCSD. HRCSD has retained SWCA to provide the needed environmental review and permitting (CDFW 1602 Streambed Alteration Agreement; USFWS Letter of Concurrence; Frac-Out Contingency Plan) for the pipeline crossing. SWCA is intimately familiar with this Project area and will help expedite completion of the environmental and permitting requirements. The mitigated negative declaration is scheduled to be complete by October 2014, and the permitting is scheduled to be complete by December 2014. These dates have been incorporated into the Project Schedule.

1.11.4 Alternatives

To address the need for water supply reliability for both human consumption and fire protection, Heritage Ranch has considered a couple of alternatives. However, limited options are available due to the lack of groundwater resources and the lack of proximity to other water purveyors. The following section summarizes the alternatives that were considered as well as why the proposed project is the favored alternative.

1.11.4.1 Alternative #1 – Enter into an Inter-Agency Agreement with a Neighboring Water Purveyor

This alternative would involve reaching out to nearby agencies to discuss the possibility of Heritage Ranch obtaining water during times of no flow in the Nacimiento River. The only feasible nearby agency with available water is Camp Roberts. However, Camp Roberts denied HRCSD's request to work on an emergency water service agreement. No costs were developed for this alternative since this agency was not willing to entertain an emergency agreement for water service. The next nearest water purveyor is the City of Paso Robles, located approximately 15 miles away, which would require a lengthy and expensive pipeline. Therefore, inter-agency agreements were deemed infeasible.

1.11.4.2 Alternative #2 – Temporary Rented Facility to Pump Water in Emergencies

This alternative would involve pumping water from the Nacimiento Lake (at dead pool elevation) to the penstock (higher in elevation than dead pool elevation), connecting to Monterey County's hydroelectric plant piping, and extending an above-ground temporary pipeline to HRCSD's water treatment plant or raw water pumping station. While this alternative was considered extensively, it was deemed less favorable due to its temporary nature and lack of approval from Moterey County. Furthermore, it would require operating a diesel generator on the lakeshore to power a floating pump on the lake, which is environmentally unfavorable. This alternative also had high operation and maintenance costs, including rental fees for two pumps, a 20 kW generator, and temporary piping (combined rental cost of $6,500/month). Additional operational costs include $1,000 per month for diesel fuel/power. The tables below present an estimated project cost summary and a pros and cons analysis of the alternative.

Alternative #2 Estimated Costs

Capital Project Costs	Annual Operations & Maintenance Costs
$100,000	$7,500/month during emergencies

Alternative #2 Evaluation Summary

Pros	Cons
• Provides a reliable water source to the Heritage Ranch Community during times when the Nacimiento Reservoir is at dead pool elevation.	• Monterey County never approved nor supported the option of any agency accessing their property or facilities on the Nacimiento Dam. • Operating a diesel generator on the lakeshore to power a floating pump on the lake was deemed environmentally risky, and noise to the local community would be undesirable. • The pipeline connection point at Monterey County's hydroelectric plant was complicated and required a number of permits and approvals, and also required a second pumping station to pump water to HRCSD's water treatment plant. • The temporary pipeline alignment, between the hydroelectric plant and HRCSD's water intake facility, is a narrow maintenance road owned and operated by Monterey County, and the exposed pipeline would be at risk for damage, and would hinder access to Monterey County. • High operation and maintenance cost.

1.11.4.3 Proposed Project - Construct a Permanent Emergency Turnout from the Nacimiento Pipeline

The proposed project includes the construction of a Nacimiento Pipeline turnout and a pipeline crossing Nacimiento River from the turnout to the HRCSD's water treatment plant intake facility. This would allow HRCSD to access their full entitlement of Nacimiento water through the Nacimiento Pipeline, which draws lake water from below dead pool elevation. The tables below present an estimated project cost summary and a pros and cons analysis of the alternative.

Proposed Project Estimated Costs

Capital Project Costs	Annual Operations & Maintenance Costs
$150,000	$0

Proposed Project Evaluation Summary

Pros	Cons
• Provides a reliable water source to the Heritage Ranch Community during times when the Nacimiento Reservoir is at dead pool elevation. • Provides a permanent solution to HRCSD's water supply problem. • Low operation and maintenance costs.	• None

1.11.5 Without-Project Conditions

As mentioned previously, Nacimiento lake water is HRCSD's sole water supply. Without access to receive and treat lake water from Nacimiento Lake during drought conditions, the community will be without potable water for basic health, sanitary and safety purposes and the community would cease to exist.

If the proposed project is not constructed, HRCSD will be required to truck water in for the community's water supply and fire suppression. However, the number of truck trips necessary to supply the needed water would be highly infeasible, and would significantly impact traffic in and around the communities of Heritage Ranch and Paso Robles.

1.11.6 Potential Adverse Effects

The Project is not anticipated to have adverse physical effects or impacts to the environment but may have temporary construction related impacts. The only potential impact would be if the directional drilling operation caused a "frac-out" and release of drilling mud into the Nacimiento River. This issue will be addressed when processing permitting requirements and in the approved Frac-Out Contingency Plan.

If the Project is not implemented and the drought conditions continue, HRCSD will not have a reliable source of water. Not having a reliable source of water will threaten the Human Right to Water and fire safety in this community.

1.12 Cost Effectiveness Analysis

HRCSD has pursued available alternatives to the proposed Project. The two alternatives along with the proposed project are listed in Table 6-2A and corresponding analysis is provided.

Table 6-2A – Project Analysis **Project Name: Project 2 Heritage Ranch Community Services District (HRCSD) Emergency Water Turnout**	
Question 1	**Types of benefits provided as shown in Tables 5-2A and 5-2B.** *Water Supply and Population Protected from Fire*
Question 2	**Have alternative methods been considered to achieve the same types and amounts of physical benefits as the proposed project been identified?** *YES*
	If no, why? *N/A*
	If yes, list the methods (including the proposed project) and estimated costs: *HRCSD considered the only two available alternatives for securing a water supply during drought conditions:* ***Alternative 1:*** *Enter into an inter-agency agreement Camp Roberts. Camp Roberts denied HRCSD's request to work on an emergency water service agreement so this alternative was deemed infeasible and thus no costs were developed.* ***Alternative 2:*** *Temporary pump and piping system to transport water from the Nacimiento Reservoir to the HRCSD water treatment plant. (Capital cost: $100,000; Annual O&M cost $7,500/month of emergency operation) Deemed infeasible due to it's temporary nature, environmental concerns, and operational costs.*

Table 6-2A – Project Analysis Project Name: Project 2 Heritage Ranch Community Services District (HRCSD) Emergency Water Turnout	
	Proposed Project: *Construct a permanent emergency turnout from the Nacimiento Pipeline that allows HRCSD to access their full entitlement of Nacimiento water through the Nacimiento Pipeline which draws lake water from below dead pool elevation (Capital cost: $150,000; Annual O&M cost: $0).*
Question 3	**If the proposed project is not the least cost alternative, why is it the preferred alternative? Provide an explanation of any accomplishments of the proposed project that are different from the alternative project or methods.** *The proposed project is the least cost alternative on a life cycle cost basis. The proposed and preferred project, to have an emergency turnout from the Nacimiento Pipeline, has essentially zero O&M costs, since the Nacimiento water is already under sufficient pressure to deliver raw water to HRCSD's water treatment plant without additional power. Furthermore, the facilities would be permanently installed and ready for immediate use during drought conditions.*

A brief life cycle cost analysis is presented in Table 6-2B, demonstrating that the preferred project is the least cost alternative. The only other alternative available to the HRCSD would be to physically pump water from the Lake through the Dam intake structure, which is costly, and poses significant environmental risk (i.e., diesel fuel stored in generators next to the lake) and noise impacts to the community.

Table 6-2B – Project Analysis Project Name: Project 2 Heritage Ranch Community Services District (HRCSD) Emergency Water Turnout		
	PROJECT	
Cost Item	**Emergency Turnout**	**Pumping From Lake to HRCSD WTP**
Present Worth Capital Cost – Construction/ Implementation (2014 Dollars)	$150,000	$100,000
Present Worth O&M	$0	$90,000[1]
Total Present Worth	$150,000	$190,000
Comments: [1] *O&M (for one single year of operation; $7,500/month for 12 months)*		

PROJECT 3: CAMBRIA COMMUNITY SERVICE DISTRICT (CCSD) EMERGENCY WATER SUPPLY

1.13 Brief Project Description

Agency: Cambria Community Services District (CCSD).

An indirect water-reuse project, which treats and injects brackish groundwater near potable groundwater wells to provide water to CCSD customers, currently in a Stage-3 emergency.

1.14 Project Map

Figure 3.6 on the following page shows Project 3's geographical location, all project facilities, affected water resources, and the proposed monitoring locations.

LEGEND	
New Monitoring Well	Product Water Pipeline to Injection Well
Existing CCSD Gradient Control Well and AWTP Source Water Well	Filtrate Line to LIW
Existing CCSD Municipal Potable Water Well (SS)	Existing CCSD Water Supply Pipeline
Potable Water Recharge Injection Well (RIW)	Brine Disposal Pipeline
Lagoon Fresh Water Injection Well (LIW)	AWTP Feed Water Pipeline
	8-Inch Well 9P7 Discharge Line

N

0 250 500 1,000
Feet

PROJECT 3: CAMBRIA CSD EMERGENCY WATER SUPPLY

FIGURE 3.6

SAN LUIS OBISPO COUNTY
IRWM DROUGHT GRANT PROPOSAL

Note: Project overlays and affects the Santa Rosa Valley Groundwater Basin.
(1) Meter at AWTP will be used for monitoring volume of RW produced.

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1.15 Project Description

Eligible Project Type: Immediate Drought Preparedness / Increase Local Water Supply Reliability

How Drought Impact is Alleviated. Cambria Community Services District (CCSD) provides water for the unincorporated town of Cambria and relies solely on two narrow aquifers for its potable water supply. CCSD's main supply aquifer is drawn down during the summer dry season and peak tourist period before being recharged during the winter rainy season. Due to drought periods or the late arrival of seasonal rainfall during normal years, CCSD's aquifers can become perilously low during late summer and early fall. This chronic pattern of dry season shortages resulted in CCSD declaring a Water Code 350 emergency in November 2001, which is still in effect. Furthermore as a result of this year's severe drought, the CCSD Board declared a Stage 3 Water Shortage Emergency on January 30, 2014. The proposed project will help alleviate this water shortage by providing an alternate water source that is less drought affected. This project will draw brackish groundwater near the CCSD's existing wastewater effluent percolation ponds, provide advanced treatment, and inject the treated water upstream (with at least 60 days travel time) near the CCSD's existing potable groundwater wells. Early construction activities on the project began during the week of May 20, 2014, which included completion of the project's injection well and monitoring well. Project completion is estimated to occur this fall. With the project facilities, 250 acre-feet of water per six-month dry season will be added to Cambria's water supply to help alleviate the current drought.

Providing Immediate Drought Relief (D.1). This project will provide immediate drought relief because it provides an alternate water source that is less affected by drought conditions, consistent with the first Drought Project Element. Cambria is currently under a Stage 3 emergency, which limits potable water use to 50 gallons-per-person-per-day, reduces business water use by 20 percent, and bans the use of potable water on landscaping. Due to Cambria's remote location, there are no options for interties with other agencies or state aqueducts. Therefore, the local aquifers are the community's sole supply. Providing additional water with this project would offer flexibility and better prepare this community for continued drought conditions. CCSD has been considering water supply alternatives since the 1990s to better prepare for drought conditions, and through alternatives analyses CCSD has determined that the proposed project best addresses the need for drought preparedness and drought relief for the 2014 drought.

Water Supply Reliability (IR.1). The proposed project also provides the Cambria community with water supply reliability and enhances water use efficiency, both part of IRWM Project Element 1. Since this community has no viable water supply alternative besides their existing groundwater wells, providing a recycled water supply greatly enhances water reliability and water use efficiency. Currently, wastewater treatment effluent simply percolates into the groundwater downgradient of municipal supply wells, providing a buffer for seawater intrusion. With the proposed project this water will be treated and injected upgradient of supply wells enhancing the reliability of the existing groundwater supply.

Need for Expedited Funding. This year, rainfall in Cambria is at 32% of average and 20% less than the the minimum amount of rainfall needed to recharge the CCSD's aquifers. Concerns remain regarding whether creek underflow will cease earlier than normal due to the very dry watershed conditions, which could result in well levels dropping faster than normal prior to the arrival of next year's rainy season. In addition, there are concerns on whether a similar weather pattern as last year will develop, which could significantly delay the arrival of winter storms. Given all of this, CCSD's water supply is imminently at risk for not meeting the human right to water. Without expedited implementation of the proposed project, there are possible disastrous consequences to the community by late summer to early fall of this year. These could include impacts to public health, public safety capabilities (fire fighting), the local economy, and the emotional well being of the local residents.

1.16 Project Physical Benefits

The Cambria Community Services District Project will only be operated during drought years and therefore project benefits are only shown during expected drought years. For the proposed emergency water supply project, project benefits include **water supply during drought years** and **protection of groundwater quality**. Refer to Tables 5-3A and 5-3B for a summary of the primary and secondary physical benefits. For the physical benefits tables, it was assumed that drought conditions would occur every 8 years and last for 3 years. This assumption is based on historical rainfall data from the region going back to 1870. Drought was defined as any three consecutive years with below average rainfall. With this definition, on average a drought occurred every 8 years. This definition encompasses the majority of the droughts defined by DWR (1918-20, 1923-26, 1928-35, 1947-50, 1959-62, 1976-77, 1987-92, 2001-02, and 2007-09). Additionally, using only DWR defined droughts, the drought cycle is also 8 years. Furthermore, this definition of drought roughly matches historical state water allocations. However, State Water allocations tend to lag droughts by a couple of years. Given this, it was assumed that a drought affecting regional groundwater levels, regional reservoir levels, and state water allocations would occur every 8 years and last for 3 years. During these drought years, it was assumed that the full capacity of the project would be utilized as an emergency supply.

Table 5-3A – Annual Project Physical Benefits

Project Name: Cambria Community Service District (CCSD) Emergency Water Supply
Type of Benefit Claimed: Water Supply
Units of the Benefit Claimed : Acre-Feet of Water per Year
Additional Information About this Benefit: NA

(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project	With Project (Use of Emergency Supply)	Change Resulting from Project (c) – (b)
2014	0	250(1,2)	250
2015(5)	0	250(2)	250
2016	0(3)	0(4)	0
2017	0(3)	0(4)	0
2018	0(3)	0(4)	0
2019	0(3)	0(4)	0
2020	0(3)	0(4)	0
2021	0(3)	0(4)	0
2022	0(3)	0(4)	0
2023	0(3)	0(4)	0
2024(68)	0	250(2)	250
2025(6)	0	250(2)	250
2026(6)	0	250(2)	250
2027	0(3)	0(4)	0
2028	0(3)	0(4)	0
2029	0(3)	0(4)	0
2030	0(3)	0(4)	0
2031	0(3)	0(4)	0
2032	0(3)	0(4)	0
2033	0(3)	0(4)	0

Table 5-3A – Annual Project Physical Benefits			
Project Name: Cambria Community Service District (CCSD) Emergency Water Supply **Type of Benefit Claimed:** Water Supply **Units of the Benefit Claimed :** Acre-Feet of Water per Year **Additional Information About this Benefit:** NA			
(a)	**(b)**	**(c)**	**(d)**
	Physical Benefits		
Year	**Without Project**	**With Project (Use of Emergency Supply)**	**Change Resulting from Project (c) – (b)**
2034	0(3)	0(4)	0
2035(6)	0	250(2)	250
2036(6)	0	250(2)	250
2037(6)	0	250(2)	250
2038	0(3)	0(4)	0
2039	0(3)	0(4)	0
2040	0(3)	0(4)	0
2041	0(3)	0(4)	0
2042	0(3)	0(4)	0
2043	0(3)	0(4)	0
2044(7)	0(3)	0(4)	0

Comments:
(1) It was assumed that once the project was constructed the full 250 AFY benefit could be realized in 2014.
(2) During drought conditions 250 AFY would be available with the proposed project.
(3) During non-drought conditions, supply was assumed to meet historical water demand.
(4) The proposed project will only supply water as needed during drought or other emergency conditions.
(5) It was assumed drought conditions continued in 2015.
(6) Based on historical rainfall data in SLO County, a drought is likely to occur every 8 years and last for 3 years.
(7) This project has a 30-year useful life.

Table 5-3B – Annual Project Physical Benefits			
Project Name: Cambria Community Service District (CCSD) Emergency Water Supply **Type of Benefit Claimed:** Protection of Groundwater Quality **Units of the Benefit Claimed:** mg/L of Total Dissolved Solids (TDS) **Additional Information About this Benefit:** NA			
(a)	**(b)**	**(c)**	**(d)**
	Physical Benefits		
Year	**Without Project(2)**	**With Project(3)**	**Change Resulting from Project (c) – (b)**
2014	350(1)	310(2)	-40
2015(6)	340-680(3)	303-514(4)	-37 to -166
2016	-	-	0
2017	-	-	0
2018	-	-	0
2019	-	-	0

Table 5-3B – Annual Project Physical Benefits

Project Name: Cambria Community Service District (CCSD) Emergency Water Supply
Type of Benefit Claimed: Protection of Groundwater Quality
Units of the Benefit Claimed: mg/L of Total Dissolved Solids (TDS)
Additional Information About this Benefit: NA

(a)	(b)	(c)	(d)
	Physical Benefits		
Year	Without Project(2)	With Project(3)	Change Resulting from Project (c) – (b)
2020	-	-	0
2021	-	-	0
2022	-	-	0
2023	-	-	0
2024(7)	340-680(3)	303-514(4)	-37 to -166
2025(7)	340-680(3)	303-514(4)	-37 to -166
2026(7)	340-680(3)	303-514(4)	-37 to -166
2027	-	-	0
2028	-	-	0
2029	-	-	0
2030	-	-	0
2031	-	-	0
2032	-	-	0
2033	-	-	0
2034	-	-	0
2035(7)	340-680(3)	303-514(4)	-37 to -166
2036(7)	340-680(3)	303-514(4)	-37 to -166
2037(7)	340-680(3)	303-514(4)	-37 to -166
2038	-	-	0
2039	-	-	0
2040	-	-	0
2041	-	-	0
2042	-	-	0
2043	-	-	0
2044(8)	-	-	0

Comments:
(1) 2013 average municipal well TDS concentration in the San Simeon aquifer was used for 2014.
(2) This concentration is the flow-weighted average of projected AWTP effluent TDS values and 2013 average municipal well TDS values in the San Simeon aquifer.
(3) "Without Project" condition assumes a historical range of TDS concentrations observed at the municipal supply well.
(4) This concentration is the flow-weighted average of projected AWTP effluent TDS values and historical TDS values from municipal supply wells.
(5) This assumes the AWTP is not active during non-drought years.
(6) It was assumed that the current drought continues through 2015.
(7) Based on historical rainfall data in SLO County, a drought is likely to occur every 8 years and last for 3 years.
(8) This project has a 30-year useful life.

1.17 Technical Analysis of Physical Benefits Claimed

1.17.1 Recent and Historical Conditions

The Cambria community relies solely on groundwater from both the Santa Rosa basin and the San Simeon Creek basin. Currently the CCSD has four potable water supply wells. There are also numerous private wells for farmland irrigation within the region. The majority of CCSD water comes from the San Simeon Creek basin, which is an alluvial aquifer that is recharged primarily from creek seepage. The San Simeon Creek drains the western flanks of the Santa Lucia Range and discharges to the Pacific Ocean. Current and historical groundwater levels for the main San Simeon Creek basin is shown in Figure 3.7 below. As shown in this figure, well levels have dropped very low in 2013 and it appears that 2014 will follow a similar pattern.

Salt-water intrusion and water supply limitations have both been ongoing issues within the region. Due to this, alternative water sources have been considered within the community since the 1980s. The most promising option considered by CCSD is desalination. Various desalination options and configurations have been evaluated over the years. An Environmental Impact Report was even published for one desalination option in 1994[3]. However, no desalination project has been constructed due to financial and past political issues.

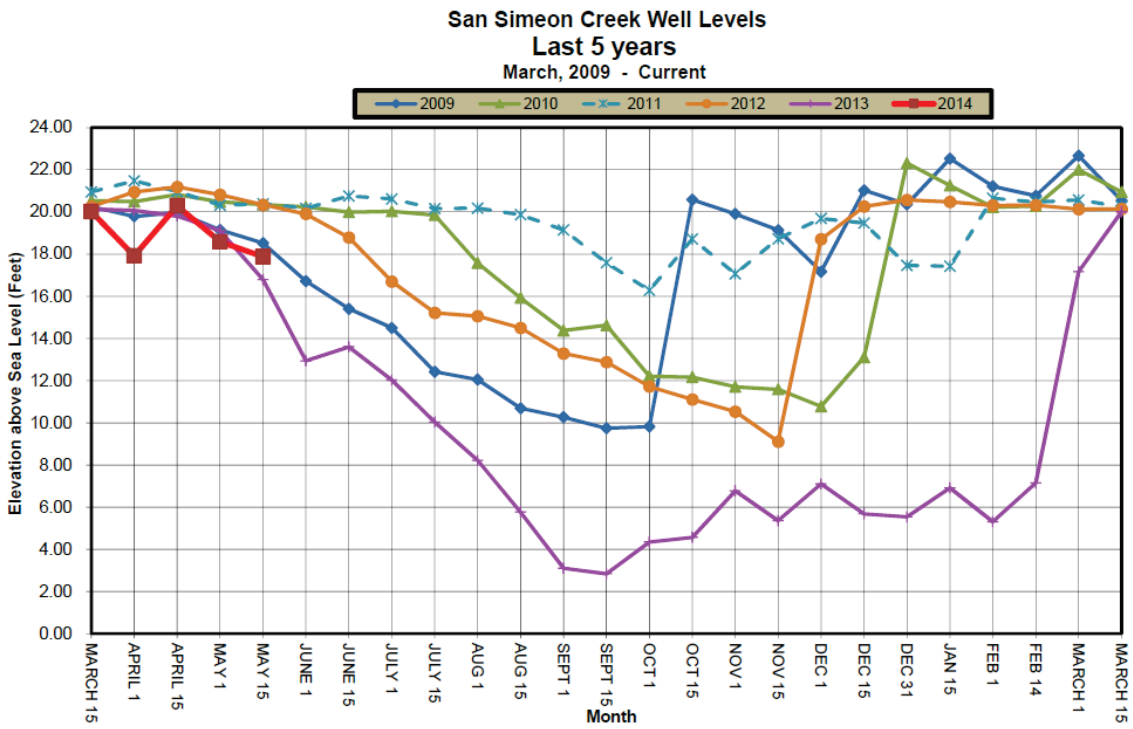


Figure 3.7: Historical Well Levels for CCSD's Main Supply Well

The Cambria community has been feeling the effect of water shortages for many years. The major drought in 1991 caused CCSD customers to reduce water consumption by 35%. Most of the restrictions put in place during this drought are still in effect today. In 2001, CCSD declared a water emergency and halted all residential construction. This moratorium is still in effect. The current 2014 drought has only

[3] Final Environmental Impact Report Cambria Desalination Facility, December 1994, http://www.cambriacsd.org/cm/projects/Long%20Term%20Water%20Supply/Documents.html

exacerbated the water shortage issue and provided impetus to implement an indirect reuse facility. Currently CCSD will run out of water in the fall of 2014 if no facility is constructed.

The CCSD also faces groundwater quality issues. During normal operation, CCSD pumps treated wastewater effluent into the San Simeon Creek aquifer downstream of their water supply production wells. This helps minimize potable water loss at the ocean interface and minimizes seawater intrusion. However, when groundwater levels at the production wells are low, the wastewater effluent could migrate to the production wells, deteriorating water quality.

1.17.2 Project Performance Measures (to estimate physical benefits)

To estimate the primary physical benefit described in Table 5 the existing water supply and use was evaluated. In a typical year, the Cambria community uses on average 700-750 AFY of water. During the 6-month dry season, the San Simeon aquifer can sustainably produce 286 AFY and the Santa Rosa aquifer can produce 200 AFY (Appendix 3-3A). The proposed AWTP has been sized to produce 250 AFY during the 6-month dry season to compensate for lack of water from either the Santa Rosa aquifer or San Simeon aquifer. For the purposes of estimating the project physical benefits, it was assumed that during drought years, the full 250 AFY capacity of the project will be utilized to offset groundwater use.

To estimate the secondary physical benefit described in Table 5, water quality samples were taken from the municipal supply wells (Appendix 3-3B). These water quality samples were the assumed “No Project” condition for all years. To asses the “With Project” condition, projected water quality values were used from CDM Smith’s Engineering Technical Memorandum, included in Appendix 3-3C. In this report, they estimate the likely water quality of the proposed AWTP effluent. The projected TDS values are much lower than the observed values in the municipal supply wells. With the proposed project, the AWTP effluent would be injected up-gradient of the CCSD’s municipal supply wells. This AWTP effluent would mix with existing groundwater before entering CCSD’s supply wells. Thus to determine the “With Project” benefit during drought years, a flow-weighted average was taken of projected AWTP effluent TDS concentrations and observed TDS concentrations from the municipal supply wells. During non-drought years, the AWTP would not be in use.

To measure performance post-implementation, water quality monitoring at the monitoring wells will occur. Additionally, water quality monitoring of the water at well 9P7 and the CCSD production wells will continue. CCSD will also document the dates of operation and volume of water produced at the AWTP.

1.17.3 Project Facilities and Actions

Implementation of the proposed Emergency Water Supply project will require the following facilities:

- Existing Well 9P7 to extract groundwater for treatment.
- An advanced water treatment plant (AWTP) to treat brackish groundwater using membrane filtration, reverse osmosis, and advanced oxidation.
- A recharge injection well to recharge treated groundwater upstream of CCSD’s production wells.
- Three lagoon injection wells to recharge treated groundwater near the San Simeon Creek to mitigate any potential impacts on the creek or downstream lagoon.
- Additional piping to transport brackish groundwater from Well 9P7 to the AWTP, to transport product water from the AWTP to the recharge injection well, to transport product water to lagoon injection wells, and to transport brine to the brine evaporation pond.
- Modifications to the existing Van Gordon Reservoir to turn it into a brine evaporation pond.
- Monitoring wells near the evaporation pond and recharge injection well.

A more detailed presentation of the required facilities can be found in Appendix 3-3C and CCSD’s Groundwater Modeling Report from May 2014 can be found in Appendix 3-3D.

In addition to the physical facilities, environmental documentation is required. This documentation has already been drafted and submitted for review. The submitted Mitigated Negative Declaration for this project can be found in Appendix 3-3E.

The CCSD is also applying for Proposition 218 funding, which is necessary for project implementation. The protest period for Proposition 218 will end on July 20, 2014. If no protest is filed, construction will proceed as planned starting on August 5, 2014. If Proposition 218 does not pass, Proposition 218 will be re-filed if grant funding is secured. If grant funding is secured, the rate study provided in Appendix 3-3F will be redone to reflect the acquired grant funds. This will result in smaller rate increases for water customers. These lower rates will make Proposition 218 more likely to pass when filed for the second time. If Proposition 218 passes on its second try, construction will not start until January 6, 2015, still well before the April 1, 2015 deadline.

1.17.4 Alternatives

To address the need for water supply reliability of both quality and quantity, CCSD has considered a number of alternatives. Most recently, CCSD and the United States Army Corps of Engineers conducted a water supply study in 2012-2013[4]. The goal of this study was to evaluate alternative water supplies and recommend the best alternative to supply Cambria with supplemental water during the six-month dry period. The following section summarizes the alternatives that were considered as well as why the proposed project is the favored alternative. A more detailed description of each alternative can be found in the November 2013 Alternatives Report, located on CCSD's website[4].

1.17.4.1 Alternative #1 – Shamel Park Seawater

This alternative involves the construction of a reverse osmosis (RO) plant and a seawater intake for desalination. The RO plant would be constructed next to the existing CCSD Wastewater Treatment Plant. The feedwater for this facility would be extracted from the permeable sediments in a paleochannel at the ocean bed. This facility would provide a reliable supply of water. However, while this option is one of the cheaper options, it` is still quite expensive. The technical feasibility of this option is also subject to further study of the existence and permeability of the paleochannel. Of all the alternatives considered it is the least technically feasible. The tables below present an estimated project cost summary and a pros and cons analysis of the alternative per the November 2013 Alternatives Report.

Alternative #1 Estimated Costs

Capital Project Costs	Annual Operations & Maintenance Costs
$17,941,000	$343,600

Alternative #1 Evaluation Summary

Pros	Cons
• High reliability source of water supply • High quality product water • Use of proven technology and standard construction methods • Low impact on the Santa Rosa Creek groundwater basins	• Complicated permitting process • Not well known hydro-geological characteristics of paleochannel • Permitting for source water wells and concentrate return • Relatively high construction and O&M costs

1.17.4.2 Alternative #2 – San Simeon Creek Off-Stream Storage

This alternative would pump groundwater during the wet season and store it in newly constructed off-stream reservoirs for use during the dry season. To supply the necessary 250 acre feet (AF) of water,

[4] Cambria Water Supply Alternatives Engineering Technical Memorandum, November 2013, http://www.cambriacsd.org/Library/PDFs/Final%2011_27_2013%20Cambria%20Water%20Supply%20Alts%20Tech%20Memo%20by%20CDM%20Smith.pdf

approximately 1,200 AF of storage would be required. This would provide some excess drought protection supply and would account for loss due to evaporation and seepage. To utilize this stored water, diversion wells, water conveyance pipelines, and a new water treatment plant would need to be constructed. All of these required facilities make this option very expensive. This option is also more complicated because it would require complex and expensive reservoir monitoring which CCSD does not currently have the expertise or staff to do. The tables below present an estimated project cost summary and a pros and cons analysis of the alternative per the November 2013 Alternatives Report.

Alternative #2 Estimated Costs

Capital Project Costs	Annual Operations & Maintenance Costs
$69,647,000	$319,600

Alternative #2 Evaluation Summary

Pros	Cons
• High quality of water • Use of proven technology and construction methods	• High construction cost • Complex and expensive dam and reservoir monitoring and maintenance. Currently, CCSD does not have expertise and staff for this type of O&M activities • Very complex and lengthy permitting process with the state Division of Safety of Dams • Substantial and complex land acquisition may slow down and complicate project implementation • Modified State Water Resources Control Board flow diversion permit will be required

1.17.4.3 Alternative #3 – Morro Bay Shared Sea Water Reverse Osmosis

This alternative would utilize the existing Morro Bay owned seawater RO desalination plant to produce additional water for Cambria; however, the plant would need to be upsized to handle additional flows and new beach wells would need to be constructed. This alternative would also require the construction of an 18-mile pipeline to deliver water to Cambria from Morro Bay. While this option would reliably provide the required water for Cambria, it is relatively expensive and would require the cooperation of Morro Bay. This alternative was not favored by the CCSD board. The tables below present an estimated project cost summary and a pros and cons analysis of the alternative per the November 2013 Alternatives Report.

Alternative #3 Estimated Costs

Capital Project Costs	Annual Operations & Maintenance Costs
$28,127,000	$378,500

Alternative #3 Evaluation Summary

Pros	Cons
• High reliability of water sources • High quality of water • Use of proven technology and relatively easy construction • Minimal disturbance on marine life by beach wells • Efficiency in using existing SWRO infrastructure and co-locating new facility with existing SWRO plant	• Relatively higher construction costs and O&M costs • Agreement with other agencies required to co-locate facilities • Long pipeline in Caltrans ROW • Permitting for source water beach wells and concentrate return

1.17.4.4 Alternative #4 – Estero Bay Marine Terminal

This alternative involves the construction of a subterranean horizontally directionally drilled well seawater intake, a seawater pipeline, a SWRO desalination plant, a product water pump station and pipeline, and concentrate return pump and pipeline. Seawater would be pulled from offshore Dog Beach, which is about 16 miles south of Cambria. At an empty lot near Dog Beach the seawater would be treated at a new RO plant and then sent via pipeline to Cambria for distribution. While this alternative would also reliably provide water for Cambria, it is expensive and located far away. Also, this option would require permitting for the HDD well and concentrate return. The tables below present an estimated project cost summary and a pros and cons analysis of the alternative per the November 2013 Alternatives Report.

Alternative #4 Estimated Costs

Capital Project Costs	Annual Operations & Maintenance Costs
$32,465,000	$366,000

Alternative #4 Evaluation Summary

Pros	Cons
• High reliability of water source • High quality of water • Use of proven technology and relatively easy construction • Minimal disturbance on marine life by HDD well	• Relatively high construction costs and O&M costs • Long pipelines in Caltrans ROW • Permitting for HDD well and concentrate return

1.17.4.5 Alternative #5 – San Simeon Creek Road Brackish Water

This alternative is very similar to the proposed project. The overall concept of treating brackish groundwater and injecting it upstream of CCSD's potable water wells is the same; however, the location of the injection wells and brine disposal technique is different. Alternative #5 would inject the treated groundwater further upstream than the proposed project. This injection site becomes more complicated because if is off CCSD's property. Additionally Alternative #5 would inject the brine near the coast instead of letting it evaporate in brine evaporation ponds. The tables below present an estimated project cost summary and a pros and cons analysis of the alternative per the November 2013 Alternatives Report.

Alternative #5 Estimated Costs

Capital Project Costs	Annual Operations & Maintenance Costs
$15,322,000	$383,440

Alternative #5 Evaluation Summary

Pros	Cons
• Low construction and O&M cost • Good quality product water • Reliable source of water supply • Proven technology • Existing potable water wells are used • Plant would be constructed on CCSD owned property • The RWQCB, with CDPH approval, has permitted similar facilities	• This alternative would require computer modeling of the aquifer • The waste disposal for the used MF backwash and RO concentrate must be investigated further to confirm there are minimal impacts • Public acceptance will be critical

1.17.4.6 Alternative #6 – Hard Rock Water Storage and Recovery Alternative

This alternative would take excess water from Santa Rosa Creek and store it in a confined Hard Rock Aquifer during wet weather. This stored water would then be pumped and treated during dry weather.

This alternative would involve the construction of a new pipeline, injection wells, extraction wells, and a new RO treatment plant. This alternative is the most expensive alternative considered. Because of it's cost and because it would require land acquisition at privately owned Fiscalini Ranch this alternative is not favored. The tables below present an estimated project cost summary and a pros and cons analysis of the alternative per the November 2013 Alternatives Report.

Alternative #6 Estimated Costs

Capital Project Costs	Annual Operations & Maintenance Costs
$75,204,000	$542,730

Alternative #6 Evaluation Summary

Pros	Cons
• Use of already appropriated water rights for source water from the Santa Rosa Creek basin • Use of existing or otherwise CCSD owned land and facilities • Proven technology and routine O&M staff	• Land acquisition at privately owned Fiscalini Ranch • Large number of storage-and-recovery wells spread over a large, remote geographical area increases project construction costs and adds to complexity for O&M • Limited data (including existing groundwater quality data), and possibly very low yield of the storage-and-recovery wells at Hard Rock Aquifer

1.17.4.7 Alternative #7 – Whale Rock Reservoir

This alternative would involve pumping excess creek flow during wet weather to Whale Rock Reservoir. During dry weather, this water would be pumped back to Cambria for potable use. To implement this alternative two new Santa Rosa basin wells, a Cambria pump station, a Whale Rock pump station, a water conveyance pipeline, and a new surface water treatment plant would need to be constructed. This alternative would also require potentially complex negotiation with the City and County of SLO. Because of this, this alternative was not favored. The tables below present an estimated project cost summary and a pros and cons analysis of the alternative per the November 2013 Alternatives Report.

Alternative #7 Estimated Costs

Capital Project Costs	Annual Operations & Maintenance Costs
$30,820,000	$239,950

Alternative #7 Evaluation Summary

Pros	Cons
• Relatively low construction cost • High reliability of water sources • High quality of water • Use of proven technology and easy construction • Straight forward regulatory permitting process	• Complicated negotiation with Caltrans to obtain approval to build 16.5 mile conveyance pipeline along the PCH • Potentially complex negotiation with City and SLO County for use of existing facilities • The 10 inch diameter piping required by short wet season pumping duration would result in low return flow velocity and longer travel time when water is pumped back to Cambria during the summer dry season. This could lead to the need for additional disinfection and related needs to address water quality concerns.

1.17.4.8 Alternative #8 – San Simeon CSD Recycled Water

This alternative would divert San Simeon wastewater to the CCSD wastewater treatment plant for treatment and use as non-potable irrigation and industrial water. This alternative would require

modifications to the San Simeon and CCSD wastewater treatment plants. Additionally, a wastewater force main, recycled water reservoir, and distribution pipelines would need to be constructed. This project was determined to be the least reliable option. Furthermore, this alternative is not favored because it only provides non-potable water. The tables below present an estimated project cost summary and a pros and cons analysis of the alternative per the November 2013 Alternatives Report.

Alternative #8 Estimated Costs

Capital Project Costs	Annual Operations & Maintenance Costs
$20,798,000	$190,000

Alternative #8 Evaluation Summary

Pros	Cons
• Use of proven technology • Offsets potable water demands • Skilled CCSD staff for O&M of wastewater facilities	• San Simeon wastewater diversion alone would not be enough to provide the amount of water required • Limitation to use non-potable recycled water only for businesses and irrigation of public areas may not generate enough demand for recycled water to offset the increased water demand of the Cambria community during dry weather conditions • Construction of recycled water distribution pipeline along Cambria streets and roads • Permitting pipeline along PCH in Caltrans ROW

1.17.4.9 Proposed Project – San Simeon Creek Road Brackish Water (Simplified)

The Proposed Project is a simplified version of Alternative #5. Alternative #5 was used as a starting point in developing the emergency water supply project proposed in this grant application. It was further simplified by resorting to prefabricated shipping-container mounted equipment, which is more modular and does not require a building. In addition, the piping configuration was simplified following a detailed hydro-geological modeling effort that showed the facilities could be built within the confines of the CCSD-owned property. All of these modifications would help expedite the project and lower its overall cost to the community. As a result, the current project estimate is $8.8 million plus a 20 %contingency. O&M costs are assumed to be at the same cost of approximately $380,000. The tables below present an estimated project cost summary and a pros and cons analysis of the alternative.

Proposed Project Estimated Costs

Capital Project Costs	Annual Operations & Maintenance Costs
$8,800,000	$383,440

Proposed Project Evaluation Summary

Pros	Cons
• Low construction and O&M cost • Good quality product water • Reliable source of water supply • Proven technology • Existing potable water wells are used • Plant would be constructed on CCSD owned property • The RWQCB, with CDPH approval, has permitted similar facilities	• This alternative would require computer modeling of the aquifer • The waste disposal for the used MF backwash and RO concentrate must be investigated further to confirm there are minimal impacts • Public acceptance will be critical

1.17.5 Without Project Conditions

Without the Emergency Water Supply project, the Cambria community will run out of water in the fall of 2014. If this happens, water will need to be trucked in for the community. Although many alternatives were considered, none of them could be implemented in time. Substantial project development and design work has already been completed for the proposed project. Additionally, the alternatives considered are much more expensive than the proposed project and due to their high cost, they are all cost prohibitive.

1.17.6 Potential Adverse Effects

The largest adverse effects will occur if the proposed project is not implemented and drought conditions continue. The Cambria community will run out of potable water in the fall of this year if no project is implemented. This threat to the Human Right to Water is great in this community.

If the project is implemented the major potential adverse effects are mitigated. One of these mitigated adverse effects is harm to habitat at the San Simeon Creek Lagoon. Since water is being pumped from the groundwater near the lagoon, there is the possibility that decreased lagoon water levels could negatively impact lagoon habitat. However, as part of the project, three lagoon injection wells are being installed. These wells will pump treated AWTP water into the groundwater near the lagoon. Because of this, lagoon habitat will likely benefit from this project since water reaching the lagoon post-project implementation will be of better quality.

1.18 Cost Effectiveness Analysis

CCSD has pursued available alternatives to the proposed Project. The eight alternatives along with the proposed project are listed in Table 6-3.

Table 6 – Cost Effective Analysis **Project name: Project 3 Cambria Community Service District (CCSD) Emergency Water Supply**	
Question 1	**Types of benefits provided as shown in Table 5:** *Amount of Water Produced and Water Quality and Supply Preservation*
Question 2	**Have alternative methods been considered to achieve the same types and amounts of physical benefits as the proposed project been identified?** *Yes*
	If no, why? *N/A*
	If yes, list the methods (including the proposed project) and estimated costs: ***Alternative 1:*** *Construct a seawater reverse osmosis plant and seawater intake next to the existing CCSD Wastewater Treatment Plant. (Capital cost: $17,941,000; Annual O&M cost: $343,600) Deemed infeasible due to technical feasibility concerns and high cost.* ***Alternative 2:*** *Divert water from San Simeon Creek during wet weather and store in off-stream reservoirs for treatment and use during dry weather. (Capital cost: $69,647,000; Annual O&M cost: $319,600) Deemed infeasible due to complex reservoir monitoring requirements and high cost.*

Table 6 – Cost Effective Analysis Project name: Project 3 Cambria Community Service District (CCSD) Emergency Water Supply	
	Alternative 3: *Upsize the existing Morro Bay owned seawater reverse osmosis desalination plant, construct additional seawater intake wells, and construct an 18-mile lone pipeline to bring water to Cambria. (Capital cost: $28,127,000; Annual O&M cost: $378,500) Deemed infeasible due to involvement of Morro Bay and high cost.* ***Alternative 4:*** *Construct a seawater reverse osmosis plant on an empty lot and seawater intake near Dog Beach. (Capital cost: $32,465,000; Annual O&M cost: $366,000) Deemed infeasible due to permiting concerns and high cost.* ***Alternative 5:*** *Extract brackish water from San Simeon Creek Basin, treat it with membrane advanced water treatment, and recharge it back to CCSD's potable water groundwater basin. (Capital cost: $15,322,000; Annual O&M cost: $383,440) Deemed infeasible due to offsite location of injection well.* ***Alternative 6:*** *Pump and treat excess water from Santa Rosa Creek and store in a confined Hard Rock aquifer during wet weather for use during dry weather. (Capital cost: $75,204,000; Annual O&M cost: $542,730) Deemed infeasible due to land acquisition requirements and high cost.* ***Alternative 7:*** *Pump excess surface water from San Simeon Creek and Santa Rosa Creek to Whale Rock Reservoir during wet weather for use during dry weather. (Capital cost: $30,820,000; Annual O&M cost: $239,950) Deemed infeasible due to complex negociation requirements and high cost.* ***Alternative 8:*** *Divert wastewater from San Simeon to the CCSD Wastewater Treatment Plant for treatment and use as unrestricted non-body-contact irrigation and industrial use. (Capital cost: $20,798,000; Annual O&M cost: $190,000) Deemed infeasible due to lack of reliability and failure to produce potable water.* ***Proposed Project:*** *Extract brackish water from San Simeon Creek Basin, treat it with membrane advanced water treatment, and recharge it back to CCSD's potable water groundwater basin, all on CCSD property. (Capital cost: $8,800,000; Annual O&M cost: $380,000)*
Question 3	**If the proposed project is not the least cost alternative, why is it the preferred alternative? Provide an explanation of any accomplishments of the proposed project that are different from the alternative project or methods:** *N/A – The proposed project is the least cost alternative*

PROJECT 4: SAN SIMEON COMMUNITY SERVICES DISTRICT (SSCSD) SMALL SCALE RECYCLED WATER PROJECT – PURPLE PIPE DISTRIBUTION

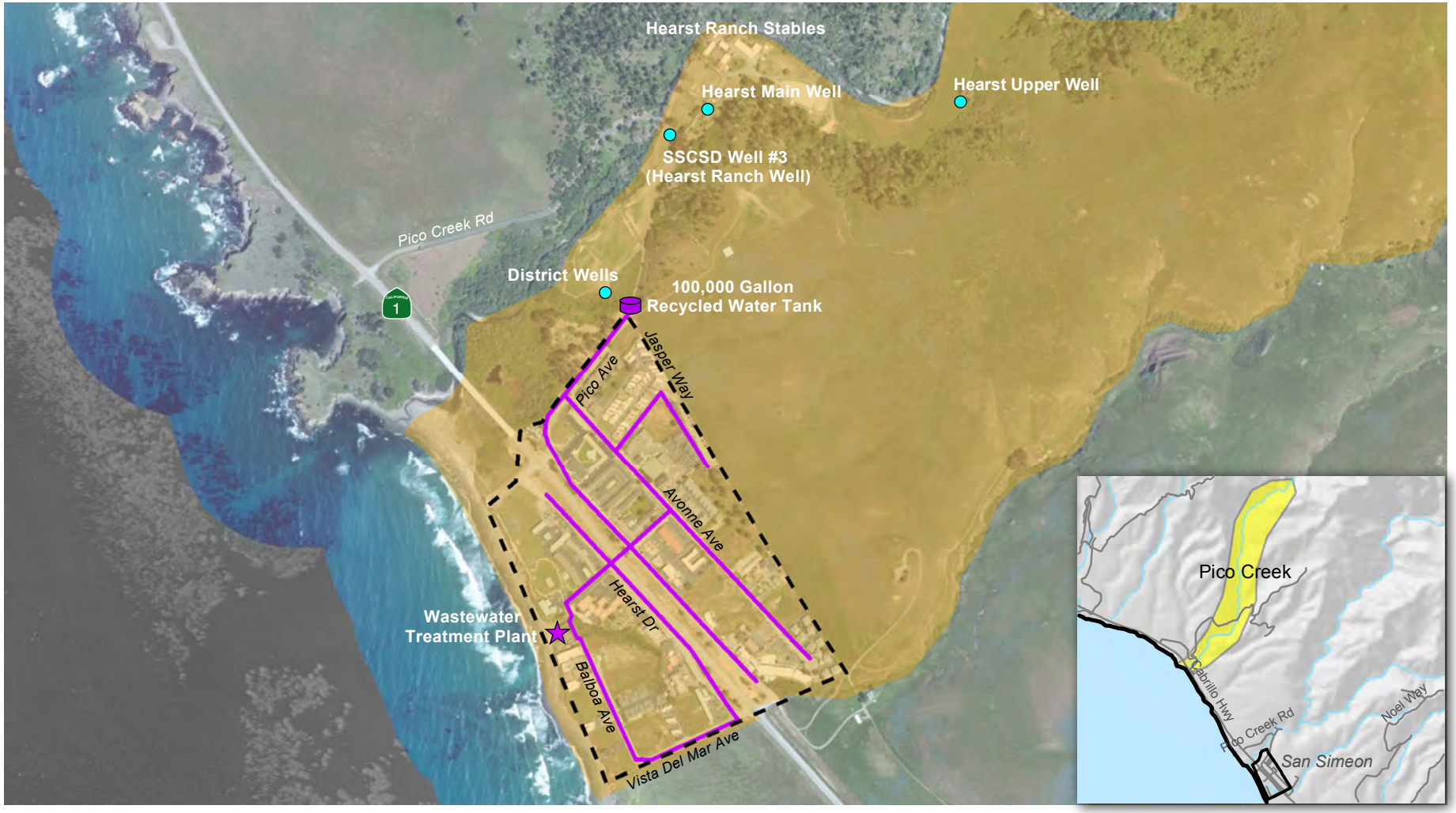
1.19 Brief Project Description

Agency: San Simeon Community Services District (SSCSD).

SSCSD's project creates 36,000 gallons of recycled water daily and delivers it to customers to avoid running out of water by fall of 2014.

1.20 Project Map

Figure 3.8 on the following page shows Project 4's geographical location, all project facilities, affected water resources, and the proposed monitoring locations.



LEGEND

- Well
- WWTP (Location of monitoring of recycled water production)

Proposed Recycled Water System

- Storage Tank
- Pipelines

- Project Service Area
- Disadvantaged Community (DAC)
- Groundwater Basin

* Individual user meters will monitor demands and performance.

N

0 0.075 0.15 0.3
Miles

PROJECT 4: SAN SIMEON SMALL SCALE RECYCLED WATER PROJECT

FIGURE 3.8

SAN LUIS OBISPO COUNTY
IRWM DROUGHT GRANT PROPOSAL

Note: Pico Creek Valley Groundwater Basin is the source of potable supply and is located north of San Simeon. Project does not affect groundwater basin.

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1.21 Project Description

Eligible Project Type: Immediate Drought Preparedness / Increase Local Water Supply Reliability

How Drought Impact is Alleviated. The disadvantaged community of San Simeon relies entirely on groundwater to meet its potable demands.The SSCSD is currently under a Stage 3 Emergency (Appendix 2J) with low groundwater well levels and high seawater intrusion. For the past 20 years, the SSCSD has experienced seawater intrusion when their groundwater well levels reach 14 feet below sea level, typically during periods of drought conditions. In addition, fire flow and storage requirements are not satisfied during these conditions. With seawater intrusion expected to increase during the summer months, outdoor irrigation has been prohibited and strict mandatory reductions of other water uses are in place.

The severe drought has placed the SSCSD water supply in jeopardy since total rainfall is less than the minimum rainfall needed to replenish its sole potable water supply. Without expedited implementation of the proposed project to offset potable water use with recycled water use, there are possible disastrous consequences to the community by late summer to early fall of this year with not being able to provide a clean, affordable, and accessible water source for human consumption, cooking, and sanitary purposes (Human Right to Water). Consequences include impacts to public health, public safety (fire fighting), the local economy, and the emotional well-being of the local residents.

SSCSD has already increased recycled water production at the SSWRF to supplement its water supply. However, in the absence of a distribution system, SSCSD only delivers a portion of the recycled water through an approved water truck to residents and hotels for use. The remaining recycled water is wasted through the SSWRF outfall line to the ocean until a recycled water pipeline is installed. In addition to those elements, the proposed project also includes installation of a 100,000-gallon recycled water storage tank to be co-located with the existing community water reservoir. The recycled water is to be used by CAL FIRE to further preserve potable water for human consumption.

Providing Immediate Drought Relief (D.1). This project will provide immediate drought relief because it provides an alternate water source that is readily available and less affected by drought conditions. Due to San Simeon's remote location, there are no interties or agreements with other agencies or state aqueducts. Therefore, the local aquifer is the community's sole supply. Providing additional water with this project would offer flexibility and better prepare this community for continued and future drought conditions.

Water Supply Reliability (IR.1). With distribution of recycled water, SSCSD's local potable water supply will be conserved and improved, the reliability of that supply will be increased, and fire flow and storage requirements will be satisfied. Without funding assistance, the community is at risk of running out of potable water by fall of 2014 (Appendix 2K).

The current project is capable of saving 36,000 gallons of potable water per day. The amount of potable water saved would keep SSCSD's groundwater from being heavily impacted during drought, prevent seawater intrusion, improve potable water quality and supply reliability, and possibly allow the 30-year building moratorium to be lifted. In the future the system can be expanded further improving regional drought-tolerance. SSCSD primary objecctivesare acquiring a drought-tolerant water supply, avoiding seawater intrusion, and satisfying fire flow regulations.

Need for Expedited Funding. To achieve the project benefits described above, expedited funding is necessary. The applicant is seeking funding for necessary upgrades to the SSWRF, temporary delivery of recycled water via truck/trailer tank, a 100,000-gallon recycled water storage tank, and the installation of a purple pipeline project for the permanent delivery of recycled water from the existing SSWRF to recycled water users in the community. SSCSD may run out of water by late summer or early fall of this year. If the drought continues, SSCSD may not be able to provide its customers with an adequate, dependable water supply, putting the ability of SSCSD to fulfill the Human Right to Water in jeopardy. The completion of the proposed recycled water project is needed now to provide needed water security for this disadvantaged community.

1.22 Project Physical Benefits

This section provides the measurable accomplishments/benefits for SSCSD's project. The SSCSD yields immediate benefit from this project by **providing a drought-tolerant source of water (recycled water) to offset potable water use** for the two major water uses – residential and hotel irrigation and laundry services. Without this project, it is projected that SSCSD will run out of potable water for health, safety and sanitation purposes by the fall of 2014. This project also eliminates the need for truck deliveries of water for irrigation, thus **reducing greenhouse gas (GHG) emissions**. Refer to Tables 5-4A and 5-4B for a summary of the primary and secondary physical benefits.

Table 5-4A – Annual Project Physical Benefits (Total over 30 year life)
Project Name: San Simeon Community Services District (SSCSD) Small Scale Recycled Water Project – Purple Pipe Distribution
Type of Benefit Claimed: Amount of Recycled Water Delivered to Hotels for Laundry Use (offset potable water use)
Units of the Benefit Claimed : Acre-Feet
Additional Information About this Benefit: N/A

(a)	(b)	(c)	(d)
Physical Benefits – Recycled Water Delivered to Hotels			
Year	**Without Project (irrigation only)**	**With Project (irrigation & laundry use)**	**Change Resulting From Project (c)-(b)(1)**
30-year Project Life	1,380	2,070	690

Comments:
(1) Implementation of this project results in a benefit over the entire 30-year life of the project, not only during drought conditions.
(2) It is estimated that there are 689 hotel rooms in the community that will use 30 gallons per day of recycled water for laundry services for 365 days each year for the duration of the project life. This results in saving 23 AFY or 690 AF of potable water. 689 rooms x 30 gal/room/day x 365 days/yr = 7,544,550 gal/yr = 23 AFY

Table 5-4B – Annual Project Physical Benefits (Total over 30 year life)
Project Name: San Simeon Community Services District (SSCSD) Small Scale Recycled Water Project – Purple Pipe Distribution
Type of Benefit Claimed: Reduced Greenhouse Gas (GHG) Emissions and Truck trips due to Eliminating Truck Deliveries of Water for Irrigation
Units of the Benefit Claimed: Metric Tons of Carbon Dioxide Equivalent Emissions and Number of Truck Trips
Additional Information About this Benefit: N/A

(a)	(b)	(c)	(d)
Physical Benefits – Reduced GHG Emissions			
Year	**Without Project (due to truck deliveries)**	**With Project (no deliveries)**	**Change Resulting From Project (c)-(b)(1)**
30-year Project Life	GHG: 8 Truck Trips: 3,780	GHG: 0 Truck Trips: 0	GHG: (8) Truck Trips: (3,780)

Comments:
(1) Implementation of this project results in a benefit over the entire 30-year life of the project, not only during drought conditions. A negative result represents a reduction in greenhouse gas emissions and truck trips due to eliminating the truck traffic required for delivering the recycled water for irrigation purposes.

1.23 Technical Analysis of Physical Benefits Claimed

1.23.1 Recent and Historical Conditions

San Simeon is located on the central coast of San Luis Obispo County, California, along Highway 1 north of Cambria. The SSCSD serves an area of approximately 100 acres, with elevations ranging from sea level on the west side of the highway, to approximately 85 feet above sea level on the east side. Water users include SSCSD and the Hearst Ranch. In 2000, there were approximately 320 dwelling units in San Simeon, and the residential population was estimated to be 247. The entire community is designated a disadvantaged community (DAC). Hotels, restaurants, and other tourist facilities are a major component of SSCSD's water and sewer usage and play a major role in sustaining the community of San Simeon.

The sole source of potable drinking water is the Pico Creek Valley Groundwater Basin. The main water-bearing unit in the basin is the Pico Creek alluvium (Appendix 3-4A). Recharge to the basin comes primarily from seepage of surface flows in Pico Creek and deep percolation of precipitation. Historically, the creek flows during the winter months and does not flow during the summer months. The alluvium between the ocean and Hearst Ranch is divided into a shallow and a deep aquifer, where the two aquifers are separated by a clay zone that acts as an aquitard. The clay zone is not present upstream of the Hearst Ranch and the alluvium eastward from there forms a single aquifer. The basin contains groundwater stored both above sea level and below sea level. The available groundwater in storage above sea level is about 40 AF. The available groundwater in storage below sea level is less than 50 AF and most of it has experienced seawater intrusion.

Since at least the mid-1980s, seawater intrusion has occurred within the Pico Creek Valley Groundwater Basin. For the past 20 years, the SSCSD has experienced seawater intrusion when their groundwater well levels reach 14 feet below sea level, typically during summer months when Pico Creek is dry and due to high usage for irrigation and hotel laundering services. As recent as 2008, groundwater well levels reached 13.8 feet below sea level. With low groundwater levels during high ocean tide, the SSCSD experiences elevated levels of chloride (salt) in their drinking water. Typical swings in chloride levels range from 30 mg/L during wet weather to 300 mg/L during dry weather, well below the State's maximum contaminant level secondary standard of 500 mg/L. However, as recent as January 2014, levels have exceeded 1,000 mg/L. The primary constraints on water availability in the basin include physical limitations and potential water quality issues. Currently the water supply of SSCSD is at a certified Level III severity rating (resource capacity has been met or exceeded) due to unreliability of the groundwater supply to meet existing demands (SLO County, 2008). As a result, a moratorium on development has been in place since 1991. As of September 25, 2013, groundwater well levels were at 14.3 feet below sea level, low enough to initiate Stage 3 water conservation measures. The probability of seawater intruding the aquifer is significantly greater at this level, especially when combined with high ocean tides. In addition, fire flow and storage requirements are not satisfied.

As of April 15, 2014, the SSCSD Board of Directors adopted Ordinance No. 114 giving the Board authority to implement a Stage 3 Water Shortage by way of Resolution 13-362 in order to protect the health, safety, and general welfare of the public. The SSCSD is currently under Stage 3 Water Shortage restrictions to prevent overdrawing their sole source of water by the fall of 2014.

The vulnerability of SSCSD's sole water supply has been long recognized as a serious concern and is at risk of being overdrawn by the fall of 2014. Though the State Board permits extraction of up to 140 AFY, groundwater studies indicate a safe yield of only 120 AFY, with 16 AFY used at Hearst Ranch. This leaves the SSCSD with a safe yield of 104 AFY, while existing demand fluctuates between 70 and 140 AFY, and projected build-out demand is estimated to be 250 AFY with an extensive conservation program in place.[5] The community will not be able to meet future demands.

[5] Source: November 2007 Water System Master Plan and Wastewater Collection System Evaluation; http://www.sansimeoncsd.com/PDFs/SSCSD_Master_Plan_12-7-07.pdf

SSCSD hired a geologist to update the 1986 groundwater study on their source water wells, aquifer, and overall watershed to determine the status of their drinking water quality and quantity. The study will be complete by the end of July 2014 and will answer whether the groundwater wells will be completely dry or if they will continue drawing in seawater into the aquifer. Preliminary findings of this study indicate that the community is at risk for running out of water before the end of 2014 (Appendix 2K). With the Stage 3 restrictions in place, SSCSD intends to slow down groundwater consumption until the study can answer whether there is a need to investigate implementing reverse osmosis into the water treatment plant to manage future chloride levels.

As a result, SSCSD has gone forward with upgrading its SSRWF to produce recycled water and is pursuing the project to expand and install recycled water purple piping distribution to further offset potable water use for irrigation and hotel laundering services. This project will prevent the groundwater wells from going dry by the fall of 2014 (allowing the wells to recharge) and will provide CAL FIRE with a drought-tolerant water supply to satisfy fire flow requirements and provide fire safety.

1.23.2 Project Performance Measures (to estimate physical benefits)

The primary physical benefit for this project is recycled water (expressed in acre-feet) delivered to hotels for laundry use over the lifetime of the project (i.e., 30 years) to offset potable water use that is necessary to sustain the community to meet the minimum life, health, and safety requirements for sanitation, drinking, and fire protection. The estimates of recycled water needed for hotel laundry use in Table 5-4A were calculated by multiplying the number of hotel rooms by 30 gallons per room per day over 30 years. The estimated consumption rate of 30 gallons per room per day for laundry purposes is based on a study performed for the Seattle Public Utilities Resource Conservation Section in July 2002 by O'Neill & Siegelbaum and The RICE Group (see Appendix 3-4B). This study identified water conservation measures and behavioral approaches to water conservation, or efficiency, from a representative sample of U.S. lodgings in a national literature and telephone survey. The data indicated that a majority of lodgings had adopted some combination of measures (like San Simeon's) to reduce water consumption, including low flow fixtures, towel-linen exchange programs, and staff education and outreach.

The secondary physical benefit presented in Table 5-4B is the reduction of greenhouse gas (GHG) emissions due to eliminating the truck traffic required for delivering the recycled water for irrigation purposes. The GHG emissions reduction is calculated over the lifetime of the project based on:

- The estimated number of truck deliveries (126) of recycled water per hotel per year if this project were not implemented
- The round-trip distance in miles from the SSWRF to each local hotel
- Emissions factors for carbon dioxide, methane, and nitrous oxide per vehicle-mile traveled (based on U.S. EPA Climate Leaders *GHG Inventory Protocol: Direct Emissions from Mobile Combustion Sources*, May 2008)
- 158.4 VMT/year x 1.692 kg CO2e/VMT ÷ 1000 kg/mt x 30 years = 8 mt CO_2emtCO_2e (or 0.27 mtCO_2e per year)

Annual Deliveries	Average Distance from SSRWF (miles)	Annual Vehicle-Miles Traveled (VMT)	Metric Tons of CO_2e* over 30 years
126	0.6	158.4	8

*Carbon dioxide equivalent emissions.

1.23.3 Project Facilities and Actions

SSCSD has identified all necessary steps, physical improvements/facilities, policies and actions required to implement this project and obtain the physical benefits needed:

Facilities Required:

- Purple pipeline for recycled water distribution.
- 100,000-gallon recycled water storage facility to supply CAL FIRE.
- Upgrading the SSRWF equipment:
  - High purity oxygen (HiPOx) approved ozone disinfection unit).
  - Amiad AMF2 36K ultra-fine filtration system.
  - Supporting electrical panels, piping, pumps, and repair of SSCSD streets/sidewalks.

Policies and Actions Required:

- Conditional Use Permit/Coastal Development Permit (pending discussion of County permit exemptions for public works projects).
- Building Permits.
- Update Title 22 Engineering Report (CDPH and RWQCB).
- Contracts with additional hotels and home owner associations.
- Contract with CAL FIRE.
- Contract with Cal Trans (for median usage).
- Potential contract with Hearst Castle.

1.23.4 Alternatives

Due to the supply limitations of the Pico Creek Valley Groundwater Basin, an alternative supply is necessary to meet future demands. Water conservation measures have been fully implemented and there is minimal or no opportunity to further reduce water demands. Further mandatory or emergency conservation can be used to offset an emergency or reliability supply, but not to support growth. Only three water management strategies are likely the most feasible options to consider for SSCSD's future water supply:

- Alternative potable supply sources (interties with neighbors, surface or groundwater)
- Desalination
- Recycled water

With respect to other water supply options, the nearest community to San Simeon with a potable water supply system is Cambria, which is also in a Stage 3 drought condition. There are no potential interties with other potable water systems. The five supply reservoirs in the County are also not located near San Simeon, the nearest being Nacimiento Reservoir located over 10 miles away (as the crow flies) on the opposite side of the Santa Lucia range with no supply lines heading the direction of SSCSD. As a Disadvantaged Community (DAC), it does not have the funding to purchase or ship water to SSCSD. There are also very limited groundwater supplies in the area and none have been identified for alternative supplies. Therefore, alternative potable water supply options were deemed infeasible.

SSCSD could also implement a desalination project (similar to one being considered by CCSD). The implementation challenges would be similar to those experienced by CCSD, which include complex permitting and environmental issues related to beach wells and implementation that could take eight years or longer. In addition, high initial capital cost could raise customer rates by 18 percent to over 100 percent to fund the project, and would cost in the neighborhood of $2,300 per AF or more, on a 20-year life cycle basis making this option infeasible.

The remaining option is production and use of recycled water. SSCSD has considered a couple of alternatives related to use of recycled water. The following section summarizes the alternatives that were considered as well as why the proposed project is the favored alternative.

1.23.4.1 Alternative #1 – Truck Recycled Water to Users

This alternative involves delivering a fraction of the recycled water via truck to local hotels to offset potable water use for irrigation purposes. For this alternative's analysis, it was assumed that truck deliveries of recycled water would take place for six months each year during the dry season whether

there is a drought or not, in order to offset potable water use. Based on a survey of hotels, it is estimated that there would be 126 truck deliveries per year with each truck delivering 4,000 gallons. This alternative was not favored, despite its low capital cost because it does not maximize the use of recycled water to offset potable water, the greenhouse gas emissions resulting from the truck traffic, and need to continually truck water each year. The tables below present an estimated project cost summary and a pros and cons analysis of the alternative.

Alternative #1 Estimated Costs

Capital Project Costs	Annual Operations & Maintenance Costs
$0	$31,500(1)
Comments: (1) This was estimated assuming it would cost $250 per truckload.	

Alternative #1 Evaluation Summary

Pros	Cons
• Allows SSCSD to utilize at least part of the recycled water they currently produce	• Higher greenhouse gas emissions • High operation and maintenance cost • Cannot use to offset laundry use as no storage is available at hotel sites.

1.23.4.2 Proposed Project – Construct a Piping System for Recycled Water Delivery

The proposed project includes construction of 10,560 feet of gravity fed purple pipeline to distribute recycled water to residents and hotels primarily for irrigation and hotel laundering services, as well as for fire saftey. This project would deliver more recycled water than Alternative #1. The tables below present an estimated project cost summary and a pros and cons analysis of the alternative.

Proposed Project Estimated Costs

Capital Project Costs	Annual Operations & Maintenance Costs
$3,515,765	$5,000

Proposed Project Evaluation Summary

Pros	Cons
• Allows SSCSD to utilize the recycled water they currently produce • Impelments a permanent distribution system for recycled water • Lower operation and maintenance costs	• None

1.23.5 <u>Without Project Conditions</u>

Groundwater is SSCSD's sole potable water supply. SSCSD operates a recycled water treatment facility to supply community hotels with irrigation water. The recycled supply offsets the use of potable groundwater; however, its use is limited due to a lack of distribution system and is only distributed by truck. If the proposed recycled water purple pipeline distribution project is not constructed (i.e., no project is implemented), SSCSD will continue to truck less than one percenct of the available recycled water for irrigation purposes to community hotels with the rest of the recycled supply going unutilized. The number of truck trips necessary to supply the full demand of water to hotels for irrigation and laundering services would be highly infeasible and significantly impact traffic in and around San Simeon. However, without making full use of the available recycled water during drought conditions, the community will overdraw its groundwater supply and eventually be without potable water for basic health, sanitary and safety purposes.

1.23.6 Potential Adverse Effects

The project will have little or no adverse physical effects or impacts to the environment. Implementation of the recycled water purple pipeline would occur within existing utility easements and would be co-located with existing utilities. Therefore, area disturbance as a result of construction would occur in previously disturbed areas within the urban center of the community and would be temporary in nature. It is anticipated that no native or undisturbed soils would be impacted by construction. In addition, the pipeline would not result in impacts related to creek crossings, wetlands or the bed and/or bank of hydrologic features.

In addition, installation of a 100,000-gallon recycled water storage tank would be located adjacent to the existing community water reservoir. This area has previously been graded; however, portions of the area have been reverted to the natural grassland landscape contiguous with the surrounding hillside. The installation of the recycled water tank could result in the disturbance of grassland habitat that could support special status plants and/or wildlife. This determination will be subject to verification by an anticipated Biological Study.

Installation of a water storage tank would have the potential to result in a visible impact from public vantage points, primarily consisting of views from nearby residential streets. It is important to note that the water tank would be co-located with the existing community water reservoir. Due to intervening topography and vegetation, this site would not be visible to travelers along Highway 1.

If the project is not implemented and the drought conditions continue, SSCSD will not have a reliable source of potable or recycled water. Not having a reliable water supply will threaten the Human Right to Water and fire safety in this community.

1.24 Cost Effectiveness Analysis

SSCSD has pursued available alternatives to the proposed Project. The two alternatives including the proposed project are listed in Table 6-4.

Table 6-4 – Cost Effective Analysis **Project name: Project 4 San Simeon Community Services District (SSCSD) Small Scale Recycled Water Project – Purple Pipe Distribution**	
Question 1	**Types of benefits provided as shown in Tables 5-4A and 5-4B:** *Alternative water supply (recycled water) and GHG emissions reduction.*
Question 2	**Have alternative methods been considered to achieve the same types and amounts of physical benefits as the proposed project been identified?** *Yes*
	If no, why? *N/A*
	If yes, list the methods (including the proposed project) and estimated costs: *SSCSD considered the only two feasible options available for providing a drought-tolerant supply (that offset groundwater consumption).* ***Alternative 1:*** *Truck a portion of the recycled water produced during the 6-month dry season to local hotels to offset potable water use for irrigation purposes. (Capital cost: $0, Annual O&M cost: $31,500) This project was deemed infeasible because trucking water would be required.*

Table 6-4 – Cost Effective Analysis Project name: Project 4 San Simeon Community Services District (SSCSD) Small Scale Recycled Water Project – Purple Pipe Distribution	
	Proposed Project: *Construct a purple piping system to deliver recycled water to residents and hotels primarily for irrigation and hotel laundering services, as well as for fire safety. (Capital cost: $3,515,765; Annual O&M cost: $5,000).*
Question 3	**If the proposed project is not the least cost alternative, why is it the preferred alternative? Provide an explanation of any accomplishments of the proposed project that are different from the alternative project or methods:** *While Proposed Project is not the least cost alternative, it is the preferred alternative since it is the only one that provides a reliable, local drought-tolerant water supply all year long, maximizes conservation of the sole potable water (groundwater) supply in turn preventing seawater intrusion in groundwater wells, and maximizes use of the available recycled water supply without waste. Alternative 1 uses only a portion of the available recycled water and cannot meet existing demand for recycled water uses in SSCSD to maximize offset potable water use and prevent further seawater intrusion.*

PROJECT 5: NACIMIENTO-SALINAS-CALIFORNIA MEN'S COLONY (CMC) WATER TREATMENT PLANT EMERGENCY INTERTIE

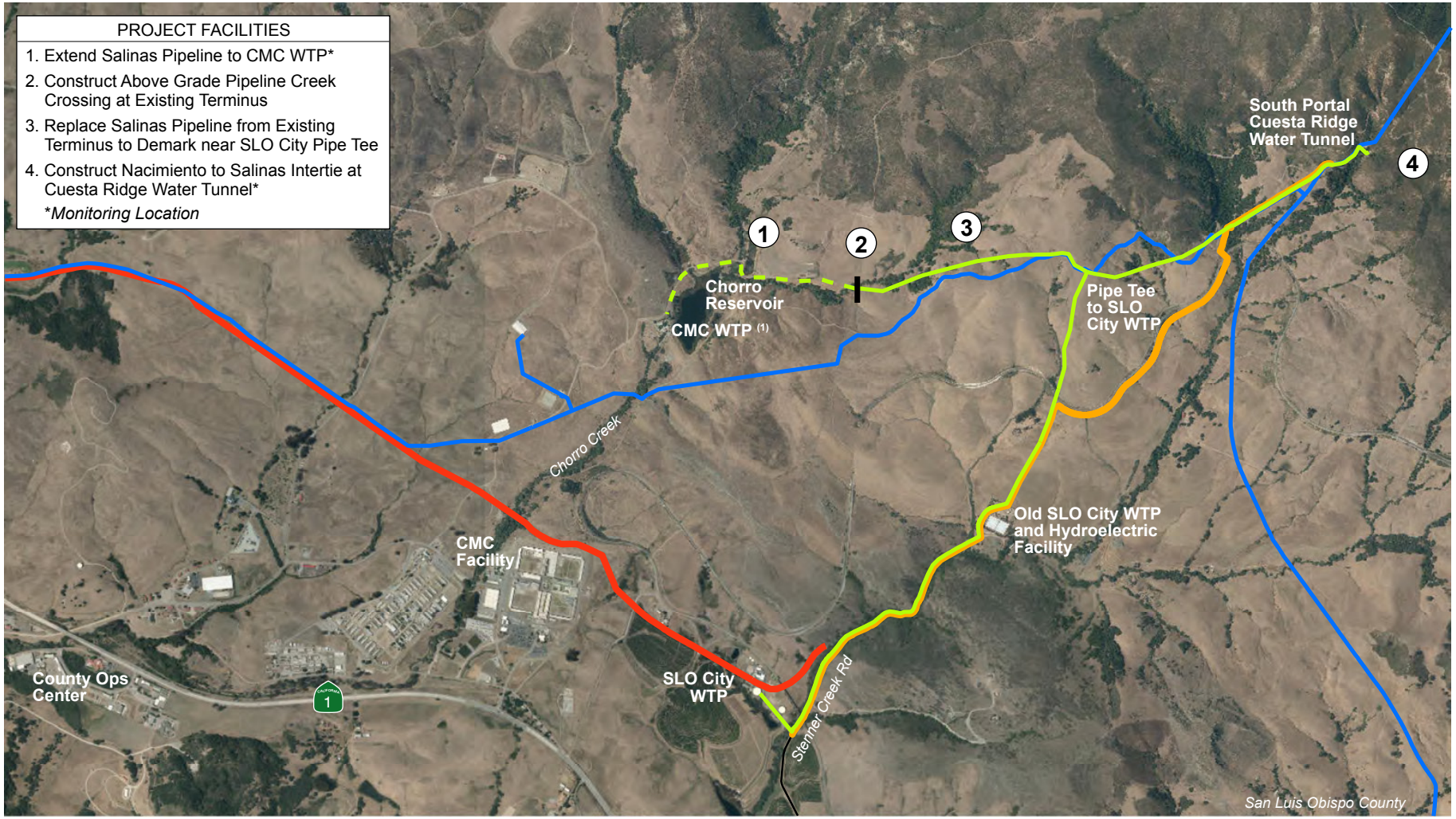
1.25 Brief Project Description

Agency:: San Luis Obispo County Flood Control and Water Conservation District (District).

Construct an intertie between the Salinas and Nacimiento Pipelines to provide an alternate water source for institutional/public use facilities, which rely solely on State Water.

1.26 Project Map

Figure 3.9 on the following page shows Project 5's geographical location, all project facilities, affected water resources, and the proposed monitoring locations.



LEGEND
- Salinas Pipeline (Proposed)
- Salinas Pipeline (Existing)
- Nacimiento Pipeline (Existing)
- Whale Rock Pipeline (Existing)
- State Water Pipeline (Existing)

N

0 0.25 0.5 1
Miles

Note: Project overlays the Chorro Valley Groundwater Basin, but project does not affect the basin.

(1) Volume of water use will be measured at the CMC Water Treatment Plant for performance monitoring.

PROJECT 5: SALINAS NACIMIENTO EMERGENCY INTERTIE

FIGURE 3.9

SAN LUIS OBISPO COUNTY
IRWM DROUGHT GRANT PROPOSAL

V:\Client86\SLOCounty\9353\slo0714\slo0714f1-9353.ai

1.27 Project Description

Eligible Project Type: Immediate Drought Preparedness / Increase Local Water Supply Reliability

How Drought Impact is Alleviated. Several regionally significant government facilities and institutions in the Chorro Valley – the California Men's Colony State Prison, County jail, County Emergency Operations Center, County Operations Center, Cuesta Community College (Chorro Valley Communities) - rely heavily on State Water. The unreliability of water this year (0% to 5% deliveries) has exacerbated the need for locally sourced supply redundancy through interties to water conveyance facilities. Due to this, the proposed project was developed to intertie the Chorro Valley Communities' water supply with the Nacimiento Reservior water supply. Currently, this reservoir has 6096 AFY of reserve water for phurchace by communities within the District for emergencies. This available supply is well above the Chorro Valley Communities' typical water usage of 1025 AFY. Without the addition of this alternate water supply, the Chorro Valley communities' ability to reliably obtain drinking water during emergencies is at risk.

Providing Immediate Drought Relief (D.1). The proposed project includes: 1) construction of an intertie between the Nacimiento and Salinas water conveyance pipelines, 2) replacement of a 0.8-mile section of existing Salinas Pipeline, and 3) 0.8-mile extension of the Salinas Pipeline to connect to the California Men's Colony Water Treatment Plant. This will provide the ability to convey locally sourced reservoir water from the Nacimiento Reservoir to the Chorro Valley communities as needed in a drought, State Water shutdown, or other emergency. This project would also provide the ability to exchange and wheel water throughout the region for the additional benefit of a more reliable regional drinking water supply.

Construction of the proposed intertie will provide immediate drought preparedness by providing an alternative water source to communities in the Chorro Valley. These communities currently have access to State Water that in some places is supplemented by two small reservoirs and one groundwater well. These local water supplies are highly impacted by drought and seasonal fluctuations. Since groundwater well and surface water reservoir production have historically decreased during droughts and other seasonal fluctuations, the system may not always provide an adequate, dependable water supply. Additionally, several Chorro Valley communities only have entitlement to State Water, which is greatly impacted by drought conditions. Adding access to an alternate water source with the proposed intertie project is critical for drought preparedness in these communities.

The proposed project would also connect 4 of the 5 major reservoirs within SLO County. This better interconnectedness would help alleviate local drought conditions by making it easier to move water from one part of the region with fewer drought impacts to another part of the region with more drought impacts.

Water Supply Reliability (IR.1). This project would also increase local water supply reliability by providing supply redundancy. With the 2014 drought, State Water allocations are greatly reduced and uncertainty exists surrounding their reliability if drought conditions continue. Since State Water is the primary water source, and in some cases the only water source, for the communities of Chorro Valley, increasing reliability is necessary to ensure the human right to water if drought conditions continue. Furthermore, like all public facilities, the Chorro Valley communities' surface water reservoir, wells, and water treatment plant are vulnerable to intentional damage or shutdown caused by vandalism or terrorist act and are also inherently vulnerable to unanticipated, unintentional damage causing well or plant shutdowns. In the event that such intentional or unintentional damage causes the plant or well to shut down or the reservoir to be unusable for an extended period of time, the Chorro Valley communities would likely not be able to obtain adequate drinking water supply. An intertie with the Nacimiento Reservoir pipeline would prevent such shutdowns from affecting water users.

Need for Expedited Funding. Expedited funding is needed for this project because water source reliability is uncertain in the face of continued drought conditions. A State prison, a County jail, the County Emergency Operations Center, the County Operations Center, a California National Guard facility, and a community college all rely on State Water to provide the water necessary for human consumption. Given State Water's decreased allocations, which dropped to 0% for part of this year, the quick construction of an intertie to connect these users to more reliable water sources is critical.

1.28 Project Physical Benefits

Nacimiento-Salinas-California Men's Colony Intertie Project will only be operated during drought years and therefore project benefits are only shown during expected drought years. For the proposed intertie project, project benefits include **water supply during drought years from the new intertie** and **regional flexibility of water supply**. Refer to Tables 5-5A and 5-5B for a summary of the primary and secondary physical benefits. For the physical benefits tables (Table 5), it was assumed that drought conditions would occur every 8 years and last for 3 years. This assumption is based on historical rainfall data from the region going back to 1870. Drought was defined as any three consecutive years with below average rainfall. With this definition, on average a drought occurred every 8 years. This definition encompasses the majority of the droughts defined by DWR (1918-20, 1923-26, 1928-35, 1947-50, 1959-62, 1976-77, 1987-92, 2001-02, and 2007-09). Additionally, using only DWR defined droughts, the drought cycle is also 8 years. Furthermore, this definition of drought roughly matches historical state water allocations. However, State Water allocations tend to lag droughts by a couple of years. Given this, it was assumed that a drought affecting regional groundwater levels, regional reservoir levels, and state water allocations would occur every 8 years and last for 3 years. During these drought years, it was assumed that the full demands of the community would be served by the emergency supply (intertie). For the regional flexibility benefit, it was assumed that in non-drought years, the intertie could be used to transfer water throughout the County, but in drought years the amount that could be transferred was less by the amount needed to supply the Chorro Valley communities.

Table 5-5A – Annual Project Physical Benefits

Project Name: Nacimiento-Salinas-California Men's Colony (CMC) Water Treatment Plant Emergency Intertie
Type of Benefit Claimed: Water Supply
Units of the Benefit Claimed : Acre-Feet per Year Provided by New Intertie
Additional Information About this Benefit: NA

(a)	(b)	(c)	(d)
	Physical Benefits		
Year	**Without Project**	**With Project**	**Change Resulting from Project (c) – (b)**
2014	N/A	N/A	Project Not Yet Built
2015[4]	0	1025[1]	1025
2016	0[2]	0[3]	0
2017	0[2]	0[3]	0
2018	0[2]	0[3]	0
2019	0[2]	0[3]	0
2020	0[2]	0[3]	0
2021	0[2]	0[3]	0
2022	0[2]	0[3]	0
2023	0[2]	0[3]	0
2024[5]	0	1025[1]	1025
2025[5]	0	1025[1]	1025
2026[5]	0	1025[1]	1025
2027	0[2]	0[3]	0
2028	0[2]	0[3]	0
2029	0[2]	0[3]	0
2030	0[2]	0[3]	0
2031	0[2]	0[3]	0

Table 5-5A – Annual Project Physical Benefits			
Project Name: Nacimiento-Salinas-California Men's Colony (CMC) Water Treatment Plant Emergency Intertie **Type of Benefit Claimed:** Water Supply **Units of the Benefit Claimed :** Acre-Feet per Year Provided by New Intertie **Additional Information About this Benefit:** NA			
(a)	**(b)**	**(c)**	**(d)**
	Physical Benefits		
Year	**Without Project**	**With Project**	**Change Resulting from Project (c) – (b)**
2032	0(2)	0(3)	0
2033	0(2)	0(3)	0
2034	0(2)	0(3)	0
2035(5)	0	1025(1)	1025
2036(5)	0	1025(1)	1025
2037(5)	0	1025(1)	1025
2038	0(2)	0(3)	0
2039	0(2)	0(3)	0
2040	0(2)	0(3)	0
2041	0(2)	0(3)	0
2042	0(2)	0(3)	0
2043	0(2)	0(3)	0
2044	0(2)	0(3)	0
2045	0(2)	0(3)	0
2046(5)	0	1025(1)	1025
2047(5)	0	1025(1)	1025
2048(5)	0	1025(1)	1025
2049	0(2)	0(3)	0
2050	0(2)	0(3)	0
2051	0(2)	0(3)	0
2052	0(2)	0(3)	0
2053	0(2)	0(3)	0
2054	0(2)	0(3)	0
2055	0(2)	0(3)	0
2056	0(2)	0(3)	0
2057(5)	0	1025(1)	1025
2058(5)	0	1025(1)	1025
2059(5)	0	1025(1)	1025
2060	0(2)	0(3)	0
2061	0(2)	0(3)	0
2062	0(2)	0(3)	0
2063	0(2)	0(3)	0
2064(6)	0(2)	0(3)	0

Comments:

(1) During drought conditions, 1025 AFY will be obtained from the Nacimiento Reservoir with the proposed project.

Table 5-5A – Annual Project Physical Benefits			
Project Name: Nacimiento-Salinas-California Men's Colony (CMC) Water Treatment Plant Emergency Intertie			
Type of Benefit Claimed: Water Supply			
Units of the Benefit Claimed : Acre-Feet per Year Provided by New Intertie			
Additional Information About this Benefit: NA			
(a)	**(b)**	**(c)**	**(d)**
	Physical Benefits		
Year	**Without Project**	**With Project**	**Change Resulting from Project (c) – (b)**

(2) During non-drought years, it was assumed that the Chorro Valley communities will receive their full State Water allocation and therefore no additional water is needed.
(3) During non-drought years, no water will be obtained from the Nacimiento Reservoir with the proposed project.
(4) It was assumed that the current drought continues through 2015.
(5) Based on historical rainfall data in SLO County, a drought is likely to occur every 8 years and last for 3 years.
(6) This project has a 50-year useful life.

Table 5-5B – Annual Project Physical Benefits			
Project Name: Nacimiento-Salinas-California Men's Colony (CMC) Water Treatment Plant Emergency Intertie			
Type of Benefit Claimed: Regional Flexibility of Water Supplies			
Units of the Benefit Claimed : Acre-Feet per Year			
Additional Information About this Benefit: NA			
(a)	**(b)**	**(c)**	**(d)**
	Physical Benefits		
Year	**Without Project**	**With Project**	**Change Resulting from Project (c) – (b)**
2014	N/A	N/A	Project Not Yet Built
2015(4)	0(1)	Up to 5070(2)	Up to 5070
2016	0(1)	Up to 6095(3)	Up to 6095
2017	0(1)	Up to 6095(3)	Up to 6095
2018	0(1)	Up to 6095(3)	Up to 6095
2019	0(1)	Up to 6095(3)	Up to 6095
2020	0(1)	Up to 6095(3)	Up to 6095
2021	0(1)	Up to 6095(3)	Up to 6095
2022	0(1)	Up to 6095(3)	Up to 6095
2023	0(1)	Up to 6095(3)	Up to 6095
2024(5)	0(1)	Up to 5070(2)	Up to 5070
2025(5)	0(1)	Up to 5070(2)	Up to 5070
2026(5)	0(1)	Up to 5070(2)	Up to 5070
2027	0(1)	Up to 6095(3)	Up to 6095
2028	0(1)	Up to 6095(3)	Up to 6095
2029	0(1)	Up to 6095(3)	Up to 6095
2030	0(1)	Up to 6095(3)	Up to 6095
2031	0(1)	Up to 6095(3)	Up to 6095

Table 5-5B – Annual Project Physical Benefits

Project Name: Nacimiento-Salinas-California Men's Colony (CMC) Water Treatment Plant Emergency Intertie
Type of Benefit Claimed: Regional Flexibility of Water Supplies
Units of the Benefit Claimed : Acre-Feet per Year
Additional Information About this Benefit: NA

(a)	(b)	(c)	(d)
	Physical Benefits		
Year	**Without Project**	**With Project**	**Change Resulting from Project (c) – (b)**
2032	0(1)	Up to 6095(3)	Up to 6095
2033	0(1)	Up to 6095(3)	Up to 6095
2034	0(1)	Up to 6095(3)	Up to 6095
2035(5)	0(1)	Up to 5070(2)	Up to 5070
2036(5)	0(1)	Up to 5070(2)	Up to 5070
2037(5)	0(1)	Up to 5070(2)	Up to 5070
2038	0(1)	Up to 6095(3)	Up to 6095
2039	0(1)	Up to 6095(3)	Up to 6095
2040	0(1)	Up to 6095(3)	Up to 6095
2041	0(1)	Up to 6095(3)	Up to 6095
2042	0(1)	Up to 6095(3)	Up to 6095
2043	0(1)	Up to 6095(3)	Up to 6095
2044	0(1)	Up to 6095(3)	Up to 6095
2045	0(1)	Up to 6095(3)	Up to 6095
2046(5)	0(1)	Up to 5070(2)	Up to 5070
2047(5)	0(1)	Up to 5070(2)	Up to 5070
2048(5)	0(1)	Up to 5070(2)	Up to 5070
2049	0(1)	Up to 6095(3)	Up to 6095
2050	0(1)	Up to 6095(3)	Up to 6095
2051	0(1)	Up to 6095(3)	Up to 6095
2052	0(1)	Up to 6095(3)	Up to 6095
2053	0(1)	Up to 6095(3)	Up to 6095
2054	0(1)	Up to 6095(3)	Up to 6095
2055	0(1)	Up to 6095(3)	Up to 6095
2056	0(1)	Up to 6095(3)	Up to 6095
2057(5)	0(1)	Up to 5070(2)	Up to 5070
2058(5)	0(1)	Up to 5070(2)	Up to 5070
2059(5)	0(1)	Up to 5070(2)	Up to 5070
2060	0(1)	Up to 6095(3)	Up to 6095
2061	0(1)	Up to 6095(3)	Up to 6095
2062	0(1)	Up to 6095(3)	Up to 6095
2063	0(1)	Up to 6095(3)	Up to 6095
2064(6)	0(1)	Up to 6095(3)	Up to 6095

Comments:
(1) Existing communities within the region currently have no way of accessing Nacimiento Reservoir water.
(2) Currently, Nacimiento Reservoir has 6095 AFY of reserve water that can be purchased by communities

Table 5-5B – Annual Project Physical Benefits			
Project Name: Nacimiento-Salinas-California Men's Colony (CMC) Water Treatment Plant Emergency Intertie			
Type of Benefit Claimed: Regional Flexibility of Water Supplies			
Units of the Benefit Claimed : Acre-Feet per Year			
Additional Information About this Benefit: NA			
(a)	**(b)**	**(c)**	**(d)**
	Physical Benefits		
Year	**Without Project**	**With Project**	**Change Resulting from Project (c) – (b)**
within the District. With this project, we are assuming that during times of drought the Chorro Valley communities would obtain 1025 AFY of the available 6095 AFY, leaving 5070 AFY for other communities. (3) During times when there is no drought, the full 6095 AFY would be available since the Chorro Valley communities would receive their full state water allocation. (4) It was assumed that the current drought continues through 2015. (5) Based on historical rainfall data in SLO County, a drought is likely to occur every 8 years and last for 3 years. (6) This project has a 50-year useful life.			

1.29 Technical Analysis of Physical Benefits Claimed

1.29.1 Recent and Historical Conditions

Between Morro Bay and San Luis Obispo there are a number of regionally significant government facilities and institutions. These Chorro Valley facilities include the California Men's Colony, County Operations Center/Office of Education, Camp San Luis Obispo (National Guard), and Cuesta Community College. The current sources of water for these communities include State Water, a small reservoir (Chorro Reservoir), and a groundwater well. The largest water supply source, and for some facilities the only source, is State Water.

Currently these Chorro Valley Facilities have a State Water contractual limit of 1025 acre-feet per year (AFY). In addition, the current State Water contracts include drought buffer water that provides them with their full allocation even when State Water deliveries are reduced to 20%. Thus, the Chorro Valley Facilities will receive their full State Water allotment unless State Water deliveries are in the range of 0-20%. Historically, the Chorro Valley users have always been able to receive their full allocation (See Appendix 3-5A). Although deliveries in 2014 were less than 20%, the amount of State Water carryover water that the users had stored, carried them through 2014 and is potentially sufficient for 2015. However, should the drought continue and reduced deliveries continue these critical State and local facilities will be in a dire situation.

The other sources of water for these communities include the small Chorro Reservoir, 420 AFY from Whale Rock Reservoir, and a groundwater well. Water provide by the groundwater well is allocated to Camp San Luis Obispo. Since this well was not constructed to meet the Department of Public Health Standards, all water obtained from this well must be treated by the CMC WTP. The amount of water obtained from the well is a function of the well pump since it is pumping up to a reservoir high in elevation. Over the last four years, the well has produced as much as 84 AFY. If sufficient groundwater exists, the pumping capacity of the well is 320 AFY. The Chorro Reservoir was constructed by the US Army Corps of Engineers to provide water to Camp San Luis Obispo at the beginning of World War II. The net storage capacity of the reservoir has decreased since it was constructed due to sedimentation, and is currently about 90 AF. Camp San Luis Obispo holds the first 140 AFY entitlement to this surface water. During surplus water years, any excess to the 140 AFY is used by CMC. Flow must be also maintained in Chorro Creek downstream of the reservoir for riparian habitat enhancement.

1.29.2 Project Performance Measures (to estimate physical benefits)

To estimate the primary physical benefit described in Table 5, historical State Water allocations were used. The proposed intertie will provide immediate drought relief to the State Water Project (SWP) users in the Chorro Valley (CV) area whose sole source of water in some cases is State Water. These users are State and local government facilities and Institutions serving a population of over 10,000 (See Table below). The primary physical benefit of the project is the ability to transport raw water from the highly productive watershed and reliable Nacimiento Reservoir to the California Men's Colony Water Treatment Plant (CMCWTP) where it can be treated and distributed. CMC is contractually responsible to be the purveyor and distributor of water for the Chorro Valley users.

In times of drought, the intertie would provide Nacimiento Reservoir water in a quantity equal to that which the CV users would receive from the SWP. These users currently have a SWP contractual amount of 1025 AFY. The current SWP contracts also include drought buffer water that provides them with their full allocation even when SWP deliveries are reduced to 20%. The primary maximum physical benefit of 1025 AF of water delivered to the CV users would be realized in years when SWP deliveries were in the range of 0-20%. Historically, the users have always been able to receive their full allocation. Although deliveries this year were also less than 20%, the amount of SWP carry over water that the users had stored, will likely carry them through 2014. However, should the drought continue and reduced deliveries continue, these critical State and local facilities will be in a dire situation.

Facilities	Daily Population Served
SLO County Operations Center	300
Jail, Juvenile Hall, Honor Farm	900
Cuesta College	5500
California Men's Colony	5200
Total	**11,900**

To estimate the secondary physical benefit described in Table 5, the total amount of Reserve Water in Nacimiento Reservoir was used. This water is available for use within the District and this project provides access to that water. Completing the proposed intertie and pipe extension links 4 of the 5 water supply reservoirs within the County of SLO to each other (see Appendix 3-5B). Those reservoirs are Nacimiento, Salinas, Chorro and Whale Rock. Lopez Lake would not be connected, although the communities in southern SLO County that utilize Lopez are also connected to the State Water System and water exchanges with the South County could occur with the Chorro Valley through this system. The proposed intertie would help enhance water reliability for the North County, South County, and coast. The benefit shown in Table 5-5B is the 6095 AFY of reserved water from Nacimiento minus the Chorro Valley users of 1025 AFY.

The bolstering of SLO County's local water resources through interties meets the July 2007 IRWM Plan water supply goals and is the objective of the first goal in the updated draft IRWM Plan which states: "Maximize the accessibility to existing and supplemental water supplies in the Region through the utilization of existing infrastructure and development of new infrastructure and agreements".

Providing this important piece of infrastructure allows for regional flexibility with exchanges and wheeling of water between the communities who are served by all the reservoirs and State Water to address water supply reliability in the event of emergencies and droughts. The region has experienced local drought conditions in the past while Northern California saw substantial snowpack making State Water deliveries reliable. This intertie will help distribute/exchange State Water throughout the County in those instances when State Water deliveries are reliable and local reservoir resources are scarce.

Post-project performance monitoring will be determined by meters to be installed to monitor flow in the new intertie.

1.29.3 Project Facilities and Actions

Implementation of the Nacimiento-Salinas- CMC Intertie project will add new facilities to the regional water systems and provide infrastructure for the delivery of water from the Nacimiento Reservoir to the Chorro Valley facilities during emergency situations. The required infrastructure is shown in the project map and includes approximately 1.6 miles of piping and one intertie. 30% design drawings of the required facilities are also included in Appendix 3-5C.

In addition to the physical facilities, water agreements will need to be negotiated to ensure water delivery in times of drought. The District currently has a 17,500 AFY entitlement to water from the Nacimiento Reservoir. 1,750 AFY is reserved for local lakeside uses and 9,655 AFY is reserved for five participants with Entitlement Contracts. The remaining 6,095 AFY of Nacimiento Reservoir water is maintained as Reserve Water that can be sold to other water users to alleviate water shortages. Appendix 3-5D shows this water allocation. Thus while no permanent water rights agreement would be pursued by the Chorro Valley Communities, in times of drought these communities would need to request and purchase water from the District. Additionally, to treat Nacimiento water, a water treatment agreement between the SLO County Flood Control and Water Conservation District and the California Men's Colony is needed. This agreement will be developed in parallel to the intertie infrastructure project. While this agreement has not currently been completed, the involved parties are aware of the proposed project and are amiable to it. If grant funds are awarded, this agreement will be pursued. Completion of the infrastructure and exchange agreement can be very beneficial to small water supply agencies through regional flexibility, system redundancy and improved water quality. Letters of support for this project are included in Appendix 3-5E.

1.29.4 Alternatives

The proposed project was developed quickly in response to the current drought situation. Thus a comprehensive alternatives analysis has not been performed. However, a few alternatives have been considered as part of the project-screening process to ensure that the proposed project achieves the required benefits in the most cost-effective and responsible way possible. The District has looked for a way to improve its water supply reliability/redundancy to the Chorro Valley in the past; however, the current drought has brought immediacy to the concept of providing emergency water to the Chorro Valley. The following alternatives and their relative cost effectiveness were considered:

1.29.4.1 Alternative #1 – Wheeling Agreement for Whale Rock Reservior Water

A wheeling agreement could be pursued in the hopes of obtaining Whale Rock Reservoir water. If this occured then Whale Rock reservoir would have to supply all the users in the Chorro Valley area as well as provide water to its existing users (City of SLO, Cayucos, Cal Poly, CMC). Whale Rock Reservoir is a 40,662 AF reservoir currently at 50% capacity that captures water from a relatively small, low producing 20.3 square mile watershed. Whale Rock could potentially provide water to the Chorro Valley users for a short duration; however, it would quickly be depleted. It is important to note that Whale Rock is fully subscribed between the existing users, with CMC only having a yearly entitlement of 420 acre-feet per year. This limits how much water is available to provide in lieu of State Water.

CMC has 2,871 acre-feet in storage at Whale Rock at this time, but the lake has seen an average of 140 acre-feet evaporate since the beginning of January and peak evaporation in the summer and fall can reach 300 acre-feet per month. The warmer temperatures predicted this summer, along with the low level of the lakes increasing water temperature, will only enhance the evaporation process. This limited amount of stored water could potentially be made available in 2015 but due to evaporation and downstream releases, will be in very low quantities and may not be able to meet the demand of the Chorro Valley through 2015, at which time this water source would be exhausted. Preserving Whale Rock during a major drought is important because the reservoir is also the water supply source for the City of San Luis Obispo, Cal Poly State University and the community of Cayucos, which collectively represent approximately 70,000 people.

Thus, this alternative is not considered feasible because it does not improve the reliability and redundancy of water supply to the Chorro Valley. The table below presents a pros and cons analysis of the alternative:

Alternative #1 Evaluation Summary

Pros	Cons
• Low capital project costs • Low annual maintenance costs	• Relies on an uncertain supply that is already fully subscribed. • No "new" water • May not be enough water available to provide water needs • Requires contentious agreements

1.29.4.2 Alternative #2 – Water Exchange with City of San Luis Obispo

This alternative involves establishing exchange agreements with the City of San Luis Obispo to release water in Whale Rock to the Chorro Valley users in exchange for other water supplies such as Nacimiento water. As discussed under Alternative 1, Whale Rock is a relatively small reservoir and is at risk for drying up during hot, dry drought conditions. Its water supplies are also already fully subscribed to support approximately 70,000 people. Therefore, after discussion and analysis, it was determined that, even without consideration of necessary capital costs, the water from these other sources are already identified and designated for other drought planning scenarios. In other words, this scenario would not provide any "new" water or water source. Thus, this alternative is not considered feasible because it does not improve the reliability and redundancy of water supply to the Chorro Valley. The table below presents a pros and cons analysis of the alternative.

Alternative #2 Evaluation Summary

Pros	Cons
• Low capital project costs • Low annual maintenance costs	• Does not improve the reliability and redundancy of water supply • No "new" water • May not be enough water available to provide water needs in an emergency Water treatment plant(s) capacity may be an issue

1.29.4.3 Alternative #3 – Water System Consolidation

This alternative involves consolidation of the Chorro Valley water system with other nearby water systems. The other nearest water system is the City of San Luis Obispo. This alternative has similar considerations in that even without consideration of necessary capital costs, the water from these other sources are already identified and designated for other drought planning scenarios. Also the City has indicated that they do <u>not</u> have an interest in taking the Chorro Valley into their service area. Thus, this alternative is not considered feasible because it does not improve the reliability and redundancy of water supply to the Chorro Valley. The table below presents a pros and cons analysis of the alternative

Alternative #3 Evaluation Summary

Pros	Cons
• Reasonable capital project costs • Low annual maintenance costs	• Does not improve the reliability and redundancy of water supply • No "new" water • May not be enough water available to provide water needs in an emergency Water treatment plant(s) capacity may be an issue

1.29.4.4 Alternative #4 –Truck Water from Outside Sources during Emergencies

This alternative does not provide for any new water system improvements. Chorro Valley Facilities would remain completely reliant on their existing sources. In the event that existing water sources – State water, Chorro Reservoir, and one groundwater well – could not supply adequate water due to drought conditions, emergency measures such as trucking water from outside sources would be required. Although this alternative would not have any immediate capital or maintenance costs, trucking drinking water during an emergency would be extremely expensive and only feasible in short term emergencies. Additionally, trucked water would only provide for drinking needs. Other water needs, such as sanitation, would not be met, resulting in potential health risks. This alternative is not considered feasible because it does not improve the ability to safely and reliably deliver water and it puts the public's health at risk. The table below presents a pros and cons analysis of the alternative.

Alternative #4 Evaluation Summary

Pros	Cons
• Reasonable capital project costs • Low annual maintenance costs	• Very high cost for delivery and storage • Does not improve the reliability and redundancy of water supply • No "new" water • May not be enough water available to provide water needs in an emergency Short term use

1.29.4.5 Alternative #5 – Nacimiento Water Project Extension

This alternative would include extension of the existing Nacimiento Water pipeline approximately 1-mile, construction of approximately 1.6-miles of pipeline to extend the Salinas pipeline, and connect to the CMC Water Treatment Plant. This alternative is essentially the proposed project with the 1-mile extension of the Nacimiento Water pipeline in addition. The cost of the additional 1-mile extension of the Nacimiento Water pipeline is preliminarily estimated to be $3,000,000, making the total project cost over $7,000,000. Alternative #4 is not considered a viable alternative because it is too costly to construct. In comparison, it would not provide a substantial increase in benefits than the proposed project. The tables below present an estimated project cost summary and a pros and cons analysis of the alternative.

Alternative #5 Estimated Costs

Capital Project Costs	Annual Operations & Maintenance Costs
>$7,000,000	*$8,264*

Alternative #5 Evaluation Summary

Pros	Cons
• Improves Chorro Valley's ability to obtain water during drought conditions and other emergencies • Nacimiento Water in excess of 6000 AFY is available (and not already considered in drought planning; this would be "new" water)	• Substantial environmental impacts due to pipeline construction over environmentally sensitive areas • High capital costs No increase in benefits from the proposed project

1.29.4.6 Proposed Project – Nacimiento-Salinas-California Men's Colony Water Treatment Plant Emergency Intertie

The proposed project includes construction of water system improvements to connect the Chorro Valley Facilities to the Nacimiento Reservoir via an intertie of the Nacimiento Pipeline with the Salinas Pipeline. The Salinas Pipeline would also have to be extended to reach the California Men's Colony Water Treatment Plant. The tables below present an estimated project cost summary and a pros and cons analysis of the alternative.

Proposed Project Estimated Costs

Capital Project Costs	Annual Operations & Maintenance Costs
$4,077,710	*$8,264*

Proposed Project Evaluation Summary

Pros	Cons
• Improves Chorro Valley's ability to obtain water during drought conditions and other emergencies • Nacimiento Water in excess of 6000 AFY is available (and not already considered in drought planning; this would be "new" water) • Low annual maintenance costs • Reasonable capital project costs	• None

1.29.5 Without Project Conditions

Without the proposed intertie project, the Chorro Valley facilities are at risk of losing their main water supply if drought conditions continue. Chorro Reservoir water and groundwater are not enough to supply for the needs of the Chorro Valley facilities. Additionally, these facilities are already using minimal water supplies, at 70 gallons-per-person-per day. There are few additional water conservation measures available.

Furthermore, the need for water in these communities could be considered more critical than for other communities in similar situations. The Chorro Valley facilities include a state prison, county jail, community college, National Guard facility, and County Operations Center. While it is possible for residential communities to move to an area where water is more abundant if a significant drought warrants that, the displacement of the Chorro Valley facilities is much harder and quite costly. Thus, an additional water source is needed.

1.29.6 Potential Adverse Effects

There are no major adverse effects expected with the implementation of this project only temporary construction related impacts that can be mitigated.

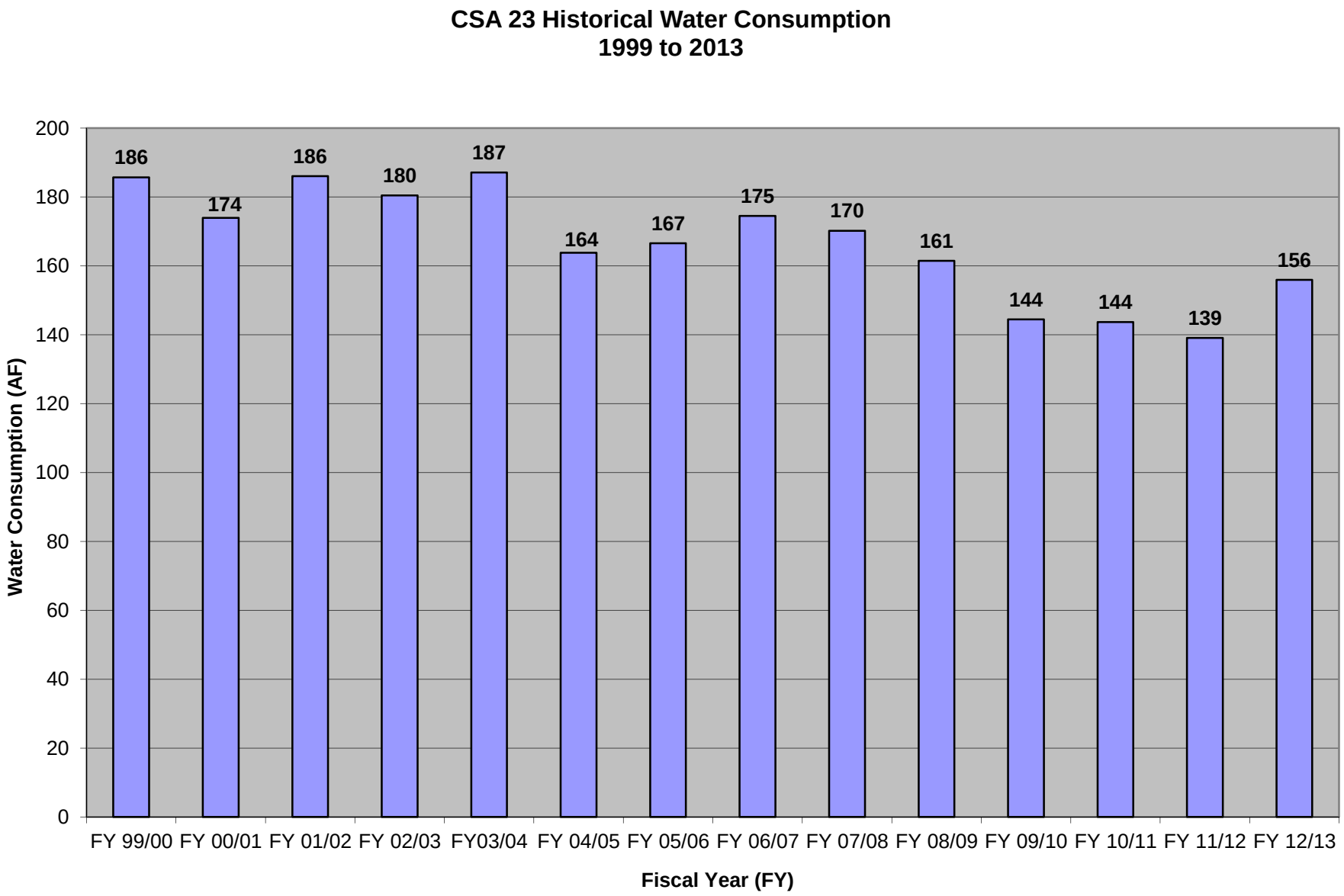
1.30 Cost Effectiveness Analysis

SLO County has pursued available alternatives to the proposed Project. The four alternatives along with the proposed project are listed in Table 6-5.

Table 6 – Cost Effective Analysis **Project name: Project 5 Nacimiento-Salinas-California Men's Colony (CMC) Water Treatment Plant Emergency Intertie**	
Question 1	**Types of benefits provided as shown in Table 5:** *Water Supply and Regional Flexibility*
Question 2	**Have alternative methods been considered to achieve the same types and amounts of physical benefits as the proposed project been identified?** *Yes*
	If no, why? *N/A*
	If yes, list the methods (including the proposed project) and estimated costs:

Table 6 – Cost Effective Analysis Project name: Project 5 Nacimiento-Salinas-California Men's Colony (CMC) Water Treatment Plant Emergency Intertie	
	Alternative 1: *Wheel water from Whale Rock Reservoirs (no cost determined because water is already fully subscribed and may not provide reliable supply)* ***Alternative 2:*** *Exchange water from a source other than Nacimiento Reservoir, such as Whale Rock or Santa margarita Reservoirs (no cost determined because water from these other sources are already designated for other drought planning scenarios)* ***Alternative 3:*** *Consolidate the Chorro Valley water system with other nearby systems (no cost determined because water from these other systems are already designated for other drought planning scenarios)* ***Alternative 4:*** *Truck water from outside sources during emergencies (no cost determined because only feasible for short term emergencies)* ***Alternative 5:*** *Extend the existing Nacimiento Water pipeline to reach the CMC Water Treatment Plant (Capital cost: >$7,000,000; Annual O&M costs: $8,264) Deemed infeasible due to its higher cost.* ***Proposed Project:*** *Construct an intertie between the Salinas Pipeline and the Nacimiento Pipeline to deliver Nacimiento Reservoir to the CMCWWTP for distribution to Chorro Valley Facilities (Capital cost: $4,077,710; Annual O&M costs: $8,264)*
Question 3	**If the proposed project is not the least cost alternative, why is it the preferred alternative? Provide an explanation of any accomplishments of the proposed project that are different from the alternative project or methods:** *N/A – The proposed project is the least cost alternative*

APPENDIX 3-1A – CSA 23 HISTORICAL WATER CONSUMPTION


CSA 23 Historical Water Consumption
1999 to 2013
Water Consumption (AF)
200
180
160
140
120
100
80
60
40
20
0
186
174
186
180
187
164
167
175
170
161
144
144
139
156
FY 99/00
FY 00/01
FY 01/02
FY 02/03
FY03/04
FY 04/05
FY 05/06
FY 06/07
FY 07/08
FY 08/09
FY 09/10
FY 10/11
FY 11/12
FY 12/13
Fiscal Year (FY)

APPENDIX 3-1B – SANTA MARGARITA EMERGENCY INTERTIE PROJECT PRELIMINARY PLANS

ROAD NO.	JOB NO.	SHEET NO.	TOTAL SHEETS
		1	7

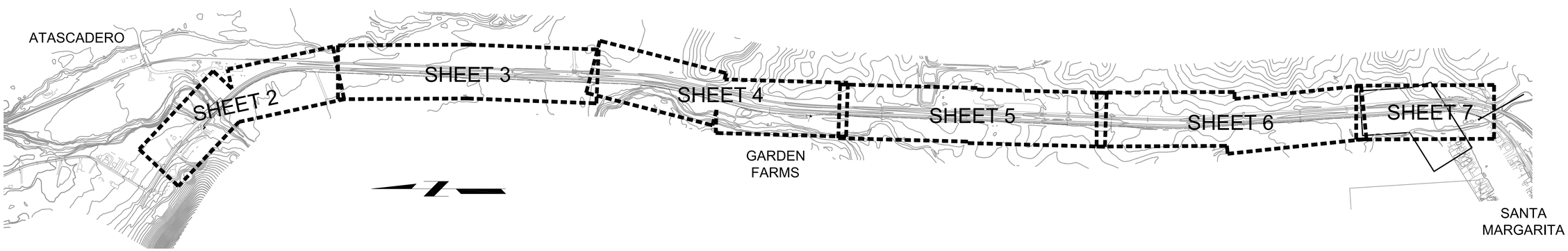
VICINITY MAP
N.T.S.

PRELIMINARY PLANS

SANTA MARGARITA EMERGENCY INTERTIE PROJECT

ATASCADERO MWC / GARDEN FARMS CWD EMERGENCY INTERTIE

COVER SHEET



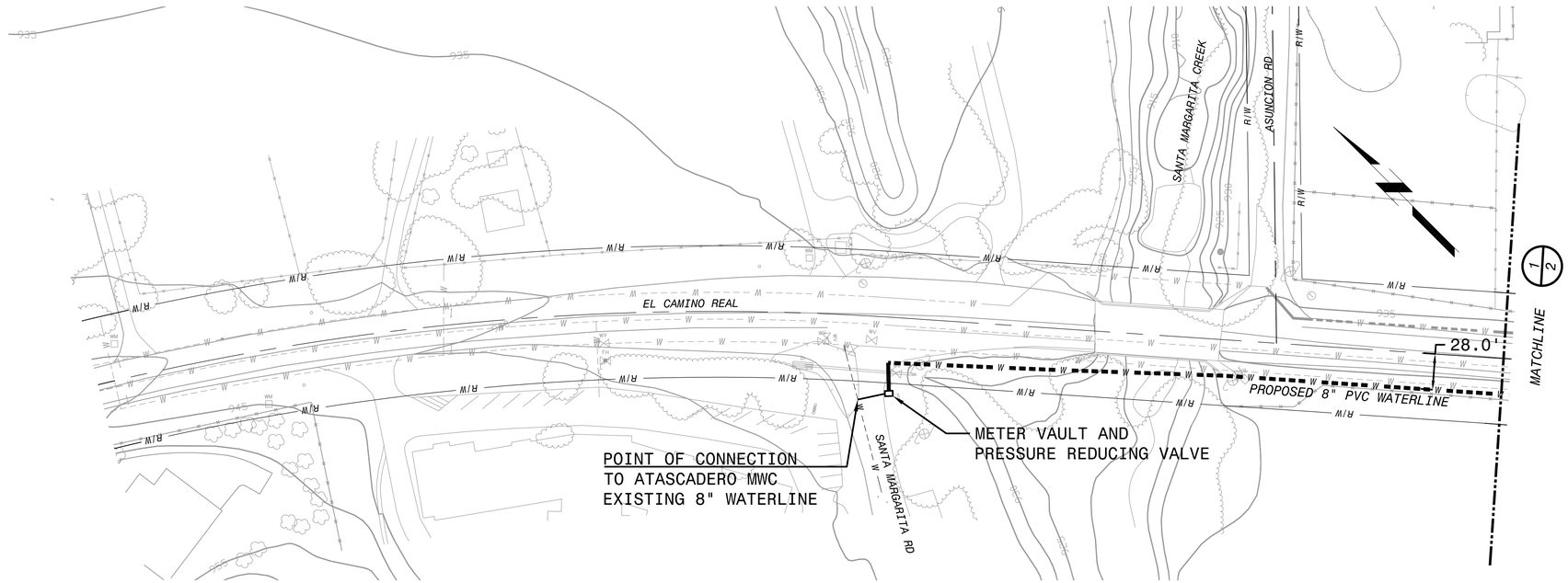
SCALE 1"=500'

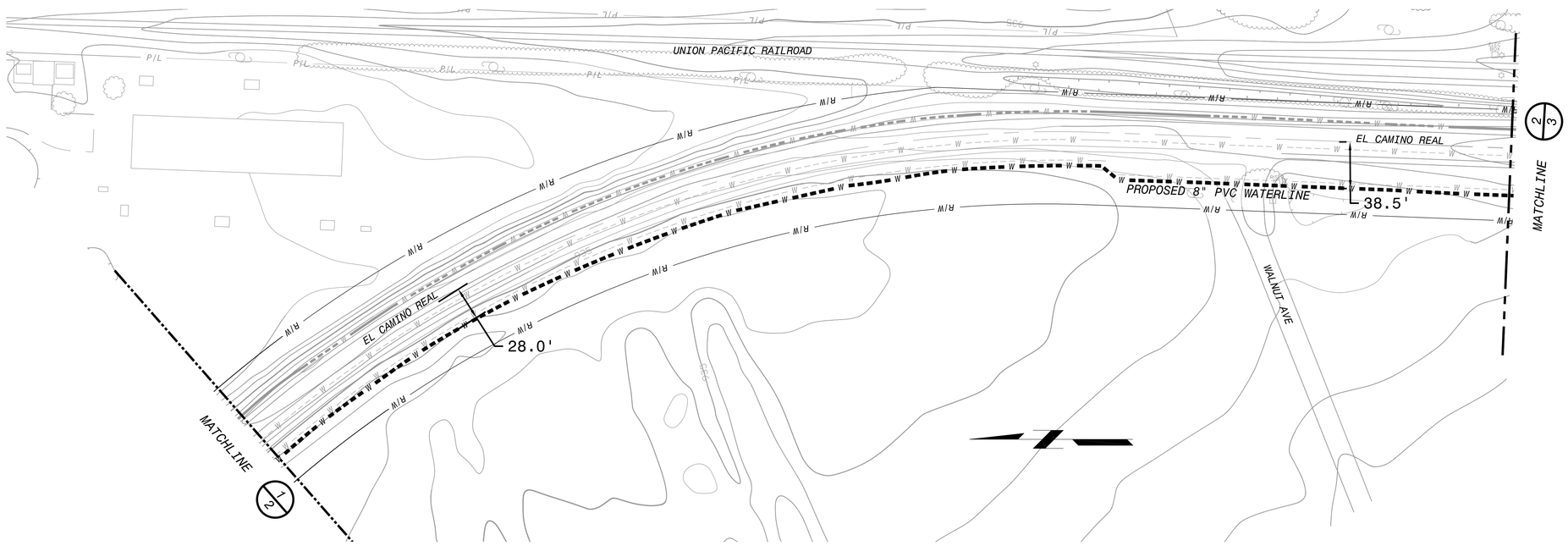
0 1 2 3
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS

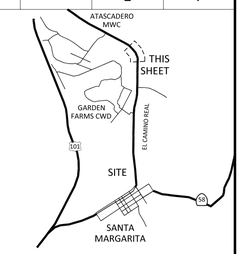
PRELIMINARY

Santa Margarita Emergency Intertie Project					
Atascadero MWC / Garden Farms CWD					
Emergency Intertie					
Designer	Date	Drawn By	Date	Design Engineer	Date
			AUG. 2012		

ROAD NO.	JOB NO.	SHEET NO.	TOTAL SHEETS
		2	7







VICINITY MAP

N.T.S.

PRELIMINARY

Santa Margarita Emergency Intertie Project

Atascadero MWC / Garden Farms CWD Intertie

Designer	Date	Drawn By	Date	Design Engineer	Date
			AUG. 2012		

SCALE 1"=50'

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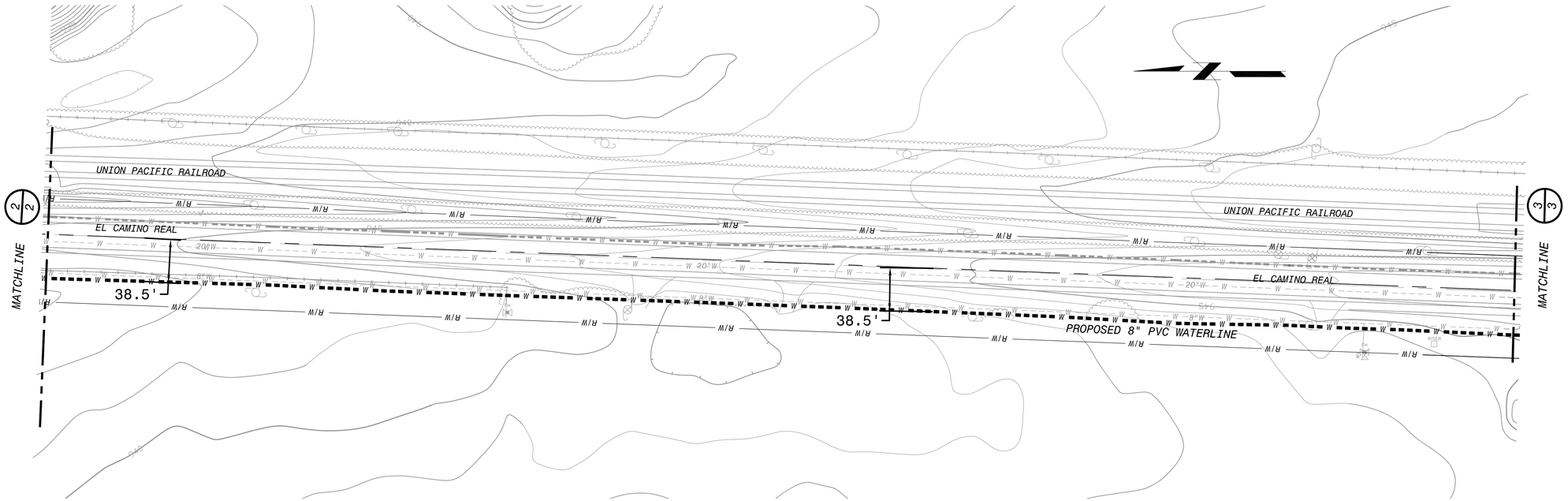
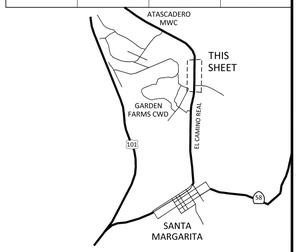
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS

ROAD NO.	JOB NO.	SHEET NO.	TOTAL SHEETS
		3	7





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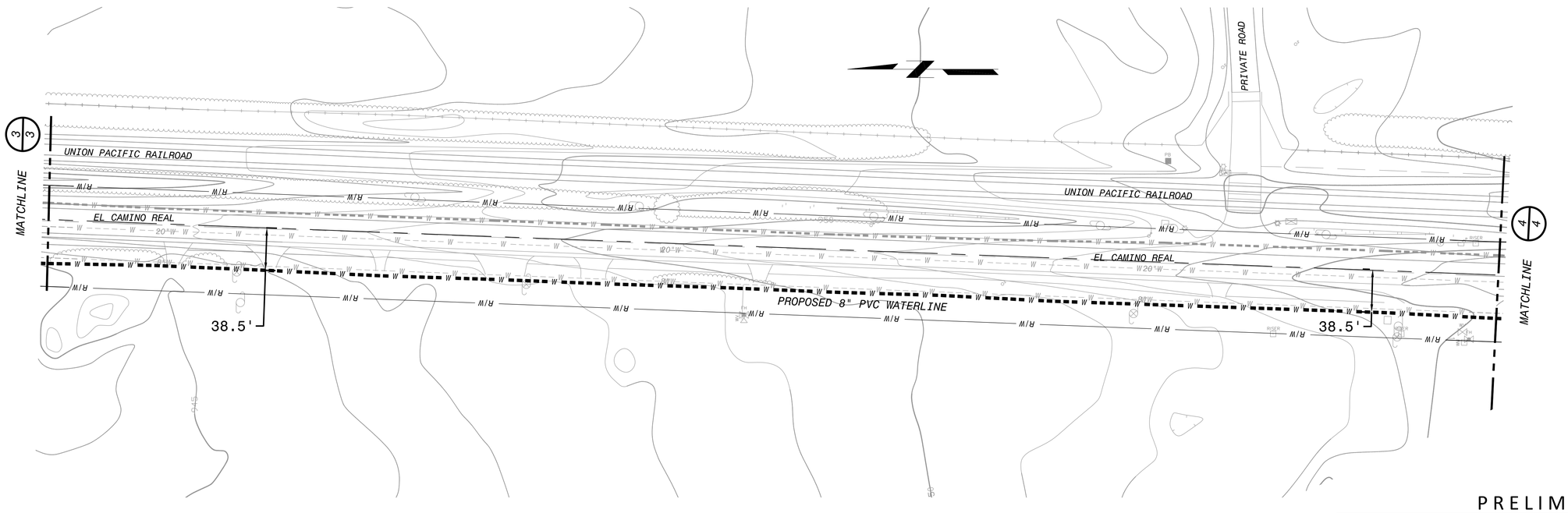
N.T.S.



PRELIMINARY

Santa Margarita Emergency Intertie Project

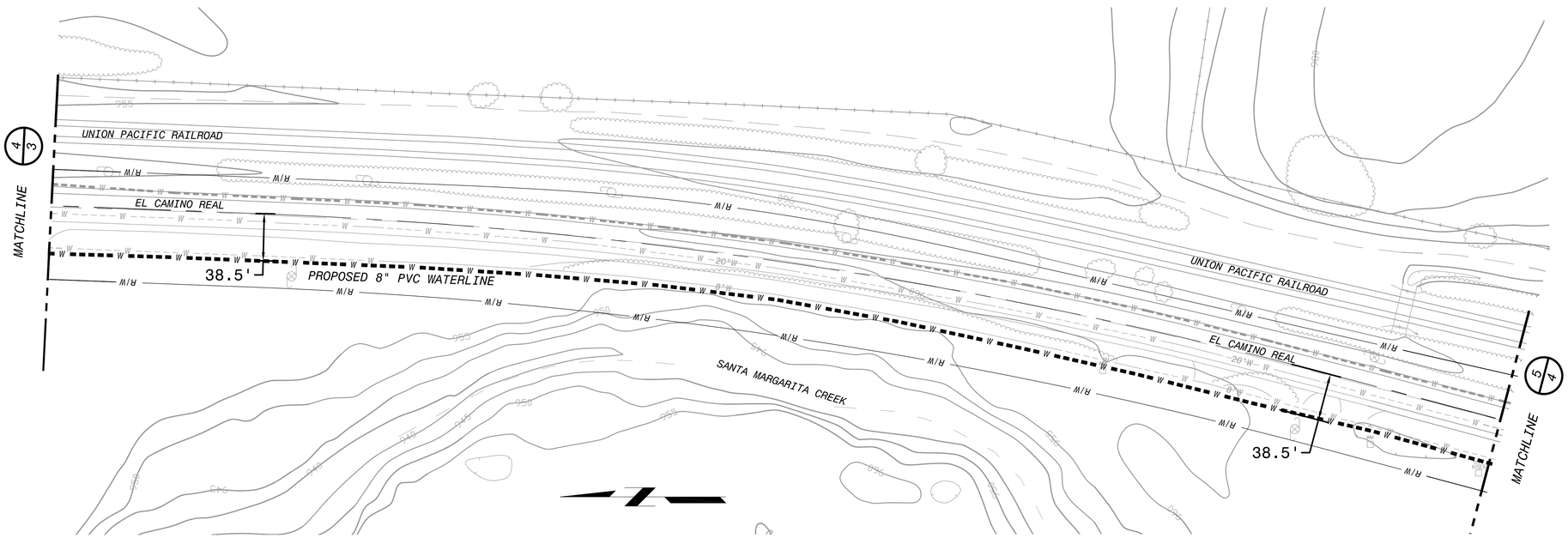
Atascadero MWC / Garden Farms CWD Intertie

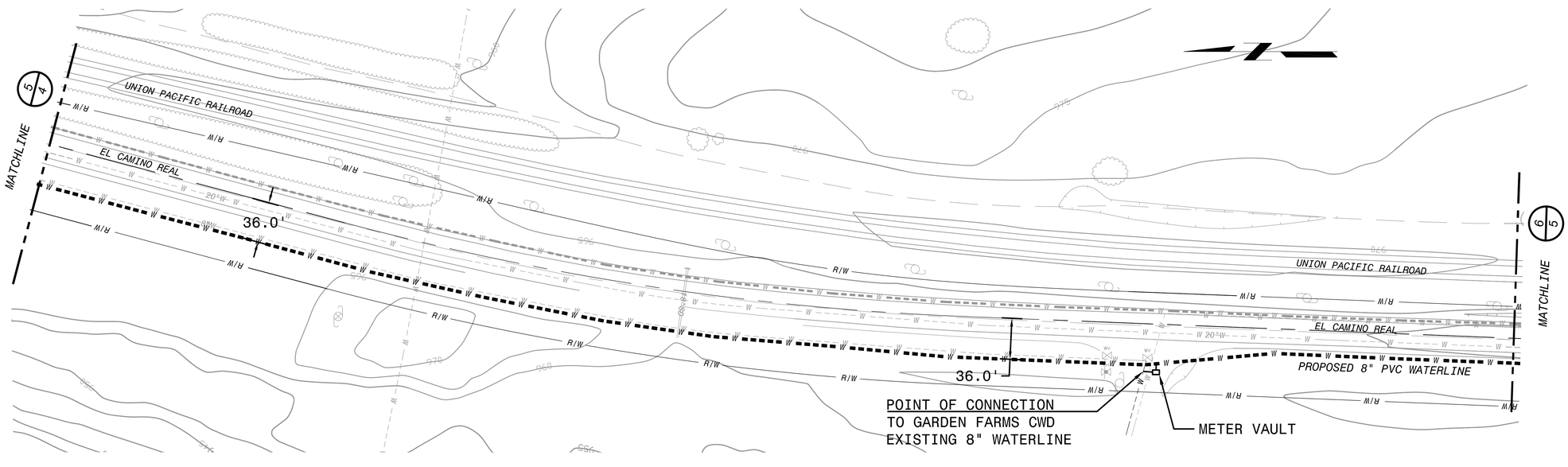
SCALE 1"=50'

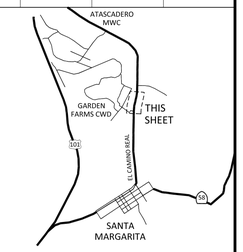
0 1 2 3
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS

Designer	Date	Drawn By	Date	Design Engineer	Date
			AUG. 2012		

ROAD NO.	JOB NO.	SHEET NO.	TOTAL SHEETS
		4	7







VICINITY MAP

N.T.S.

SCALE 1"=50'

0 1 2 3
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS

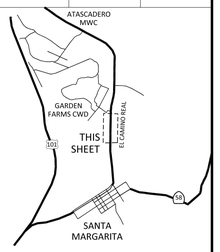
PRELIMINARY

Santa Margarita Emergency Intertie Project

Atascadero MWC / Garden Farms CWD Intertie

Designer	Date	Drawn By	Date	Design Engineer	Date
			AUG. 2012		

ROAD NO.	JOB NO.	SHEET NO.	TOTAL SHEETS
		5	7



VICINITY MAP

N.T.S.

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ORIGINAL SCALE IN INCHES FOR REDUCED PLANS

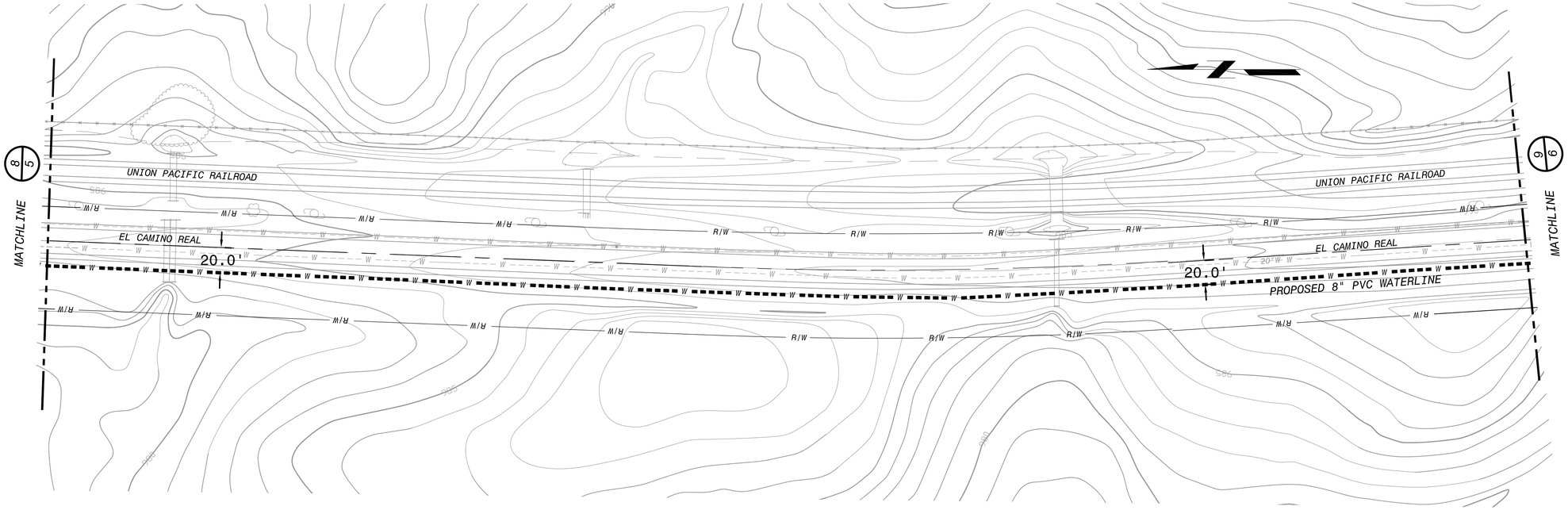
PRELIMINARY

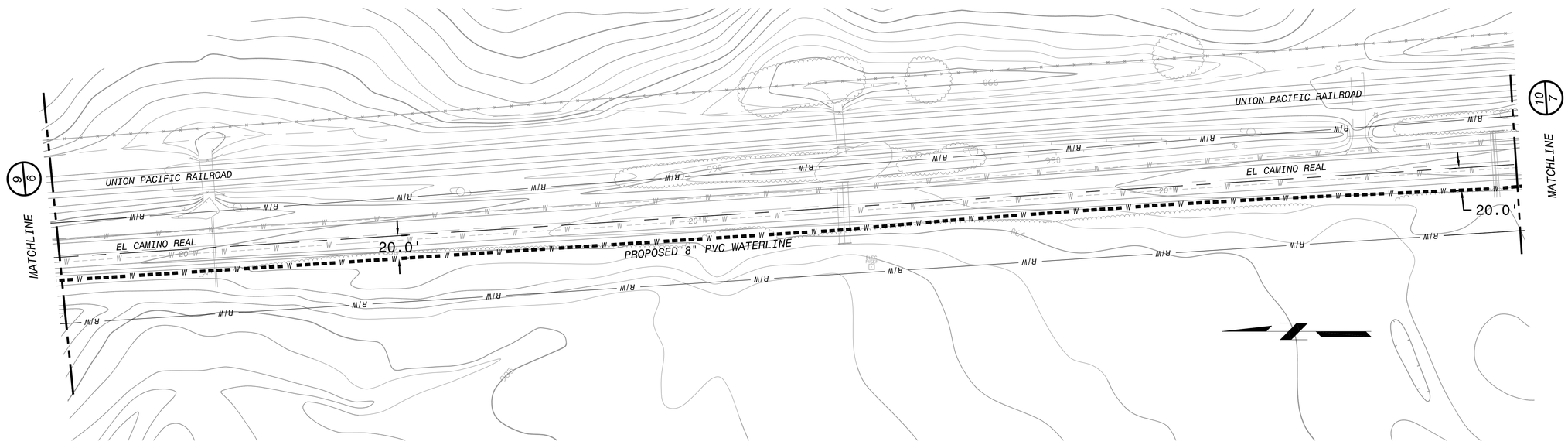
Santa Margarita Emergency Intertie Project

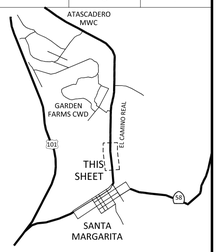
Atascadero MWC / Garden Farms CWD Intertie

Designer	Date	Drawn By	Date	Design Engineer	Date
			AUG. 2012		

ROAD NO.	JOB NO.	SHEET NO.	TOTAL SHEETS
		6	7







VICINITY MAP

N.T.S.

PRELIMINARY

Santa Margarita Emergency Intertie Project

Atascadero MWC / Garden Farms CWD Intertie

Designer	Date	Drawn By	Date	Design Engineer	Date
			AUG. 2012		

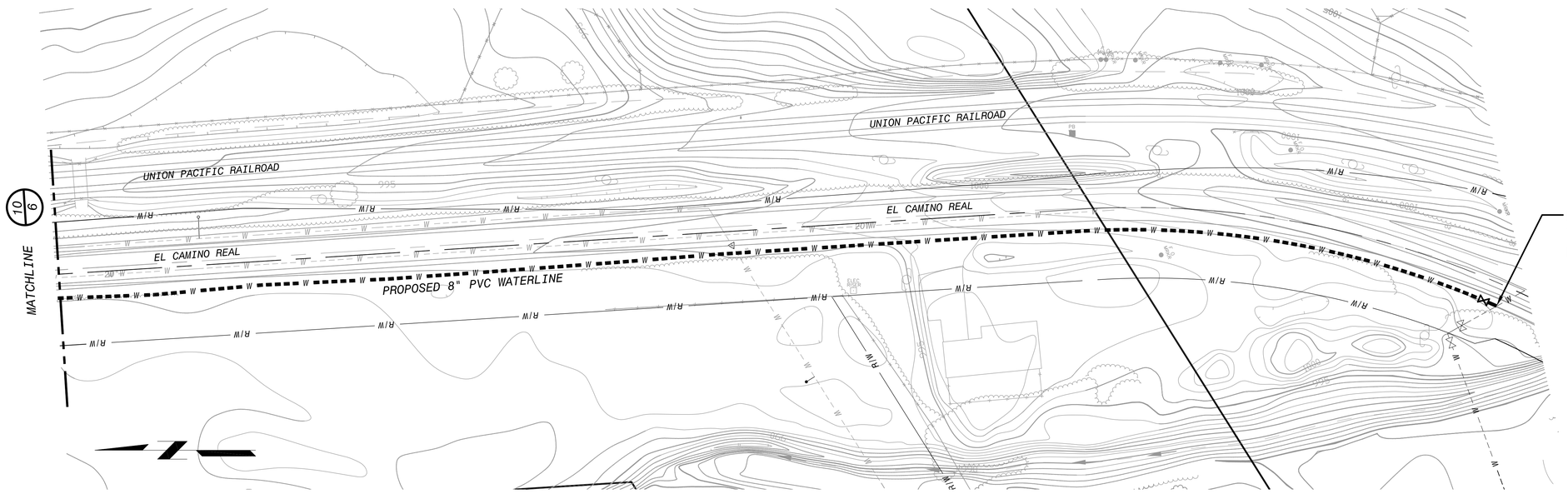
SCALE 1"=50'

0 1 2 3
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS

ROAD NO.	JOB NO.	SHEET NO.	TOTAL SHEETS
		7	7

VICINITY MAP

N.T.S.



POINT OF CONNECTION
TO SANTA MARGARITA
EXISTING 8" AC WATERLINE

SCALE 1"=50'

0 1 2 3
ORIGINAL SCALE IN INCHES FOR REDUCED PLANS

PRELIMINARY

Santa Margarita Emergency Intertie Project

Atascadero MWC / Garden Farms CWD Intertie

Designer	Date	Drawn By	Date	Design Engineer	Date
			AUG. 2012		

APPENDIX 3-1C – GFCWD AND AMWC SUPPORT LETTERS

Garden Farms Community Water District

Marcia Joyce, General Manager
17005 Walnut Avenue
Atascadero, CA 93422
805-438-3751
E-mail: manager@gfcwd.org

Board of Directors
John Billings, Chairman
John Pinson
Jay Jamison
Mike LaBarbera
Charron Sparks

June 11, 2014

Mr. Dean Benedix
San Luis Obispo County
Department of Public Works
County Government Center, Room 206
San Luis Obispo, CA 93408

Subject: 2014 IRWM Drought Solicitation Grant funded by Proposition 84

Dear Mr. Benedix:

At their meeting of June 11, 2014, the Garden Farms Community Water District (GFCWD) Board of Directors discussed the 2014 Integrated Regional Water Management (IRWM) Implementation Grant Program application that is currently being prepared by the County. The application will request funds for construction of a water intertie between the communities of Santa Margarita (CSA 23), Garden Farms and Atascadero for the purpose of providing immediate drought preparedness.

The GFCWD Board of Directors voiced unanimous support for the filing of the application, recognizing the significant benefits such a water intertie would provide in water surety and reliability to our District as well as our neighbors in Santa Margarita.

Actual participation in the water intertie project will be subject to GFCWD and the County being able to reach an acceptable agreement on the operation of the intertie and under what conditions water will be transferred between the participating communities.

We appreciate the County considering GFCWD for possible participation in this beneficial project.

Respectfully yours,

Marcia Joyce

Marcia Joyce

5005 EL CAMINO REAL • P.O. BOX 6075 • ATASCADERO, CA 93423 • (805) 466-2428

Atascadero Mutual Water Company

ESTABLISHED 1913

July 17, 2014

Mr. Dean Benedix
San Luis Obispo County
Department of Public Works
County Government Center, Room 206
San Luis Obispo, CA 93408

Subject: 2014 IRWM Drought Solicitation Grant funded by Proposition 84

Dear Mr. Benedix:

At its meeting of July 16, 2014, the Atascadero Mutual Water Company (AMWC) Board of Directors discussed the 2014 Integrated Regional Water Management (IRWM) Implementation Grant Program application that is currently being prepared by the County for the construction of a water intertie pipeline between the communities of Santa Margarita (CSA 23), Garden Farms, and Atascadero. The purpose of the intertie pipeline is to provide immediate drought preparedness for the participating communities.

The AMWC Board supported the filing of the application, recognizing the significant benefits such a water intertie pipeline would provide AMWC's shareholders and the communities of Garden Farms and Santa Margarita.

Actual participation in the water intertie pipeline project and its subsequent use will be subject to AMWC and the County being able to reach a mutually acceptable agreement on the operation of the interconnection. The agreement will need to specifically address the conditions under which water will be transferred between the participating communities, and account for the limitations AMWC has as a mutual water company in allowing the transfer of water from its service area.

We appreciate the County considering AMWC for possible participation in this beneficial project.

Respectfully yours,

John B. Neil
General Manager

APPENDIX 3-2A – 2008 HRCSD WATER MASTER PLAN

CHAPTER 2

STUDY AREA CHARACTERISTICS

This chapter describes the study area characteristics relevant to this water master plan for the District, including a description of the various land uses in the District, a definition of the District's boundary, existing and future population projections, and a summary of the anticipated growth rate within the District service area.

BACKGROUND

Heritage Ranch is located approximately 15 miles northwest of the City of Paso Robles, between the Salinas Valley and the Pacific Ocean. The District's service area encompasses 5,360 acres just east of Lake Nacimiento.

The Heritage Ranch Community Services District was formed in 1990 to oversee water and sewer services for the Heritage Ranch community. In subsequent years solid waste, parks and recreation, and gas station services were added to the District's functions. The Heritage Ranch Homeowners Association operates and maintains all other facilities.

LAND USE

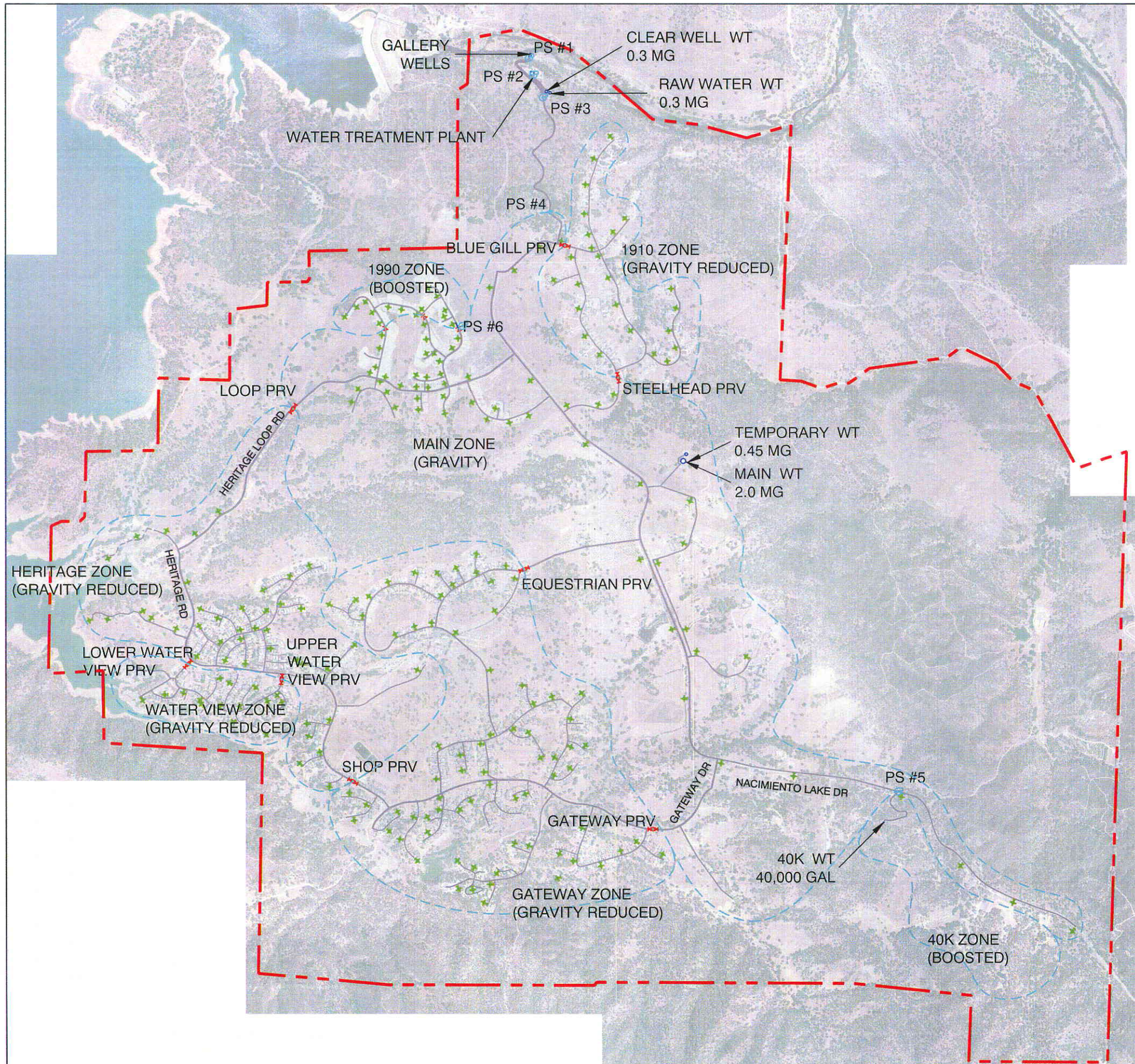
Heritage Ranch is an unincorporated community located in San Luis Obispo County, California on the east side of Lake Nacimiento. Land use at Heritage Ranch consists mostly of residential, recreational, and open space areas with some commercial and public facility areas including a country store, fire station, recreational complex, marina, campground, wilderness park, ballpark, church, gas station, equestrian center, and storage area for boats and trailers. Figure 2-1 illustrates the District's boundary.

POPULATION

Existing Population

As of 2005 the District was 58 percent developed leaving 1,209 lots undeveloped. A survey completed in 1981 showed that of the total 757 units built at that time, 220 lots, or percent of the units, were occupied seasonally. Of the existing 1,691 units within the District, the situation has reversed from 1981. According to the District, approximately 70 percent of the population is now considered full-time residents and only 30 percent are seasonal residents. Development at Heritage Ranch is comprised of single-family units, mobile homes, multi-family units, and recreational vehicles. It is expected that the population will continue to grow and shift with these trends.

Based on the 2000 California Census, the average household size for the Lake Nacimiento area, which includes Heritage Ranch is 2.4 persons per household. However, the District is mainly comprised of retired or part-time residents with some families. Based on District staff recommendation, it is estimated that the true household density for Heritage Ranch is 2.0 persons per household. The District currently serves approximately 1,750 services with an estimated population of 3,500 persons.



LEGEND

WATER TANK	WT	
PUMP STATION	PS #	
PRESSURE REDUCING VALVE	PRV	
FIRE HYDRANT	FH	
CHECK VALVE	CV	
WATERLINE		
PRESSURE ZONE BOUNDARY		
DISTRICT BOUNDARY		

WALLACE GROUP
CIVIL ENGINEERING
CONSTRUCTION MANAGEMENT
LANDSCAPE ARCHITECTURE
MECHANICAL ENGINEERING
PLANNING
PUBLIC WORKS ADMINISTRATION
SURVEYING / GIS SOLUTIONS
WATER RESOURCES
WALLACE SWANSON INTERNATIONAL
612 CLARION COURT
SAN LUIS OBISPO, CA 93401
T 805 544-4011 F 805 544-4294
www.wallacegroup.us

HERITAGE RANCH
COMMUNITY SERVICES DISTRICT
WATER SYSTEM LAYOUT
FIGURE 2-1

JOB No. :	160-001-605
DRAWING :	FIG 2-1
DRAWN BY:	MJB
DATE :	09-18-2008
SCALE :	1" = 2000'

N

GRAPHIC SCALE

0 1000 2000 4000

(IN FEET)

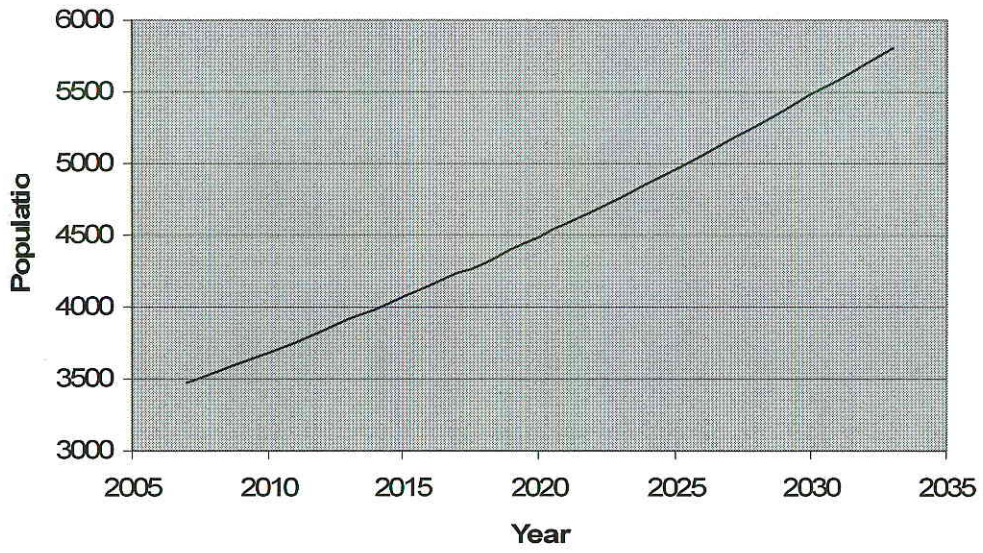
1 IN = 2000 FT

Build Out Population

The Adopted Specific Plan for the District, prepared in 1972 and revised in 1980, limited the total number of developable units to 4,000. In 2004, the maximum number of developable units was revised a second time to its current maximum value of 2,900 units. Residential units within the District consist of a combination of several housing tracts, custom homes, condominiums, mobile homes, and recreational trailers.

Based on the average household size of 2.0 persons per household, it is anticipated that the District's total build-out population will reach 5,800 persons. It is unknown exactly how long it will take the District to reach full build out. In the 1990s the District had very little growth. However, recently the District has experienced several years of rapid growth with the construction of two new tract developments. Due to the slow down in the housing market and economy, it is anticipated that growth will continue at a slower rate then seen in the recent past. Based on an average population growth rate of 2%, Figure 2-2 estimates that build-out will be reached in approximately 26 years.

Figure 2-2
Projected Population



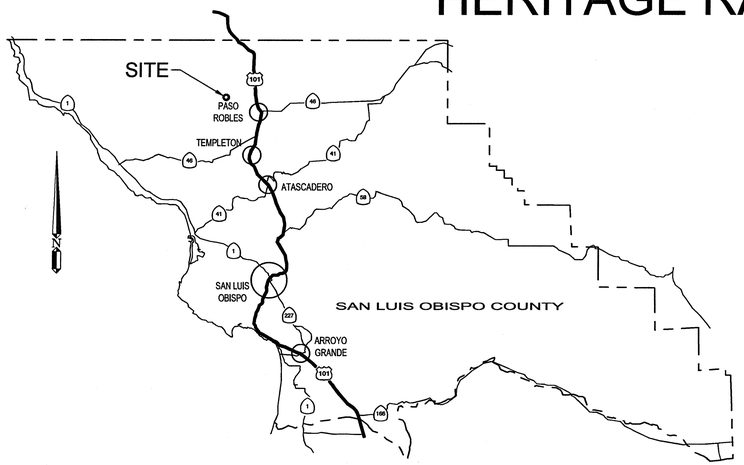
APPENDIX 3-2B – TURNOUT ON THE NACIMIENTO PIPELINE DESIGN PLANS

FILE NAME: WATER TURNOUT.DWG

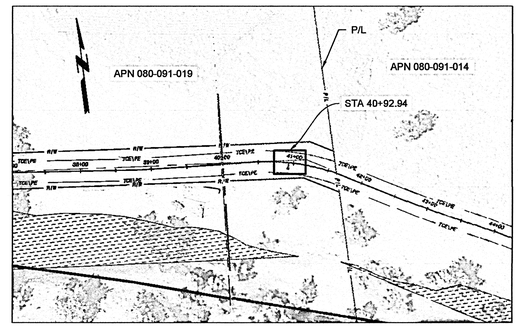
FOR REDUCED PLANS ORIGINAL SCALE IS IN INCHES 0 1 2 3

SAN LUIS OBISPO COUNTY FLOOD CONTROL & WATER DISTRICT
NACIMIENTO WATERLINE PROJECT EMERGENCY WATER TURNOUT
FOR THE
HERITAGE RANCH COMMUNITY SERVICES DISTRICT

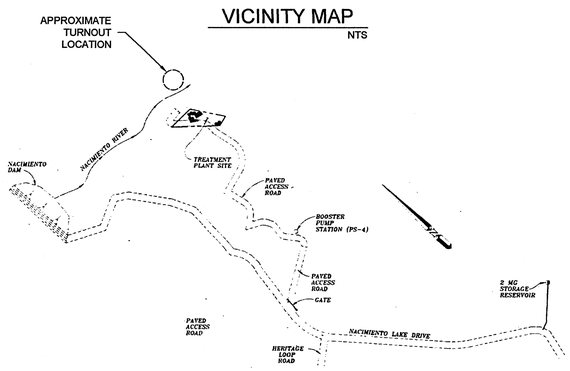
PASO ROBLES, CALIFORNIA



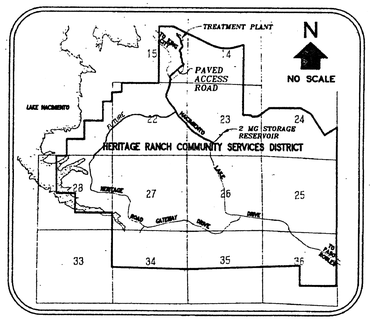
VICINITY MAP
NTS



PROJECT LOCATION
NTS



LOCATION MAP
NTS



HRCSD MAP
NTS

SHEET INDEX	
SHEET #	SHEET TITLE
1	COVER SHEET
2	TURNOUT DETAILS

PROJECT APPROVALS

APPROVED: March 3, 2014
STEVEN G. TANAKA, RCE 49779
HRCSD DISTRICT ENGINEER

APPROVED: June 16, 2014
Dave Flynn
DEPUTY DIRECTOR OF PUBLIC WORKS

APPROVED: 6/11, 2014
UTILITY DIVISION MANAGER

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REGISTERED PROFESSIONAL ENGINEER STEVEN G. TANAKA No. 49779 CIVIL STATE OF CALIFORNIA
SIGNATURE
3-3-14
DATE SIGNED

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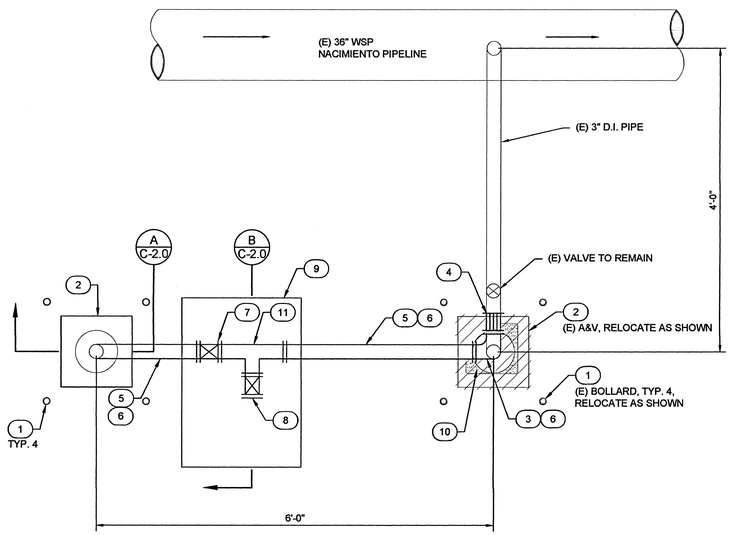
COVER SHEET
NACIMIENTO PIPELINE EMERGENCY WATER TURNOUT FOR
HERITAGE RANCH COMMUNITY SERVICE DISTRICT

JOB #: 0160-0001
DESIGNERS: SGT
DRAWN BY: GC
DATE: 3/4/2014

DRAWING NO.
C-1.0
1 OF 2 SHEETS

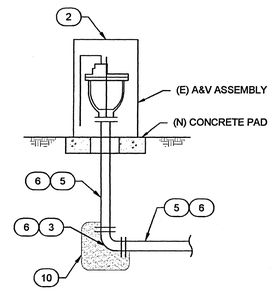
FILE NAME: WATER TURNOUT.DWG

FOR REDUCED PLANS
ORIGINAL SCALE IS IN INCHES 0 1 2 3



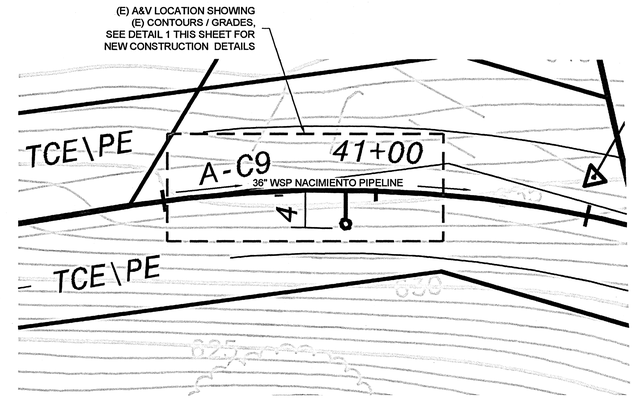
1 HRCSD TURNOUT PLAN

NTS



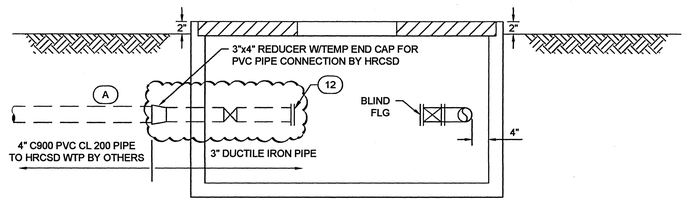
A A&V SECTION

NTS



TURNOUT PART PLAN

NTS



A. HRCSD TO PROVIDE METER, PIPE EXTENSION TO ACCOMMODATE METER MFG STRAIGHT PIPE RUN REQUIREMENT, AT TIME EMERGENCY WATER IS NEEDED.

B VAULT SECTION

NTS

REFERENCE NOTES:

1	RELOCATE EXISTING BOLLARDS TO NEW A&V CAN LOCATION AS SHOWN. REMOVE EXISTING CONCRETE FOOTINGS. POUR NEW CONCRETE FOOTINGS PER DETAIL CO25 TO SET BOLLARDS. PROTECT EXISTING BOLLARD COATINGS IN PLACE.
2	RELOCATE EXISTING A&V CAN ASSEMBLY TO NEW LOCATION SHOWN. REMOVE CONCRETE PAD, POUR NEW CONCRETE PAD PER DETAIL C037.
3	3" DIAMETER DUCTILE IRON 90 DEGREE ELBOW, FLG X FLG.
4	CUT (E) DUCTILE IRON PIPE AT THIS LOCATION, PROVIDE 3" RESTRAINED FLANGE COUPLING ADAPTER (RFCA), DUCTILE IRON AND T-BOLTS PER AWWA C111, STAINLESS STEEL. NSF 61 CERTIFIED FUSION BONDED EPOXY COATING.
5	3" DIAMETER DUCTILE IRON SPOOL, FLG X FLG, DIMENSION TO FIT PLAN LAYOUT.
6	NEW BURIED DUCTILE IRON PIPE AND FITTINGS, COATINGS AND TAPE PER NOTES 1 AND 2, DETAIL TO-001.
7	3" ISOLATION GATE VALVE INSTALLED WTIHIN VAULT, TYP 2.
8	3" BLIND FLANGE FOR FUTURE CONNECTION TO WATER METER.
9	17-1/8" x 30-1/4" CONCRETE UTILITY BOX, N36 UTILITY BOX, CHRISTY/OLDCASTLE PRECAST OR APPROVED EQUAL, WITH BOLT-DOWN VANDAL PROOF LID, SET VAULT LEVEL, WITH LID 2" ABOVE EXISTING/FINISHED GRADE.
10	CONCRETE THRUST ANCHOR BLOCK, 2 SF BEARING AREA, 2,500 PSI MIN. STRENGTH CONCRETE.
11	3" DUCTILE IRON TEE, FLG X FLG.
12	AT TIME OF USE, PROVIDE INSULATING FLANGE KIT FOR DIELECTRIC SEPARATION BETWEEN HRCSD DISCHARGE PIPING, AND TURNOUT/METER ASSEMBLY. WATER METER SHALL BE A SAN LUIS OBISPO COUNTY APPROVED WATER METER.

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REGISTERED PROFESSIONAL ENGINEER
STEVEN G. TAMAKI
No. 49779
CIVIL
STATE OF CALIFORNIA

SIGNATURE

7-3-14
DATE SIGNED

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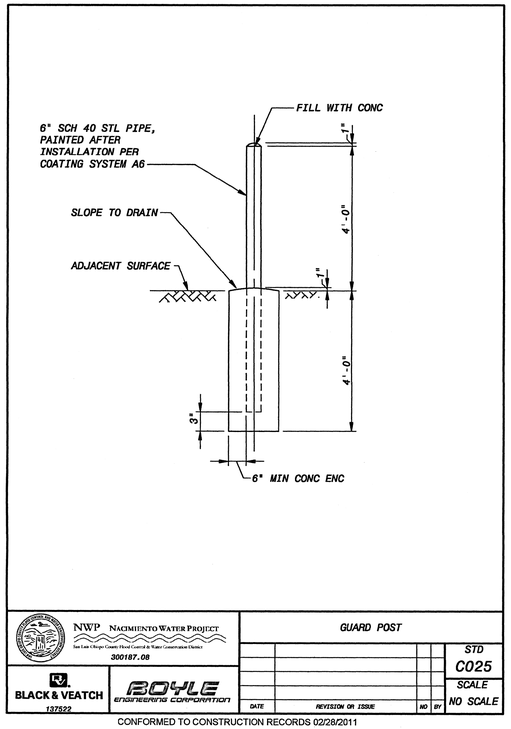
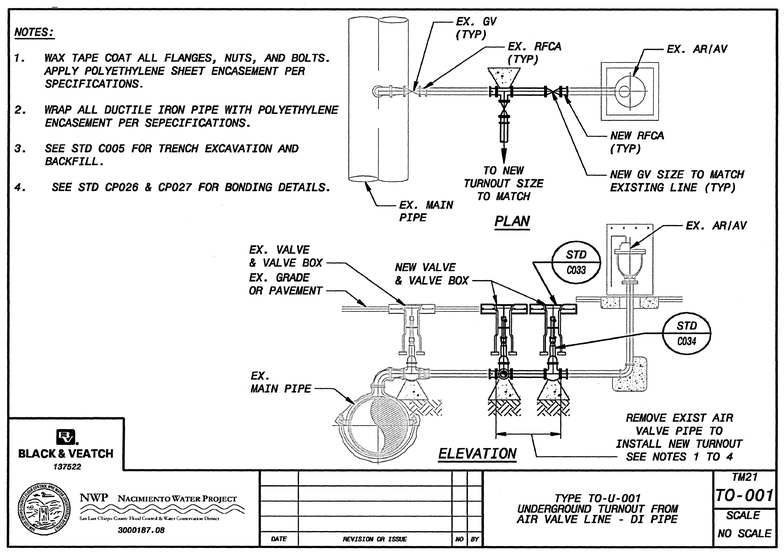


CONFORMED TO CONSTRUCTION RECORDS 02/28/2011

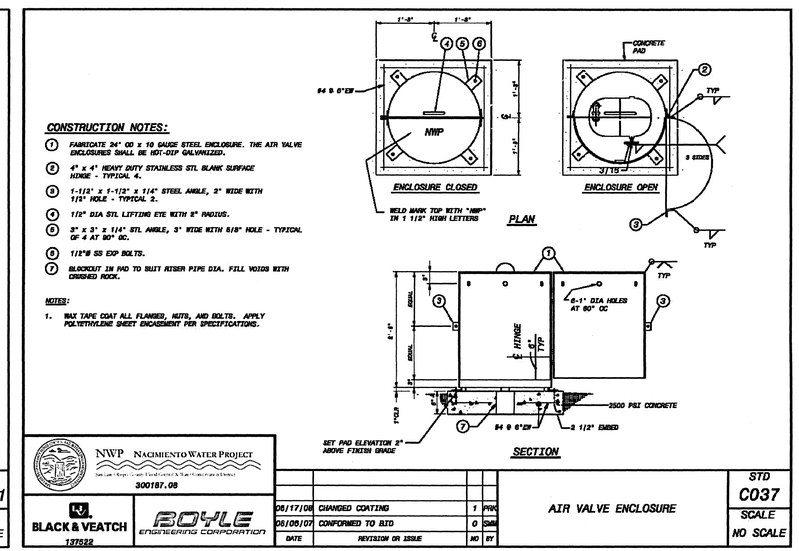
2 GUARD POST

NTS



3 UNDERGROUND TURNOUT FROM A/V LINE - REFERENCE ONLY

NTS



CONFORMED TO CONSTRUCTION RECORDS 02/28/2011

4 AIR VALVE ENCLOSURE

NTS

TURNOUT DETAILS
NACIMIENTO PIPELINE EMERGENCY WATER TURNOUT FOR HERITAGE RANCH COMMUNITY SERVICES DISTRICT

JOB #: 0160-0001
DESIGNERS: SGT
DRAWN BY: GC
DATE: 3/4/2014

DRAWING NO.
C-2.0
2 OF 2 SHEETS

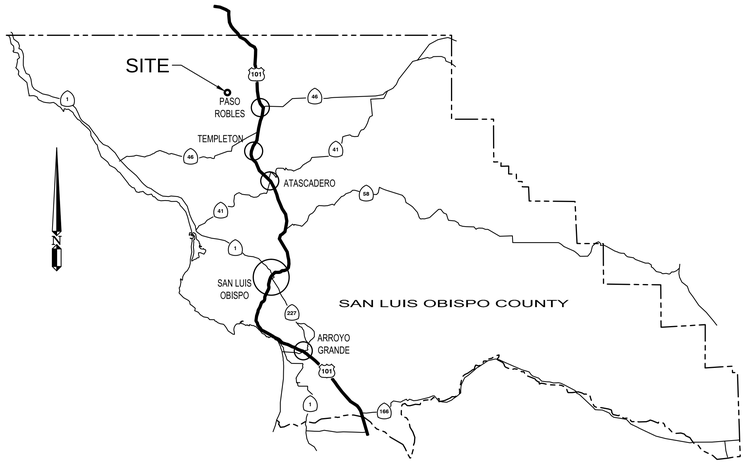
APPENDIX 3-2C – PIPELINE CROSSING NACIMIENTO RIVER 50% DESIGN PLANS

FILE NAME: 0160-067 - RIVER CROSSING.DWG

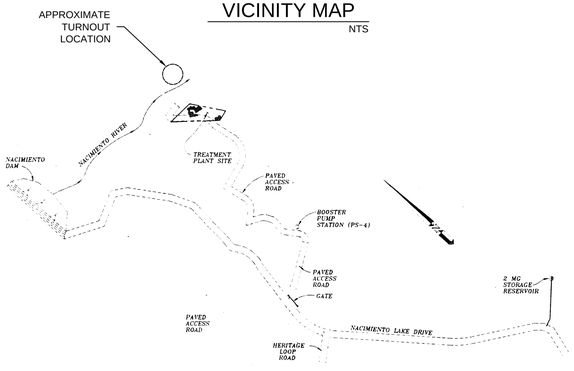
FOR REDUCED PLANS
ORIGINAL SCALE IS IN INCHES

SAN LUIS OBISPO COUNTY FLOOD CONTROL & WATER DISTRICT
EMERGENCY TURNOUT PIPELINE EXTENSION TO WTP FOR THE HERITAGE RANCH COMMUNITY SERVICES DISTRICT

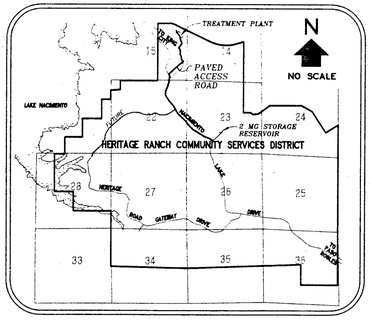
PASO ROBLES, CALIFORNIA



VICINITY MAP
NTS



LOCATION MAP
NTS



HRCSD MAP
NTS

PROJECT LOCATION MAP
NTS

SHEET INDEX	
SHEET #	SHEET TITLE
C-1.0	COVER SHEET
C-2.0	PLAN AND PROFILE
C-3.0	DETAIL SHEET

PROJECT APPROVALS

APPROVED: _____, 20_____

STEVEN G. TANAKA, RCE 49779
HRCSD DISTRICT ENGINEER

APPROVED: _____, 20_____

DEPUTY DIRECTOR OF PUBLIC WORKS

APPROVED: _____, 20_____

UTILITY DIVISION MANAGER

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STEVEN G. TANAKA
No. 49779
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SIGNATURE

DATE SIGNED

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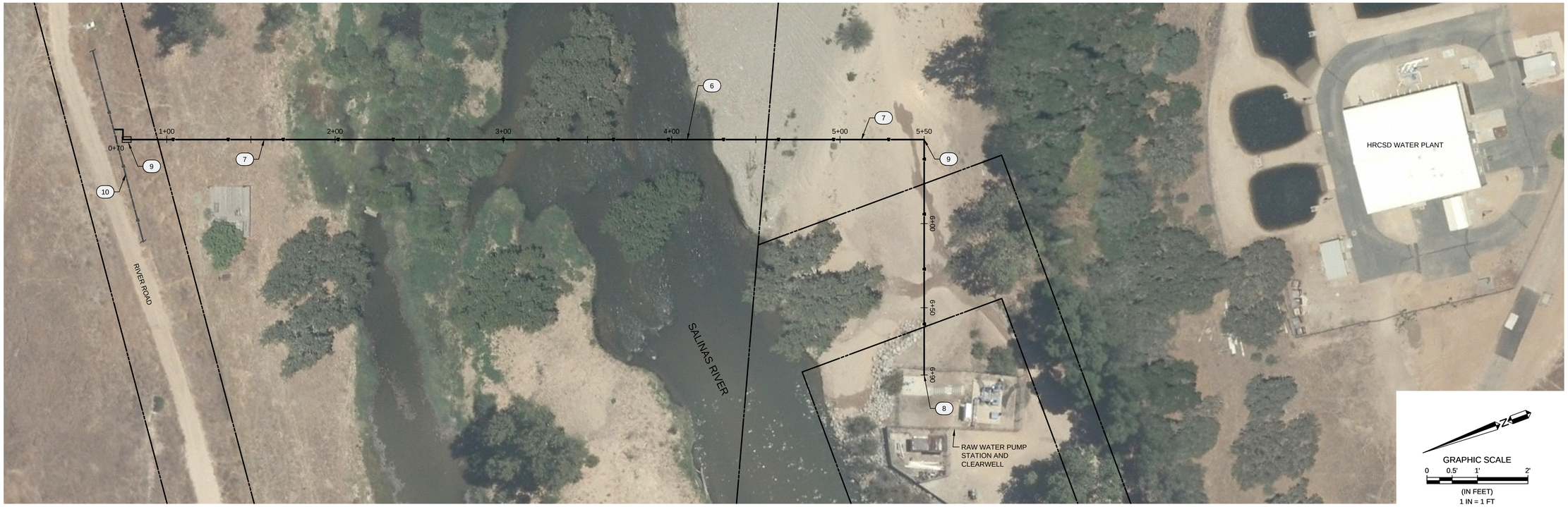
COVER SHEET
EMERGENCY TURNOUT PIPELINE EXTENSION TO WTP
HERITAGE RANCH COMMUNITY SERVICES DISTRICT

JOB #: 0160-0001-00
DESIGNERS: SGT
DRAWN BY: JSW
DATE: 5/21/2014

DRAWING NO.
C-1.0
1 OF 3 SHEETS

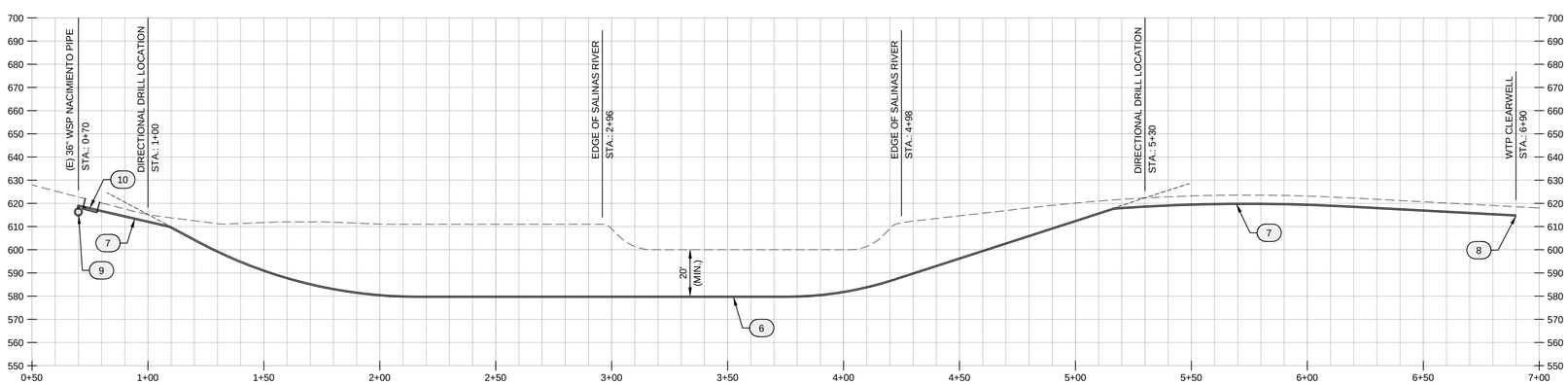
FILE NAME: 0160-067 - RIVER CROSSING.DWG

FOR REDUCED PLANS
ORIGINAL SCALE IS IN INCHES



PLAN

SCALE: 1" = 30'



PLAN

SCALE: HORIZONTAL 1" = 30' VERTICAL 1" = 30'

CONSTRUCTION NOTES:

XXX	DESCRIPTION
1	UNLESS OTHERWISE SHOWN OR SPECIFIED, ALL PIPE MINIMUM COVER SHALL BE 3 FEET.
2	HDPE PIPE SHALL BE PRESSURE CLASS 250 (DR 9) UNLESS OTHERWISE SPECIFIED.
3	COMPLY WITH ALL ENVIRONMENTAL PERMIT REQUIREMENTS AND "FRAC-OUT" PLAN.
4	PROTECT EXISTING UTILITIES IN PLACE UNLESS OTHERWISE SHOWN OR SPECIFIED.
5	FOR WORK ON PRIVATE PROPERTY, NOTIFY DISTRICT A MINIMUM OF 72 HOURS IN ADVANCE OF WORK, TO ALLOW DISTRICT TIME TO NOTICE PROPERTY OWNER OF WORK.
6	6" DIAMETER HDPE PIPE, HORIZONTAL DIRECTION DRILL BELOW SALINAS RIVER. MINIMUM CLEARANCE BELOW RIVER BED SHALL BE 20 FEET. DO NOT EXCEED PIPE BENDING RADIUS RECOMMENDED BY PIPE MANUFACTURER.
7	6" DIAMETER HDPE PIPE, TRENCH INSTALLATION. TRENCH BACKFILL PER TRENCH DETAIL, DETAIL U-4A, SHEET C-3.0. ALL PIPE INSTALLED BY TRENCHING SHALL BE PROVIDED WITH TRACER WIRE PER TRENCH DETAIL U-4A, SHEET C-3.0.
8	CONNECT 6" HDPE PIPE TO EXISTING WTP CLEARWELL.
9	90 DEGREE HORIZONTAL FITTING.
10	(E) 36" DIAMETER WSP NACIMIENTO PIPELINE.
11	METER CONNECTION AT HRCSD TURNOUT PER TURNOUT PLAN, DETAIL 1, SHEET C-3.0.

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SIGNATURE

DATE SIGNED

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PLAN AND PROFILE
EMERGENCY TURNOUT PIPELINE EXTENSION TO WTP
HERITAGE RANCH COMMUNITY SERVICES DISTRICT

JOB #: 0160-0001-00
DESIGNERS: SGT
DRAWN BY: JSW
DATE: 5/21/2014

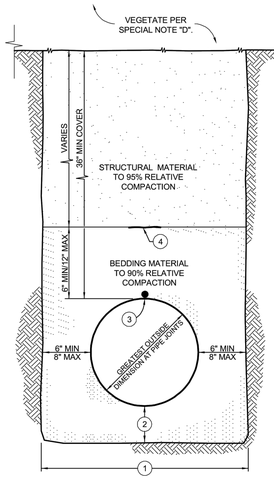
DRAWING NO.

C-2.0

FOR REDUCED PLANS
ORIGINAL SCALE IS IN INCHES 0 1 2 3

Revisions

Description	Approved	Date	Description	Approved	Date
LOCATION OF DETECTOR WIRE & TAPE, NOTES 3 & 4	REM	NOV 07	PIPE COVER	GDM	JAN 11
REMOVE "SEWER" FROM NOTE 3	GDM	NOV 08			



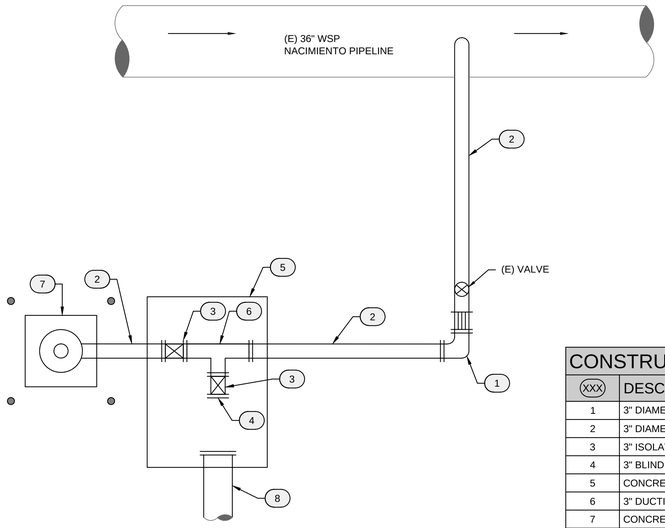
NOTES:
1. TRENCH WIDTH SHALL BE PIPE DIAMETER PLUS 12" (6" EACH SIDE OF PIPE) FOR PIPES 36" DIAMETER OR LESS, AND PIPE DIAMETER PLUS 16" (8" EACH SIDE) FOR PIPE DIAMETERS GREATER THAN 36".
2. BEDDING MEASUREMENT IS 6" BELOW GREATEST OUTSIDE DIMENSION AT PIPE JOINTS. PIPE SHALL BE BACKFILLED TO THE SPRING LINE AND COMPACTED TO 90% PRIOR TO COMPLETING INITIAL BACKFILL.
3. FOR WATER, 14-GAUGE INSULATED COPPER TRACER WIRE SHALL BE LAID ATOP ALL PIPES AND SERVICE LATERALS.
4. FOR WATER AND SEWER, 3" WIDE POLYETHYLENE NON-DETECTABLE TAPE MARKED AND COLOR CODED PER THE DESIGN STANDARDS SHALL BE BURIED IN THE TRENCH 12-INCHES ABOVE ALL PIPES AND LATERALS.
5. REFER TO STANDARD DRAWINGS U-3 TO U-3b FOR ADDITIONAL REQUIREMENTS FOR WATER AND SEWER TRENCHES.

SPECIAL NOTES:
A. SPECIAL CONSIDERATION SHALL BE TAKEN BY THE DESIGNER TO ENSURE SURFACE DRAINAGE WILL NOT ENTER THE TRENCH.
B. WHEN TRENCHING ON STEEP SLOPES, CUT-OFF WALLS AND/OR PIPE ANCHORS MAY BE REQUIRED BY THE DEPARTMENT AND SHALL BE DETAILED ON THE PLANS.
C. TRENCHING ALIGNMENT SHALL BE DESIGNED TO AVOID DAMAGE TO EXISTING TREES AND THEIR ROOT SYSTEMS. WHEN ADJACENT TO TREES THEN THE TRENCHING RECOMMENDATIONS OF THE PROJECT BOTANIST SHALL BE FOLLOWED.
D. THE UPPER SURFACE SHALL BE SCARIFIED AND REVEGETATED. VEGETATIVE COVER SHALL BE ESTABLISHED PRIOR TO ACCEPTANCE OF WORK.

BEDDING MATERIAL		STRUCTURAL MATERIAL	
SIEVE SIZES	PERCENT PASSING	SIEVE SIZES	PERCENT PASSING
1"	100%	3"	100%
No. 4	80% - 100%	No. 4	35% - 100%
No. 200	0% - 15%	No. 30	20% - 100%

DEPARTMENT OF PUBLIC WORKS & TRANSPORTATION
TRENCH DETAIL
OUTSIDE ROADWAY PRISM

Scale: NTS | Adopted: 2011
Drawing No: U-4a
Sheet No: 1 OF 1



CONSTRUCTION NOTES:

XXX	DESCRIPTION
1	3" DIAMETER DUCTILE IRON 90 DEGREE ELBOW, FLG. X FLG.
2	3" DIAMETER DUCTILE IRON PIPE
3	3" ISOLATION GATE VALVE
4	3" BLIND FLANGE FOR FUTURE CONNECTION TO WATER METER.
5	CONCRETE UTILITY BOX
6	3" DUCTILE IRON TEE
7	CONCRETE THRUST ANCHOR BLOCK
8	6" DIAMETER HDPE PIPE WITH 6" BLIND FLANGE FOR FUTURE CONNECTION

1 TURNOUT PLAN

NTS

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SIGNATURE

DATE SIGNED

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DETAIL SHEET
EMERGENCY TURNOUT PIPELINE EXTENSION TO WTP
HERITAGE RANCH COMMUNITY SERVICES DISTRICT

JOB #: 0160-0001-00
DESIGNERS: SGT
DRAWN BY: JSW
DATE: 5/21/2014

DRAWING NO.
C-3.0
3 OF 3 SHEETS

APPENDIX 3-2D – CONTRACT OF SERVICES BETWEEN SWCA AND HRCSD

SWCA®
ENVIRONMENTAL CONSULTANTS

SERVICES AGREEMENT

San Luis Obispo Office
1422 Monterey Street, C200
San Luis Obispo, California 93401
Tel 805.543.7095 Fax 805.543.2367
Tax I.D. Number 860483317

Project Title: Heritage Ranch CSD Emergency Pipeline Tie-in Project

Project Number: P29580 **Date:** May 2, 2014

Company Name: General Manager

Client Contact Person: John D'Ornellas **State of Incorporation/Organization:** Ca

Street Address or P.O. Box: 4870 Heritage Ranch CSD

City: Paso Robles **State:** Ca **Zip:** 93446

Telephone No: 805-227-6230 **Fax No:**

SWCA Project Manager: Jon Claxton

Scope of Services (check one):

☒ Services to be performed are: Botanical Surveyt

☐ Scope of services is described in a separate document prepared or approved by SWCA (such document is incorporated herein and may be attached).

Fees for SWCA Services (check one):

☐ $ on a Fixed Fee basis.

☐ Time and Materials basis*

☒ Time and Materials basis* not-to-exceed (NTE) $1,000

*SWCA rate schedule to be attached for Time and Materials/NTE contracts

---

Reimbursement of Other Direct Costs (ODCs) (check one):

☒ ODCs are included in Professional Services Fees.

☐ ODCs not to exceed $ without Client approval.

Retainer: A retainer of $0.00 must be received by , 20 . SWCA may delay work until receipt of retainer. Retainer will be applied to fees/costs incurred. SWCA reserves right to apply retainer to final invoice.

Payment Terms: Unless otherwise agreed to in writing by SWCA, Client will be invoiced monthly for services rendered and costs incurred (based on percentage of completion/hours expended, as applicable). All billed amounts not covered by a retainer are due and payable upon presentation of the invoice and become overdue if payment is not received within thirty (30) days after the date of the invoice. In no event shall payment to SWCA be withheld pending Client's receipt of payment by a third-party. Overdue amounts bear interest at the rate of 1.5% per month until paid and are subject to a monthly late-payment service charge equal to the greater of $200 or 1% of the overdue balance. **Payment should be remitted to: P.O. Box 92170, Elk Grove, IL 60009.**

Prices and terms quoted are subject to Client's acceptance within thirty (30) days of the date set forth above.

☐ Special terms:

SWCA® ENVIRONMENTAL CONSULTANTS SWCA Incorporated, an Arizona corporation	**Client:** Heritage Ranch CSD
	a(n):
By: (signature)	**By:** (signature)
Name: Bill Henry, AICP	**Name:** John D'Ornellas
Title: Office Director	**Title:** General Manager
Date: May 2, 2014	**Date:** 5-12-14

Attached Terms (including disclaimers) are a part of this Agreement

SWCA Standard Terms of Service

1. Scope of Services. Subject to the terms set forth on the face hereof and those contained herein (collectively "this Agreement"), SWCA shall provide those services that SWCA has agreed in writing to provide under this Agreement ("the Services"). Any other services provided by SWCA in connection with this Agreement shall constitute "Additional Services". Any Additional Services are to be authorized on SWCA's standard Change Order form, which shall be incorporated herein, describing changes in the scope of work and any adjustment in pricing and terms. Unless otherwise agreed in writing by SWCA, Client shall pay for any Additional Services at SWCA's standard hourly rates, and fees for Additional Services shall be due and payable as incurred and invoiced.

2. Payment. In the event of late payment, the failure to provide a retainer or other breach of this Agreement by Client, SWCA reserves the right to (i) stop work; and/or (ii) apply any existing retainer and condition the performance of further services on obtaining payment in full of any unpaid balance and an additional retainer; and/or (iii) terminate this Agreement; and/or (iv) pursue all other rights and remedies available under this Agreement or applicable law. SWCA reserves the right to withhold its work product pending payment in full. Unless Client objects in writing to any charges set forth in an invoice within 10 days of receipt of the invoice, such invoice shall be deemed accepted. Client shall be responsible for any sales tax, transaction privilege tax, use tax, excise tax or similar taxes, if applicable, on the work performed under this Agreement.

3. Termination. In the event that this Agreement is terminated and the Services are priced on a fixed fee basis SWCA shall be entitled to payment from Client based on the percentage of work completed as reasonably estimated by SWCA, and in the event that this Agreement is terminated and the Services are priced on a Time and Materials basis, SWCA shall be entitled to payment based on the number of hours worked at the applicable rate, and in all events SWCA shall be entitled to reimbursement of costs incurred prior to termination. All provisions of this Agreement that expressly or by their nature continue in effect (such as warranty disclaimers and remedy limitations) shall survive termination.

4. Client Cooperation and Compliance. Client shall fully cooperate with SWCA as requested by SWCA and as necessary or appropriate to facilitate the completion of the Services. Client is responsible for providing SWCA with all information relevant to the Services available to Client and for complying with all applicable laws and requirements in connection with this Agreement. The Client Contact identified on the face hereof shall have complete authority on behalf of Client with respect to this Agreement and the Services, including the authority to provide or obtain any necessary information and approvals, and SWCA may rely on such authority. In the event that a Client Contact is not identified, SWCA may treat any representative of the Client that communicates with SWCA with respect to this Agreement or the Services as the Client Contact.

5. Third-Party Services and Costs. SWCA may, at its discretion, use subcontractors to complete the Services. SWCA shall not be responsible for acts or omissions of subcontractors and Client hereby releases SWCA from any claims related thereto. Client shall reimburse SWCA for costs incurred in connection with the Services as provided in this Agreement. Unless otherwise agreed by SWCA in writing, subcontractor costs shall be subject to a 20% administrative fee and other costs shall be subject to a 15% administrative fee.

6. Delays. In the event that SWCA provides an estimated completion date, SWCA will use reasonable efforts to complete the Services on or prior to that date subject to Client's compliance with this Agreement and other factors beyond SWCA's reasonable control. SWCA is not responsible for delays or other circumstances caused by the unavailability of third-party services, delays in government approvals, or other factors beyond SWCA's reasonable control.

7. Limited Warranty; Disclaimer. SWCA warrants that the Services performed by its employees will be performed substantially in conformance with the standard of care observed by similarly situated companies providing services under similar conditions. In the event of a breach of the foregoing warranty, SWCA's sole obligation shall be to use commercially reasonable efforts to re-perform the Services in compliance with such warranty, if possible, or at SWCA's option, refund the fees paid by Client for the Services. EXCEPT FOR THE FOREGOING WARRANTY, THE SERVICES AND INFORMATION PROVIDED UNDER THIS AGREEMENT ARE PROVIDED "AS-IS" AND SWCA DISCLAIMS TO THE MAXIMUM EXTENT PERMITTED BY LAW ALL WARRANTIES RELATING TO SUCH SERVICES AND INFORMATION INCLUDING ANY IMPLIED WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Client understands that for various reasons investigations conducted by SWCA may not uncover all relevant information and that reports generated by SWCA may rely on various third-party information which SWCA may assume to be accurate without independent verification. Any maps or similar materials provided by SWCA are for illustration only and should not be relied on as surveys. No opinions are intended to be

expressed by SWCA for matters that require legal expertise or other specialized knowledge beyond that customarily possessed by similarly situated environmental consulting companies.

8. Limitation of Remedies. In the event that Client incurs any damages in connection with this Agreement or the Services, SWCA's liability shall in no event exceed the amount actually paid by Client to SWCA for the Services. TO THE MAXIMUM EXTENT PERMITTED BY LAW, SWCA SHALL HAVE NO OTHER LIABILITY TO CLIENT FOR ANY DAMAGES, WHETHER GENERAL, SPECIAL, INCIDENTAL OR CONSEQUENTIAL, INCLUDING ANY LOST PROFITS OR LOST SAVINGS, WHETHER OR NOT FORESEEABLE. CLIENT EXPRESSLY ACKNOWLEDGES AND AGREES THAT SWCA IS ENTERING INTO THIS AGREEMENT IN RELIANCE ON THE DISCLAIMERS AND LIMITATIONS SET FORTH HEREIN.

9. Choice of Law and Forum; Attorneys' Fees. This Agreement shall be governed exclusively by its terms and by the laws of the State of Arizona as applied to contracts entered into in Arizona between Arizona residents without regard to the State's rules concerning choice of law. Client hereby consents and agrees to exclusive jurisdiction and venue in Maricopa County, Arizona, provided that SWCA may pursue collection efforts for any amounts payable under this Agreement in any forum having jurisdiction. Client shall reimburse SWCA on demand for all attorneys' fees, costs and expenses incurred by SWCA (including any commissions payable to collection agencies) in seeking to collect amounts payable under this Agreement (including fees, costs and interest) or otherwise seeking to enforce its rights under this Agreement.

10. Severability. In the event that any provision of this Agreement is held to be invalid or unenforceable, the remainder of this Agreement shall continue in full force and effect, and the provision held to be invalid or unenforceable shall be automatically amended to most closely approximate the original provision on terms that are valid and enforceable and the court or other adjudicating authority shall make such amendment accordingly.

11. Assignment; Successors; Third-Parties. Client may not assign its rights under this Agreement without SWCA's written consent and, unless otherwise expressly agreed by SWCA in writing, Client shall in all events remain responsible for the performance of its obligations hereunder notwithstanding any such assignment. This Agreement shall be binding upon assignees and other successors. Any services and information provided by SWCA are being furnished solely for Client's benefit and only with respect to the project that is the subject of this Agreement and no third-party may rely thereon and no third-party shall be construed to be a beneficiary of this Agreement.

12. Integration; Modification; Waiver. This Agreement reflects the entire agreement of the parties relating to the subject matter hereof, and any prior understandings, agreements or representations related to such subject matter are hereby superseded. This Agreement shall control over any conflicting documents and shall be the sole source of any obligations of SWCA. No provision of this Agreement shall be deemed amended or waived by SWCA unless a written amendment or a form of waiver is signed by SWCA. All attachments authorized by SWCA are hereby incorporated into this Agreement. This Agreement may be executed in counterparts and delivered by any reasonable means including facsimile.

13. Interpretation; Notices. The terms of this Agreement constitute the written expression of the mutual agreement of the parties and shall be construed neutrally and not for or against either party. When used in this Agreement the term "include" or "including" shall be construed as illustrative and not exhaustive. The headings in this Agreement are inserted for convenience; the provisions of this Agreement shall control. Periods of time established by this Agreement in days shall be calculated using calendar days and not business days unless otherwise specified. Notices and communications given and made in connection with this Agreement may be given and made by any reasonable means including facsimile or email if reasonable in the circumstances.

14. Relationship; Authority. The relationship of the parties hereunder is that of independent contractors and not principal-agent, partners, or otherwise. Except as expressly provided under this Agreement, neither party shall have any authority to act on behalf of or bind the other party. Only SWCA's project manager or an officer of SWCA shall be authorized to bind SWCA.

15. Non-Discrimination. SWCA shall not discriminate or allow parties under its control to discriminate in violation of the Rehabilitation Act, 29 U.S.C. § 793, the Vietnam Era Readjustment Assistance Act, 38 U.S.C. § 4212 or Executive Order 11246 or similar requirements to the extent applicable, and shall, to the extent required, take affirmative action to employ and advance in employment qualified individuals.

APPENDIX 3-3A – CCSD PRESENTATION ON AQUIFER SUPPLIES

Discussion & Consideration of Contingency in Addition to Baseline Amount for the Purpose of Sizing Long-Term Water Supply

Agenda Item 9.C.

April 26, 2012

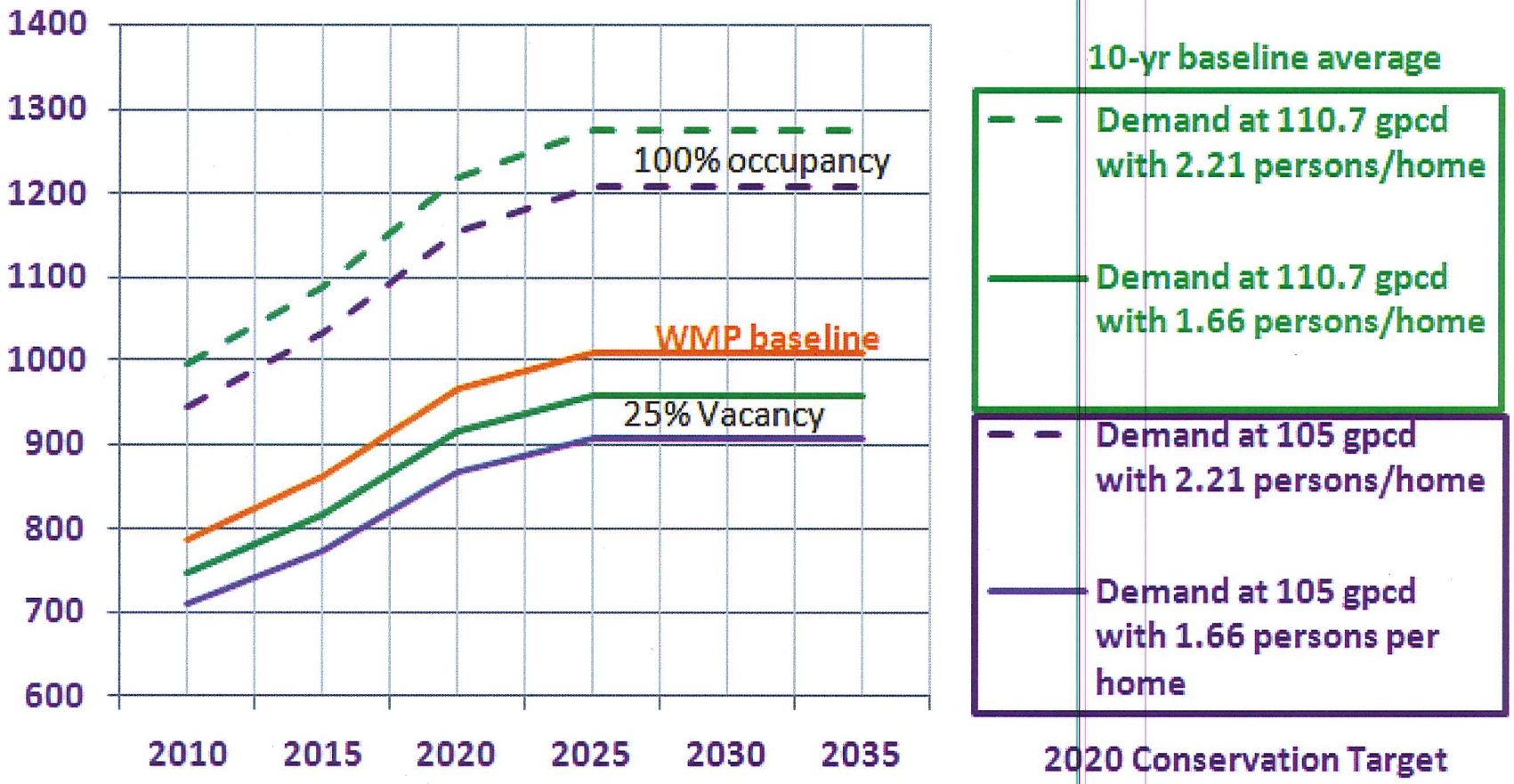
Background

- 2003-2004 Water Master Plan (WMP) report developed demands for baseline, and increases of 10, 20, and 50%
- Board direction provided in 2003 by minute action directed WMP to use a 50% increase, which resulted in a future facility size of 602 acre-feet of dry season capacity.
- Baseline demands with no increase would have resulted in a capacity of 306 acre-feet.
- A contingency percentage review has been requested using more recent information.

Factors Considered in Long-Term Planning

- Quantitative/more numbers based
  - Population forecasts
  - Statistical analyses on supply/rainfall; e.g., probability of occurrence
- Qualitative/less resolute
  - Potential changes in long-term demographics; e.g., occupancy rates
  - Future demands for habitat; e.g., "instream flows"
  - Agricultural intensification
  - Catastrophic event planning, such as loss of an aquifer resulting from a chemical spill

Acre Feet/Yr Demand Estimates at 25% to 100 % occupancy rates



Supply Reliability Considerations

Aquifer Recharge Scenario (From 1988 USGS Report 98-4061 by Yates & Van Konyenburg)	Recurrence Interval (years)	Recurrence Intervals Expressed as Percent Probability of Occurrence			
		Percent Probability of Occurrence, over 1 year	Percent Probability of Occurrence, over 10 years	Percent Probability of Occurrence, over 20 years	Percent Probability of Occurrence, over 40 years
A year with less than minimum to completely recharge the Santa Rosa Basin	18	5.6%	43.5%	68.1%	89.8%
A year with less than minimum to completely recharge the San Simeon Basin	25	4.0%	33.5%	55.8%	80.5%
Two successive years of incomplete recharge in the Santa Rosa Basin	360	n.a.	2.5%	5.1%	10.3%
Two successive years of incomplete recharge in the San Simeon Basin	730	n.a.	1.2%	2.6%	5.2%
For discussion purposes	100	1.0%	9.6%	18.2%	33.1%

Habitat Unknowns

- From March 23, 2012 Coastal Commission letter (p.2) commenting on Notice of Preparation on Water Supply Project EIR/EIS:

"… instream flow study results… could show a need to increase or decrease currently assumed water volumes or flow regimes now serving as the basis for basin protections – e.g., caps on seasonal well withdrawals… results could also change the amount of water available to …CCSD's water supply…"

Agricultural Needs

- The overall water budget within each watershed, which includes agricultural/riparian uses.
- Need to consider 2006 settlement agreement on Warren's water rights (183.5 acre-feet of non-potable/potable water for planned orchards).

Catastrophic Event Planning (I.e., the "what-ifs")

- Redundancy in supply alternatives improves reliability in response to:
  - Major drought
  - Chemical spill shutting down an aquifer
  - Major earthquake
  - Tsunami inundation of a well field
- Contingency factor allows for:
  - Sizing a facility to serve the town's demands without one of the aquifers available
  - Sizing facility to carry town without any intervening rainy season recharge of one or both aquifers.

Contingency Factor Planning Using a Sensitivity Analysis Approach

- Consider a range of capacities based on quantitative and qualitative factors
- Do not eliminate any reasonable alternative from consideration based solely on capacity & related contingency factor
- Review matrix of alternatives and assess whether potential impacts, costs, and other factors offset the increased risk/lessening of reliability through use of a lower contingency facotr.

Sensitivity analysis – continued

Example scenarios and related sizing assumptions

	Annual Demand	Dry season Demand	Supply Scenario San Simeon	Supply Scenario Santa Rosa	Size acre feet	Description//Rationale
Baseline	910	534	286	0	248	95 % reliabilty level of San Simeon aquifer
(with 2020	910	534	0	200	334	loss of San Simeon aquifer
reduction target)	910	534	0	0	534	loss of both aquifers
Baseline +10%	1001	588	286	0	302	95 % reliabilty level of San Simeon aquifer
	1001	588	0	200	388	loss of San Simeon aquifer
	1001	588	0	0	588	loss of both aquifers
Baseline + 20%	1092	641	286	0	355	95 % reliabilty level of San Simeon aquifer
	1092	641	0	200	441	loss of San Simeon aquifer
	1092	641	0	0	641	loss of both aquifers
Baseline + 50%	1365	801	286	0	515	95 % reliabilty level of San Simeon aquifer
	1365	801	0	200	601	loss of San Simeon aquifer
	1365	801	0	0	801	loss of both aquifers

The above suggests a range of 250 to 800 acre-feet in capacity be considered in analysis

Recommendations

- Work with Corps and consultant in developing a sensitivity analysis approach with range of sizes
- Do not eliminate a reasonable alternative from consideration based solely on a contingency factor (e.g., 50%)
- Assess all factors, including environmental, costs, permitting complexity, etc., before making a final decision on the desired contingency level

APPENDIX 3-3B – CCSD 2013 CONSUMER CONFIDENCE WATER QUALITY REPORT

2013 Consumer Confidence Report

Water System Name: **CAMBRIA COMM SERVICES DIST** Report Date: April 2014

We test the drinking water quality for many constituents as required by state and federal regulations. This report shows the results of our monitoring for the period of January 1 - December 31, 2013

Este informe contiene información muy importante sobre su agua beber. Tradúzcalo ó hable con alguien que lo entienda bien.

Type of water sources(s) in use: According to CDPH records, this Source is Groundwater. This Assessment was done using the Default Groundwater System Method.

Your water comes from 4 sources: Santa Rosa Well 04, San Simeon W1, San Simeon W2, and San Simeon W3.

Opportunities for public participation in decisions that affect drinking water quality: Regularly-scheduled Cambria Community Services District board meetings are held every 4th Thursday of every month at 12:30 p.m. at the Cambria Veterans Memorial building, located at 1000 Main St., Cambria CA.

For more information about this report, or for any questions relating to your drinking water, please call (805) 927 - 6227 and ask for Justin Smith.

TERMS USED IN THIS REPORT:

Maximum Contaminant Level (MCL): The highest level of a contaminant that is allowed in drinking water. Primary MCLs are set as close to the PHGs (or MCLGs) as is economically and technologically feasible. Secondary MCLs are set to protect the odor, taste, and appearance of drinking water.

Maximum Contaminant Level Goal (MCLG): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs are set by the U.S. Environmental Protection Agency.

Public Health Goal (PHG): The level of a contaminant in drinking water below which there is no known or expected risk to health. PHGs are set by the California Environmental Protection Agency.

Maximum Residual Disinfectant Level (MRDL): The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

Maximum Residual Disinfectant Level Goal (MRDLG): The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

Primary Drinking Water Standards (PDWS): MCLs for contaminants that affect health along with their monitoring and reporting requirements, and water treatment requirements.

Secondary Drinking Water Standards (SDWS): MCLs for contaminants that affect taste, order, or appearance of the drinking water. Contaminants with SDWSs do not affect the health at the MCL levels.

Regulatory Action Level (AL): The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.

Variances and Exemptions: Department permission to exceed an MCL or not comply with a treatment technique under certain conditions.

ND: not detectable at testing limit
ppm: parts per million or milligrams per liter (mg/L)
ppb: parts per billion or micrograms per liter (µg/L)
pCi/l: picocuries per liter (a measure of radioactivity)

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, spring, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material, and can pick up substances resulting from the presence of animals or from human activity.

Contaminants that may be present in source water include:

- *Microbial contaminants,* such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations and wildlife.
- *Inorganic contaminants,* such as salts and metals, which can be naturally-occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming.
- *Pesticides and herbicides,* which may come from a variety of sources such as agriculture, urban stormwater runoff, and residential uses.
- *Radioactive contaminants,* which can be naturally occurring or the result of oil production and mining activities.
- *Organic chemical contaminants,* including synthetic and volatile organic chemicals, which are byproducts of industrial processes and petroleum production, and can also come from gas stations, urban stormwater runoff, and septic systems.

In order to ensure that tap water is safe to drink, the U.S. Environmental Protection Agency (USEPA) and the California Department of Public Health prescribes regulations which limit the amount of certain contaminants in water provided by public water systems. Department regulations also establish limits for contaminants in bottled water that must provide the same protection for public health.

Tables 1, 2, 3, 4, 5 and 6 list all of the drinking water contaminants that were detected during the most recent sampling for the constituents. The presence of these contaminants in the water does not necessarily indicate that the water poses a health risk. The Department of Public Health allows the CCSD to monitor for certain contaminants less than once per year because the concentrations of these contaminants do not change frequently. Some of the data, though representative of the water quality, are more than one year old.

TABLE 1 - SAMPLING RESULTS SHOWING THE DETECTION OF LEAD AND COPPER

Lead and Copper (complete if lead or copper detected in the last sample set)	**No. of Samples Collected**	**90th Percentile Level**	**No. Site Exceeding AL**	**AL**	**PHG**	**Typical Sources of Contaminant**
Lead (ppb)	23 (2013)	7.90	1	15	0.2	Internal corrosion of household water plumbing systems; discharges from industrial manufacturers, erosion of natural deposits
Copper (ppm)	23 (2013)	0.565	0	1.3	.3	Internal corrosion of household plumbing systems; erosion of natural deposits; leaching from wood preservatives

TABLE 2 - SAMPLING RESULTS FOR SODIUM AND HARDNESS

Chemical or Constituent (and reporting units)	**Sample Date**	**Level Detected**	**Range of Detections**	**MCL (MRDL)**	**PHG (MCLG)**	**Typical Sources of Contaminant**
Sodium (ppm)	(2011)	24.8	19 - 37	none	none	Salt present in the water and is generally naturally occurring
Hardness (ppm)	(2011)	379	304 - 598	none	none	Sum of polyvalent cations present in the water, generally magnesium and calcium, and are usually naturally occurring

TABLE 3 - DETECTION OF CONTAMINANTS WITH A PRIMARY DRINKING WATER STANDARD

Chemical or Constituent (and reporting units)	**Sample Date**	**Level Detected**	**Range of Detections**	**MCL (MRDL)**	**PHG** (MCLG) [MRDLG]	**Typical Sources of Contaminant**

TABLE 3 - DETECTION OF CONTAMINANTS WITH A PRIMARY DRINKING WATER STANDARD						
Chemical or Constituent (and reporting units)	**Sample Date**	**Level Detected**	**Range of Detections**	**MCL (MRDL)**	**PHG** (MCLG) [MRDLG]	**Typical Sources of Contaminant**
Arsenic (ppb)	(2011)	0.8	ND - 3	10	n/a	Erosion of natural deposits; runoff from orchards, glass and electronics production wastes
Barium (ppm)	(2011)	0.15	0.1 - 0.2	1	2	Discharge from oil drilling wastes and from metal refineries; erosion of natural deposits
Nitrate (ppm)	(2013)	1.2	ND - 2	45	45	Runoff and leaching from fertilizer use; leaching from septic tanks and sewage; erosion of natural deposits
Nitrate + Nitrite as N (ppm)	(2011)	0.4	ND - 1.1	10	10	Runoff and leaching from fertilizer use; leaching from septic tanks and sewage; erosion of natural deposits
Gross Alpha (pCi/L)	(2005 - 2013)	1.4	ND - 4	15	(0)	Erosion of natural deposits.

TABLE 4 - DETECTION OF CONTAMINANTS WITH A SECONDARY DRINKING WATER STANDARD						
Chemical or Constituent (and reporting units)	**Sample Date**	**Level Detected**	**Range of Detections**	**MCL (MRDL)**	**PHG (MCLG)**	**Typical Sources of Contaminant**
Chloride (ppm)	(2011)	24	20 - 34	500	n/a	Runoff/leaching from natural deposits; seawater influence
Color (Unfiltered) (Units)	(2011)	11	11 - 11	15	n/a	Naturally-occurring organic materials
Iron (ppb)	(2011)	350	ND - 1800	300	n/a	Leaching from natural deposits; Industrial wastes
Manganese (ppb)	(2011)	135	ND - 540	50	500	Leaching from natural deposits
Specific Conductance (umhos/cm)	(2011)	766	632 - 1140	1600	n/a	Substances that form ions when in water; seawater influence
Sulfate (ppm)	(2011)	66.8	49 - 120	500	n/a	Runoff/leaching from natural deposits; industrial wastes
TDS (ppm)	(2011)	435	340 - 680	1000	n/a	Runoff/leaching from natural deposits
Zinc (ppm)	(2011)	0.032	ND - 0.09	5	n/a	Runoff/leaching from natural deposits

Any violation of MCL,AL or MRDL is shaded. Additional information regarding the violation is provided later in this report.

TABLE 5 - DETECTION OF UNREGULATED CONTAMINANTS					
Chemical or Constituent (and reporting units)	**Sample** Date	**Level Detected**	**Range of Detections**	**Notification Level**	**Health Effects Language**
Boron (ppm)	(2011)	0.2	0.2 - 0.2 (2011)	1	The babies of some pregnant women who drink water containing boron in excess of the notification level may have an increased risk of developmental effects, based on studies in laboratory animals.
Vanadium	(2011)	0.002	ND - 0.002	0.05	The babies of some pregnant women who drink

TABLE 5 - DETECTION OF UNREGULATED CONTAMINANTS					
Chemical or Constituent (and reporting units)	**Sample** Date	**Level Detected**	**Range of Detections**	**Notification Level**	**Health Effects Language**
(ppm)			(2011)		water containing vanadium in excess of the action level may have an increased risk of developmental effects, based on studies in laboratory animals.

TABLE 6 - DETECTION OF FEDERAL DISINFECTANT/DISINFECTANT BYPRODUCT RULE						
Chemical or Constituent (and reporting units)	**Sample Date**	**Level Detected**	**Range of Detections**	**MCL (MRDL)**	**PHG (MCLG)**	**Typical Sources of Contaminant**
Total Trihalomethanes (TTHMs) (ppb)	(2013)	8.4	ND - 14.3	80	n/a	By-product of drinking water disinfection
Haloacetic Acids (five) (ppb)	(2013)	3	ND - 5	60	n/a	By-product of drinking water disinfection

Additional General Information on Drinking Water

Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of contaminants does not necessarily indicate that water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the USEPA`s Safe Drinking Water Hotline (800-426-4791).

Some people may be more vulnerable to contaminants in drinking water than the general population. Immuno-compromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants can be particularly at risk from infections. These people should seek advice about drinking water from their health care provider. USEPA/Centers for Disease Control (CDC) guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the Safe Drinking Water Hotline (800-426-4791)

For Lead (Pb), If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. *CAMBRIA COMM SERVICES DIST* is responsible for providing high quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at http://www.epa.gov/safewater/lead.

Summary Information for Contaminants Exceeding an MCL, MRDL, or AL, or a violation of Any Treatment Technique or Monitoring and Reporting Requirement

About our Iron: Iron was found at levels that exceed the secondary MCL. The Iron MCL was set to protect you against unpleasant aesthetic affects such as color, taste, odor and the staining of plumbing fixtures (e.g., tubs and sinks), and clothing while washing. Exceeding the MCL does not pose a risk to public health.

About our Manganese: Manganese was found at levels that exceed the secondary MCL. The Manganese MCL was set to protect you against unpleasant aesthetic affects such as color, taste, odor and the staining of plumbing fixtures (e.g., tubs and sinks), and clothing while washing. Exceeding the MCL does not pose a risk to public health.

Drinking Water Source Assessment Information

Assessment Info

A source water assessment was conducted for the SAN SIMEON WELLS 01, 02, and 03 of the CAMBRIA COMM SERVICES DIST water system in April, 2003. A source water assessment was conducted for the SANTA ROSA WELL 04 of the CAMBRIA COMM SERVICES DIST water system in May, 2003.

Well 01 - is considered most vulnerable to the following activities not associated with any detected contaminants:
Other Animal operations

Well 02 - is considered most vulnerable to the following activities not associated with any detected contaminants:
Other Animal operations

Well 03 - is considered most vulnerable to the following activities not associated with any detected contaminants:
Agricultural Drainage
Other Animal operations

Well 04 - is considered most vulnerable to the following activities not associated with any detected contaminants:
Agricultural Drainage
Septic systems - low density [<1/acre]
Wells - Agricultural/ Irrigation

Discussion of Vulnerability

The activities to which the San Simeon Wells 01, 02, and 03 are most vulnerable include the existence; Other Animal Operations. Crops, irrigated & non-irrigated. Fertilizer, Pesticide/herbicide Application. Surface water – streams, agricultural drainage. Artificial recharge projects-spreading basins. The activities to which the Santa Rosa Well 04 is most vulnerable include the existence; Crops, Irrigated. Agricultural Drainage. Wells - Agricultural/irrigation. Septic Systems. Parking Lots, Wells - water supply. Historic Gas stations. Known Contaminant Plumes. No contaminants associated with the above activities have been detected in the groundwater and CCSD continues a regular monitoring program.

Acquiring Info

A copy of the complete assessment may be viewed at:
DHS Drinking Water Field Operations Branch
1180 Eugenia Place
Suite 200

Carpenteria, CA 93013
You may request a summary of the assessment be sent to you by contacting:
Kurt Souza
District Engineer
805 566 1326

APPENDIX 3-3C – CDM SMITH'S ENGINEERING TECHNICAL MEMORANDUM

Cambria Community
Services District

Cambria Emergency Water Supply

Engineering Technical Memorandum

Cambria, California

June 2014

CDM Smith

The information contained in the document titled "Cambria Emergency Water Supply Engineering Technical Memorandum

" dated June 2014 has received appropriate technical review and approval. The conclusions and recommendations presented represent professional judgments and are based upon findings from the investigations and sampling identified in the report and the interpretation of such data based on our experience and background. This acknowledgement is made in lieu of all warranties, either expressed or implied. The activities outlined in this report were performed under the supervision of a California Registered Professional Engineer.

Prepared by:

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Project Manager

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Project Director

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Section 1
Introduction

1.1 Background

For water year 2013/2014, the total rainfall in Cambria community was approximately 80 percent of the minimum rainfall needed to fully recharge the two coastal stream aquifers that are the sole water supply for Cambria community. This severe drought condition has placed the water supply for Cambria community in immediate jeopardy. Consequently, on January 30, 2014, the Cambria Community Services District (CCSD) Board of Directors declared a Stage 3 Water Shortage Emergency, the most stringent of three water shortage levels. Reflecting the severity of the severe drought conditions experienced in Cambria community as well as the rest of the state of California, on January 17, 2014, Governor Jerry Brown declared a drought emergency for the State of California, and on March 11, 2014, the San Luis Obispo (SLO) County Board of Supervisors proclaimed a local emergency due to the County's drought conditions. The Governor issued a subsequent drought declaration on April 24, 2014.

In response to the ongoing severe drought emergency, and in combination with very stringent water conservation measures, CCSD is proposing the Cambria Emergency Water Supply Project to construct and operate emergency water supply facilities at the District's existing San Simeon Well Field and Effluent Percolation Ponds property. The emergency water supply system would be utilized to treat potentially impaired groundwater to fully recharge the San Simeon well field aquifer with advance treated water. The goals of the project are to avoid projected water supply shortages by the end of summer/early fall 2014; prevent seawater intrusion into the San Simeon well field aquifer, avoid possible ground subsidence; and protect well pumps from losing suction.

CCSD projects continued water shortages and drought conditions over the course of the next 20 years as a result of climate change impacts, and projects the likely need for use of the emergency water supply facilities in eight to ten years of the next 20 years.

1.2 Project History

Under a partnership agreement between CCSD and United States Army Corps of Engineers, a study for Cambria community water supply was conducted in 2012-2013. The principal objective of this study was to identify, evaluate and recommend the best water supply alternative that will provide Cambria community with supplemental water supply during six dry months of the year, from May 1 through October 31. The findings and results of the study were presented in Cambria Water Supply Alternatives Engineering Technical Memorandum (Engineering TM), CDM Smith, November 27, 2013. In cooperation with residents of the Cambria community, twenty eight water supply alternative concepts and options were identified. Through a tiered evaluation, eight alternative water supply concepts were selected and recommended for further development and evaluation, while the other twenty were rejected based on fatal flow analysis.

Technical details and cost estimates were prepared, and the selected alternatives were ranked applying multiple-attribute ranking technique using Criterion Decision Plus software. The studied alternatives were ranked from 1 through 8, with 1 as the best and 8 as the worst:

1. San Simeon Creek Road Brackish Water

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2. Shamel Park Seawater
3. Whale Rock Reservoir
4. Morro Bay Shared SWRO
5. Estero Bay Marine Terminal
6. Simeon CSD Recycled Water
7. San Simeon Creek Off-stream Storage
8. Hard Rock Aquifer storage and Recovery

The 2013/2014 year drought prompted CCSD's decision to provide new water supply for the Cambria community that will be quickly implemented. Technical concepts of the highest ranked San Simeon Creek Road Brackish Water alternative are used as a basis for development of the emergency water supply project. An advanced groundwater model of the San Simeon Basin has been completed to provide hydrogeological inputs for the proposed emergency water supply project that will provide new water to the community and will maintain and improve fresh water conditions in the San Simeon Creek fresh water lagoons over the currently projected six month dry period.

1.3 Project Purpose

As stated above, the Cambria Emergency Water Supply Project is being developed in response to a Stage 3 Water Shortage Emergency to avoid potentially disastrous consequences to the Cambria Community. The project, which needs to be operational in 2014, is being designed and constructed to treat potentially impaired groundwater using proven advanced treatment technologies and recharge the CCSD's San Simeon well field aquifer with advance treated water. The project will provide 250 acre-foot of water supply to the community over six dry months, or shorter if the basin is replenished naturally during the pending winter season, through groundwater augmentation.

In addition to water supply augmentation, the project has goals of preventing seawater intrusion into the groundwater aquifer and protecting well pumps from losing suction. Furthermore, to avoid potential impacts from additional pumping project's extraction well, the Project is being designed to provide up to 100 gallons per minute (gpm) of freshwater for purposes of protecting the San Simeon Creek and downstream San Simeon Creek lagoon areas when the emergency water supply project is operational.

The emergency water supply facilities of the Cambria Emergency Water Supply project are shown in Figure 1-1 and described in detail in the sections below.

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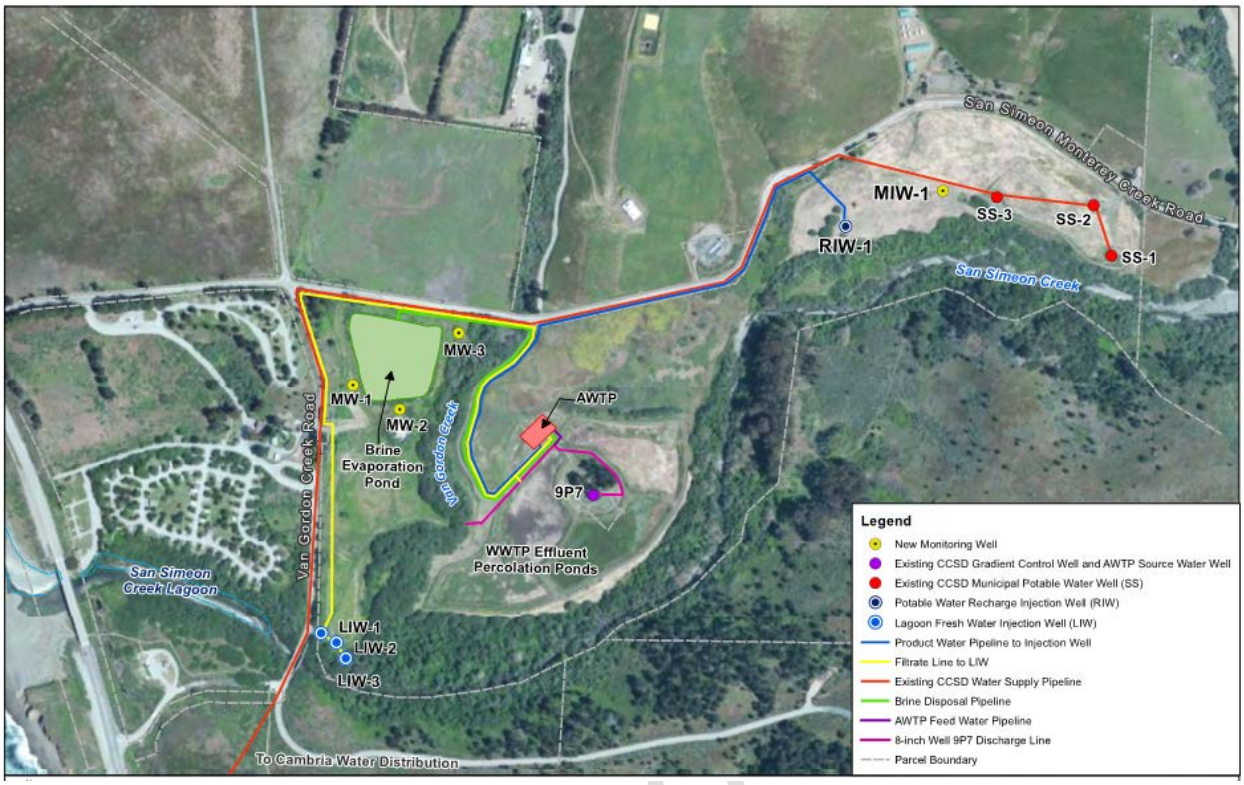

Figure 1-1 Proposed Project Facility

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Section 2
Emergency Water Supply Project Facilities

The emergency water supply project facilities include the following components:

- *Project Source Water* - The extracted groundwater that will feed the advanced water treatment plant (AWTP) will be a blend of the percolated secondary effluent from the CCSD's WWTP, fresh native basin groundwater, and deep aquifer brackish water. The degree to which this groundwater source is impaired will depend on the ultimate contribution of secondary effluent in the extracted water and the level of treatment achieved for this water through soil aquifer treatment and aquifer travel time. The potentially impaired groundwater will be extracted from the San Simeon Creek Basin, treated, and then injected back into the basin downstream of the existing CCSD potable well field, providing additional potable water supply to the Cambria community. The water elevation of the secondary effluent mound is higher than that of seawater, preventing it from moving inland when the inland basin water level is lower.

- *Source Water Extraction* – Existing Well 9P7 will provide the potentially impaired groundwater to the advanced water treatment plant.

- *AWTP* – A new AWTP will be constructed to treat the potentially impaired groundwater to advance treated water quality suitable for injection further upstream in the groundwater basin, where it will directly impact potable water supplies. The main treatment process of the AWTP will include membrane filtration (MF), reverse osmosis (RO), and advanced oxidation process (AOP) utilizing ultraviolet (UV) light and hydrogen peroxide. The new AWTP will be located just north of the existing secondary effluent percolation ponds. The product water capacity of the AWTP will be 484 gpm, producing water during six dry season months. Assuming all process associated losses, and a 100 gpm flow of membrane filtrate water directed to the creek, the AWTP feed water flow rate will be 691 gpm during the six months.

- *Recycled Water Recharge* – A new recharge injection well (RIW) will be constructed to inject advance treated water to groundwater basin at San Simeon Well Field.

- *Potable Water Extraction Wells* – There are three existing water supply wells SS1, SS2 and SS3 that are extracting ground water from the San Simeon Creek potable water aquifer, each having capacity of 400 gpm. Since the Cambria Emergency Water Supply project is designed to secure the permeated extraction from the San Simeon Basin of up to 370 AF (456 gpm) over six dry month. Only two existing wells, including Well SS1 and Well SS2, will be operational while the third well, Well SS3, will not be used during emergency water supply conditions, unless results of a tracer study have confirmed that sufficient travel time exists between the new injection well and SS3.

- *AWTP Generated Concentrate* – Concentrate from the RO process will be directed to the existing Van Gordon Reservoir which will be used as a Brine Evaporation Pond. The existing reservoir will be rehabilitated with a new liner to prevent impact to groundwater. Five (four duty and one standby) mechanical spray evaporators will be added to enhance brine evaporation rate within the pond.

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- *Water for Lagoon Protection* – MF filtrate from the AWTP will be discharged to San Simeon Creek fresh water lagoons to maintain and improve fresh water conditions. For this purpose, a new conveyance piping may be routed to three lagoon injection wells (LIWs), or existing discharge piping of Well 9P7 may be utilized to discharge to Van Gordon Creek adjacent to the AWTP.
- *Monitoring Wells* – A new monitoring well, MIW-1, will be constructed at San Simeon Well Field in the vicinity of RIW-1, and three monitoring wells (MW-1 through MW-3) will be constructed near Van Gordon Evaporation Pond.

These project facilities are described below.

2.1 Source Water-Existing Well 9P7

2.1.1 Well Site Description

The source water for the Cambria Emergency Water Supply Project is the brackish groundwater from San Simeon Creek Basin, two miles north of the Cambria Township. The water will be extracted from the aquifer at CCSD Well 9P7, located between the existing Effluent Percolation Ponds. The extracted groundwater will be conveyed to the new AWTP using an existing 8 inch PVC pipeline originally construct to discharge pumped groundwater from Well 9P7 to Van Gordon Creek (see Figure 1-1). The existing Well 9P7, a manually controlled 20 hp pump, is shown in Figure 2-1.

Figure 2-1 Existing Well 9P7

2.1.2 Source Water Quality

Key water quality data for Cambria Wastewater Treatment Plant (WWTP) effluent and groundwater extracted from Well 9P7 are summarized in Table 2-1. Well 9P7 has better water quality than wastewater effluent likely due to the influence from the surrounding basin water. Wastewater effluent

water quality was used for the AWTP treatment process sizing, since it represents the worst-case water quality scenario for the AWTP.

Table 2-1 Source Water Quality

Constituent	Units	PQL	Wastewater Effluent [1]	Well 9P7 Groundwater [1]
Metals, Dissolved				
Arsenic	ug/L	2	ND	ND
Cadmium	ug/L	0.2	ND	ND
Chromium	ug/L	1	ND	1
Iron	ug/L	50	110	60
Lead	ug/L	0.5	0.7	ND
Manganese	ug/L	0.5	6.9	3.9
Mercury	ug/L	0.02	ND	ND
Nickel	ug/L	1	2	1
Silica	mg/L		20	21
Silver	ug/L	1	ND	ND
Metals, Total				
Aluminum	ug/L	10	ND	ND
Arsenic	ug/L	2	ND	ND
Barium	ug/L	0.2	80.5	134
Boron	mg/L	0.01	0.32	0.17
Cadmium	ug/L	0.2	0.2	ND
Calcium	mg/L	1	72	66
Chromium	ug/L	1	ND	ND
Iron	ug/L	50	150	120
Lead	ug/L	0.5	1.7	ND
Magnesium	mg/L	1	58	44
Manganese	ug/L	0.5	6.9	3.9
Mercury	ug/L	0.02	ND	ND
Nickel	ug/L	1	3	2
Potassium	mg/L	1	26	2
Silver	ug/L	1	ND	ND
Sodium	mg/L	1	247	36
Strontium	ug/L	5	545	584
Zinc	ug/L	10	70	ND
Wet Chemistry				
Ammonia Nitrogen	mg/L	0.2	0.3	ND
Alkalinity	mg/L as CaCO3	10	210	240
Bicarbonate	mg/L	10	250	290
Carbonate	mg/L	10	ND	ND
Hydroxide	mg/L	10	ND	ND
Bromide	mg/L	0.03	0.93	ND
Carbon Dioxide	mg/L	1	12	12
Chloride	mg/L	5	347	30

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Constituent	Units	PQL	Wastewater Effluent [1]	Well 9P7 Groundwater [1]
Chlorine, Total	mg/L	0.1	ND	ND
Specific Conductance	umhos/cm	1	1940	707
Cyanide, Total	mg/L	0.004	ND	ND
Fluoride	mg/L	0.1	0.1	ND
Nitrate	mg/L	2	142	4.8
Nitrite	mg/L	0.3	ND	ND
Nitrogen, Total Kjeldahl	mg/L	1	ND	ND
Oxygen, Dissolved	mg/L	0.5	6.3	1.5
pH	units	--	7.6	7.7
Phosphate	mg/L	3	18	0.4
Solids, Total Dissolved (TDS)	mg/L	20	1110	400
Solids, Total Suspended (TSS)	mg/L	1	6	ND
Sulfate	mg/L	2	107	48
Sulfide, Total	mg/L	0.1	ND	ND

Note
PQL: Practical Quantification Limit
1. Based on April 7, 2014 sampling event.

2.2 Advanced Water Treatment Plant (AWTP)

2.2.1 AWTP Site

The AWTP site will be located in a flat, vacant lot north of the Effluent Percolation Ponds (see Figure 1-1 and Figure 2-2). The flat area of the site is approximately 60,000 square feet (sf) bordered by chain link fence to the north and access road for the Percolation Ponds to the south. Approximately 17,000 sf (100 by 170 ft) will be utilized for AWTP.

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Figure 2-2 AWTP Site

2.2.2 Plant Description

The new AWTP will consist of multiple unit processes, including MF, RO, advance oxidation with UV and hydrogen peroxide (UV/H2O2) and post-treatment chemical addition designed to stabilize the treated water before it is conveyed to the RIW for recharge. The overall treatment process flow diagram is shown in Figure 2-3.

Table 2-2 summarizes recoveries, waste flows, and treatment process capacities for MF and RO systems required to meet the target potable water augmentation of 390 acre feet per year (AFY) (700,000 gallons per day over 6 months) and San Simeon Creek fresh water lagoon recharge of 80 AFY (140,000 gallons per day over 6 months).

Table 2-2 AWTP Process Design Capacities

Parameter	Unit	Criteria
MF recovery	%	92
RO recovery	%	92
Influent to AWTP	gpm	691
MF filtrate water capacity	gpm	629
MF filtrate water capacity for San Simeon Creek Lagoon	gpm	100
AWTP Product water capacity for RIW	gpm	484
MF backwash waste	gpm	55
RO brine	gpm	42

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Table 2-3 summarizes the projected water quality of RO permeate and concentrate based on the RO membrane projection with an average membrane age of 3 years. Since MF does not remove any ionic species, it is expected that the MF filtrate and backwash waste would retain ionic water qualities similar to the source water.

Table 2-3 Projected Water Quality of RO Permeate and Concentrate

Ion	Unit	RO Permeate	RO Concentrate (Brine)
Ca	mg/L	4.06	943
Mg	mg/L	3.27	760
Na	mg/L	61.7	2,687
K	mg/L	7.81	268
NH4	mg/L	0.08	2.80
Ba	mg/L	0.01	1.80
Sr	mg/L	0.03	7.10
CO3	mg/L	0.00	1.10
HCO3	mg/L	84.6	1,619
SO4	mg/L	6.28	1,772
Cl	mg/L	62.8	6,015
F	mg/L	0.03	0.90
NO3	mg/L	4.39	15.8
B	mg/L	0.32	0.34
SiO2	mg/L	6.76	197
CO2	mg/L	38.4	38.4
TDS	mg/L	242	14,291
pH	mg/L	6.56	7.74

Equipment of the key AWTP unit processes will be pre-packaged and mounted in shipping containers. UV vessels, water tanks, pump skids and self-contained chemical totes will be installed outdoors on concrete housekeeping pads. The AWTP layout is shown is Figure 2-4.

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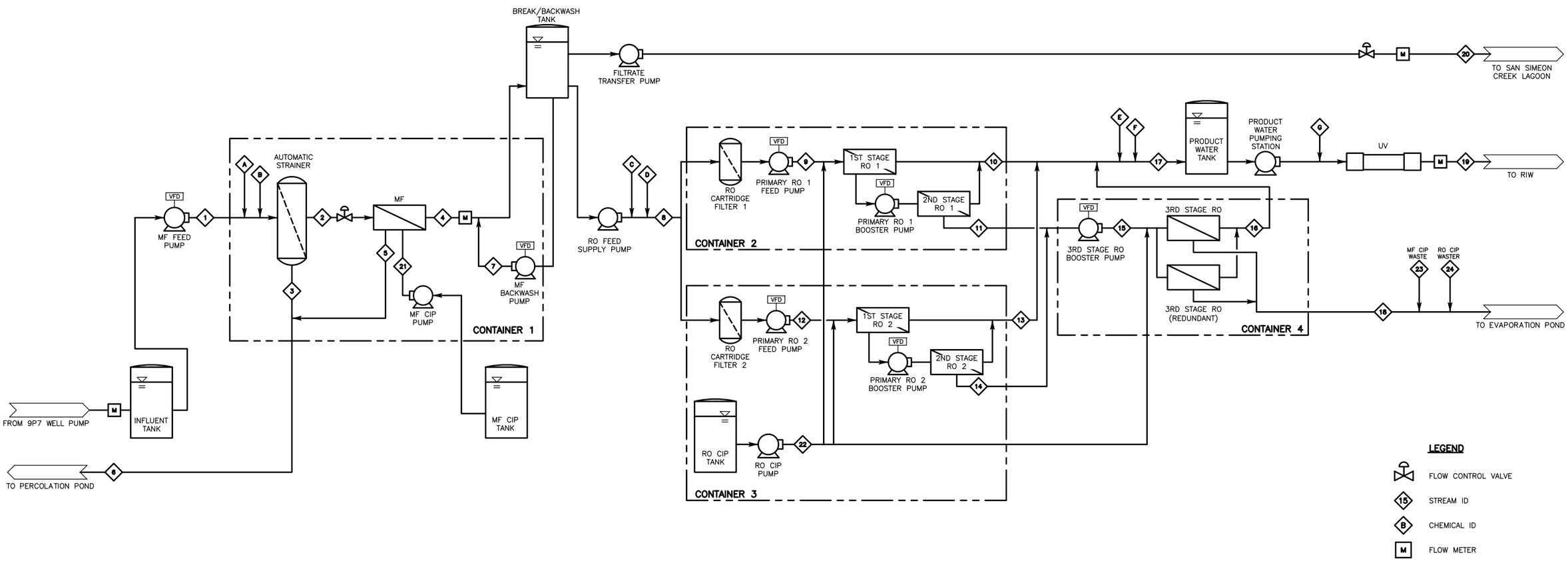

FLOW BALANCE

AUTOMATIC STRAINER RECOVERY	99%
MF RECOVERY	92%
OVERALL RO RECOVERY	92%
CIP WASTE	0.5%

FLOW STREAM	AW/TP FEED	MF FEED	AUTOMATIC STRAINER WASTE	MF FILTRATE	MF BACKWASH WASTE (NOTE 1)	MF AND AUTOMATIC STRAINER COMBINED WASTE	MF BACKWASH FEED (NOTE 1)	COMBINED RO FEED	PRIMARY RO 1 FEED	PRIMARY RO 1 PERMEATE	PRIMARY RO 1 CONCENTRATE	PRIMARY RO 2 FEED	PRIMARY RO 2 PERMEATE	PRIMARY RO 2 CONCENTRATE	THIRD STAGE RO FEED	THIRD STAGE RO PERMEATE	COMBINED RO PERMEATE	THIRD STAGE RO CONCENTRATE	PRODUCT WATER TO RECHARGE INJECTION WELL (RIW)	MF FILTRATE TO SAN SIMEON CREEK LAGOON	MF CIP FEED (NOTE 1)	RO CIP FEED (NOTE 1)	MF CIP WASTE (NOTE 1)	RO CIP WASTE (NOTE 1)
FLOW STREAM ID	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
Average Flow (GPM)	691	684	7	629	55	62	55	529	265	212	53	265	212	53	106	64	487	42	484	100	2	1	2	1
Pressure (psi)	40	30	5	5	5	5	30	30	122	15	115	122	15	115	215	15	15	20	30	30	20	20	20	20
TDS (mg/L)	1374	1374	1374	1374	-	1374	1374	1374	1366	101	6756	1366	101	6756	6756	1108	222	14529	222	1374	-	-	-	-

CHEMICAL	AQUEOUS AMMONIA	SODIUM HYPOCHLORITE	THRESHOLD INHIBITOR	SULFURIC ACID	SODIUM HYDROXIDE	CALCIUM CHLORIDE	HYDROGEN PEROXIDE
CHEMICAL STREAM ID	A	B	C	D	E	F	G
Bulk Chemical Concentration	19.00%	12.50%	100.00%	50.00%	25.00%	34.70%	27.00%
Chemical Dose, Max	1.5 mg/L	6.0 mg/L	3.0 mg/L	180 mg/L	50 mg/L	35 mg/L	5.0 mg/L
Dosing Rate, Max	8.3 gpd	38 gpd	1.8 gpd	49.0 gpd	112 gpd	52 gpd	11.8 gpd

NOTES

1. INTERMITTENT FLOW.
2. ALL THE CHEMICAL DOSING SKIDS EXEPT THRESHOLD INHIBITOR WILL BE INSTALLED IN CONTAINER 5 (NOT SHOWN). THRESHOLD INHIBITOR DOSING SKIDS WILL BE INSTALLED IN CONTAINER 2 AND CONTAINER 3.
3. MAIN CONTROL ROOM AND OFFICE SPACE WILL BE SUPPLIED IN CONTINER 6 (NOT SHOWN).
4. RO FLOW CONDITIONS ARE BASED ON AN AVERAGE MEMBRANE AGE OF 3 YEARS.

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: –
DRAWN BY: RH
SHEET CHK'D BY: –
CROSS CHK'D BY: –
APPROVED BY: –
DATE: JUNE, 2014

WARNING
0 1/2" 1"
IF THIS BAR SCALE DOES NOT MEASURE 1" THIS DWG HAS BEEN REDUCED SCALE ACCORDINGLY

CDM Smith
111 Academy Way, Suite 150
Irvine, California 92617
Tel: (949) 752-5452

CAMBRIA EMERGENCY WATER SUPPLY PROJECT
CAMBRIA COMMUNITY SERVICE DISTRICT

PROCESS FLOW DIAGRAM

PROJECT NO. XXXXX–XXXXXX
FILE NAME:

FIGURE 2-3

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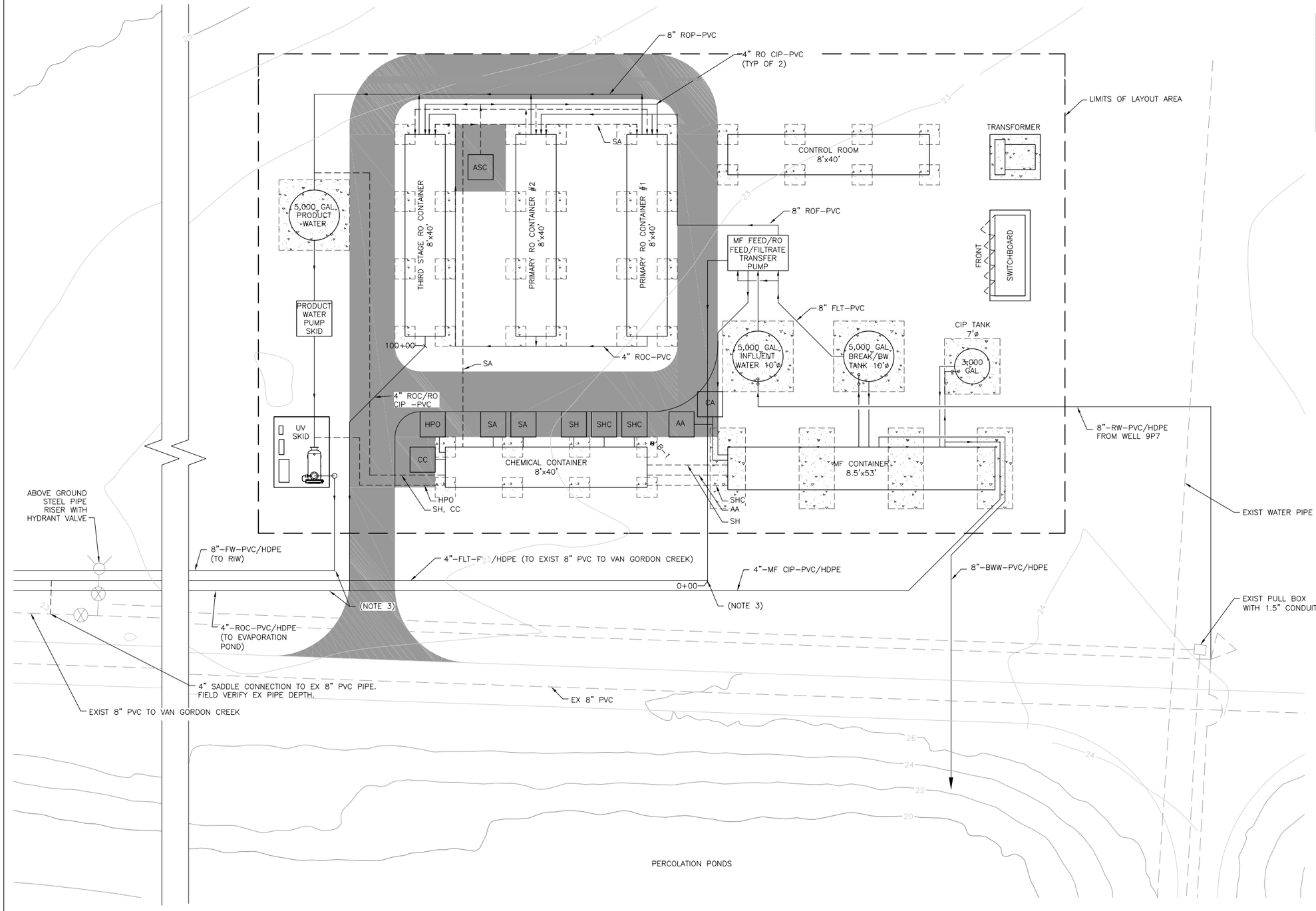

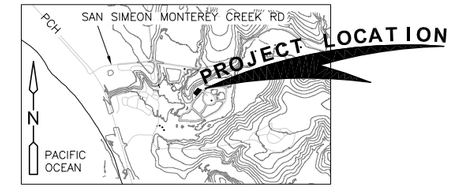

NOTES:

1. ALL CHEMICAL LINES TO BE ¼" FLEXIBLE PVC HOSE (REINFORCED), OR PEX (FOR AQUEOUS AMMONIA AND SODIUM HYPOCHLORITE AT A MINIMUM) PLACED IN 2" TO 3" PVC PIPE AS SECONDARY CONTAINMENT.
2. ALL PIPING AND HOSE TO BE INSTALLED BELOW GRADE WITHIN THE LAYOUT AREA OF THE AWTP AS INDICATED BY DASHED BOX. PIPE AND/OR HOSE TO TURN VERTICALLY TO SURFACE NO MORE THAN 3 FEET FROM PROCESS CONNECTIONS LOCATED ABOVE GRADE.
3. YARD PIPING CONNECTIONS TO CONVEYANCE PIPING SHALL OCCUR ONCE PIPING ALIGNMENT IS ORIENTED IN NORTHWEST DIRECTION OUTSIDE OF THE LAYOUT AREA. THE CONNECTION SHALL BE ACHIEVED BY AN UPWARD 45 DEGREE BEND TO BRING PIPING TO FINISH GRADE. PIPING SHALL BE SUPPORTED AT SURFACE PENETRATION BY CONCRETE PIPE SUPPORT AS INDICATED IN DETAIL B, SHEET C-9.

ABBREVIATIONS:

CC	CALCIUM CHLORIDE
HPO	HYDROGEN PEROXIDE
SA	SULFURIC ACID
ASC	ANTI-SCALANT/THRESHOLD INHIBITOR
SHC	SODIUM HYPOCHLORITE
AA	AQUEOUS AMMONIA
SH	SODIUM HYDROXIDE
CA	CITRIC ACID
BWW	BRACKISH WASTE
FLT	FILTRATE
FW	FINISHED WATER
ROC	RO CONCENTRATE
ROF	RO FEED
ROP	RO PRODUCT
RW	RAW WATER
UVP	UV PRODUCT

LEGEND:

- - - - - CHEMICAL HOSE (DOUBLE CONTAINED)
——— PROCESS PIPING

MATERIAL

HDPE	HIGH DENSITY POLYETHYLENE
PVC	POLYVINYL CHLORIDE

N

1" = 10'
5 0 10

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: E.Y.
DRAWN BY: O.N.
SHEET CHK'D BY: –
CROSS CHK'D BY: –
APPROVED BY: –
DATE: JUNE, 2014

WARNING
0 1/2" 1"
IF THIS BAR SCALE DOES NOT MEASURE 1" THIS DWG HAS BEEN REDUCED SCALE ACCORDINGLY

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Irvine, California 92617
Tel: (949) 752-5452

CAMBRIA EMERGENCY WATER SUPPLY PROJECT
CAMBRIA COMMUNITY SERVICE DISTRICT

AWTP CIVIL YARD PIPING PLAN

PROJECT NO. XXXXX-XXXXXX
FILE NAME:

FIGURE 2-4

NOT FOR CONSTRUCTION

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2.2.3 Main Treatment Processes

2.2.3.1 Membrane Filtration System

The MF system provides pretreatment for the RO system to reduce the particulate and biological fouling of the RO membranes. The MF system will effectively remove inert particulates, organic particulates, colloidal particulates, pathogenic organisms, bacteria and other particles by the size-exclusion sieve action of the membranes. Table 2-4 presents the MF water quality goals.

Table 2-4 Membrane Filtration Water Quality Goals

Constituent	Design Criteria
Suspended Solids	Undetectable[1]
Turbidity	<0.2 NTU (95th percentile) <0.5 NTU (All the time)
Filtrate Silt Density Index (SDI)	<3

Notes:
[1] EPA Method 160.2. Method detection limit is 1.0 mg/L, so the goal is to be <1.0 mg/L.

Pre-Treatment Chemical Addition

Ammonium hydroxide and sodium hypochlorite will be added downstream of the membrane feed pumps and upstream of the strainers for chloramination to control the biological fouling of the MF membranes. The target combined chlorine concentration (chloramines) is 3 to 5 mg/L. The chemicals will be flow paced based on the MF feed flow rate and trimmed based on the combined chlorine concentration.

Strainers

Strainers will be provided immediately upstream of the membrane system to protect the membranes from damage and/or fouling due to larger particles. The strainers are typically provided by the membrane manufacturers as part of a complete MF system package and are required by the membrane system warranty.

MF Systems

Both the MF system will be designed to achieve the membrane filtration water quality goals described above in Table 2-4. The MF system will be a containerized system utilizing an open configuration that can be installed with membranes from multiple different suppliers. Figure 2-5 shows the MF system layout. The layout is based on the 33 gfd instantaneous flux rate.

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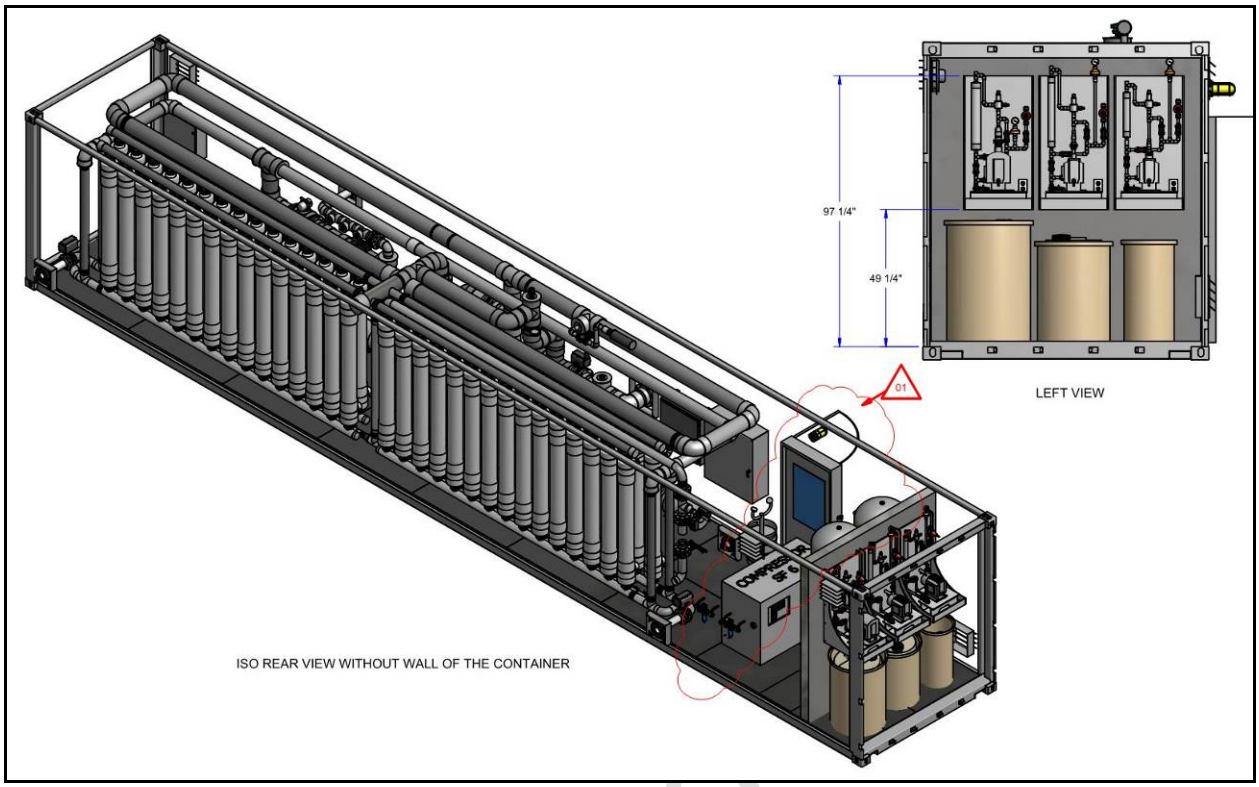

Figure 2-5 MF System Layout

Break Tank

The MF break tank will serve as a flow equalization reservoir for the MF product prior to being supplied to the RO system. The MF filtrate will be conveyed to the MF break tank with residual pressure from the MF system. The MF break tank will mitigate the impact of the variations in the MF filtrate flow (resulting from backwashes, cleanings, and integrity tests), by providing equalization volume between the MF and RO processes equivalent to approximately 15 minutes of the maximum RO feed flow. To prevent the excessive accumulation of the particles on the membrane surface, membrane backwashes will be performed every 25 to 30 minutes. Overflow from the break tank will be directed back to the secondary effluent percolation ponds.

2.2.3.2 Reverse Osmosis System

While RO is used for purification and desalination in water treatment, it also has an extensive history of being effectively utilized in wastewater treatment processes for removal of a wide array of dissolved constituents, including trace organic compounds that are not removed through a tertiary filtration process. RO has proven to be effective at removing the refractory organics and volatile organic fractions of dissolved organic constituents. It can also remove complex organic constituents such as taste and odor causing compounds. RO is generally recognized as the best available treatment for reducing TDS and many constituents of emerging concern in wastewater effluent intended for indirect potable reuse through groundwater replenishment extraction and disinfection of the extracted water.

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The RO facility includes the following processes:

- RO feed supply pump,
- RO pre-treatment chemical addition (antiscalant and sulfuric acid for scale control),
- Cartridge filters,
- Primary RO feed pumps, and
- RO systems with interstage booster pumps.

The RO feed supply pumps will pump MF filtrate from the MF break tank through the RO cartridge filters to the RO feed pumps.

A three-stage RO configuration will be provided to increase recovery and reduce brine flow. The RO system is designed with target recovery of 92 percent. Eight-inch elements, which are the most common size in the IPR industry to date, will be used. A total of three separate containers will be utilized, one for each of the primary RO systems and a separate container for the third stage system. Two identical primary RO trains, equipped in separate containers and each treating half the flow, will be provided. The primary RO has a two-stage design operating at approximately 85 percent recovery. The third stage RO container will be equipped with one duty and one redundant third stage RO train. The third stage RO system targets approximately 50 percent recovery. The three RO containers will share a common chemical cleaning system.

The cartridge filters, located upstream of the RO, help protect the RO membranes from particulates that may be introduced to the MF filtrate in the MF break tank or through chemical addition.

Antiscalant will be added to control scaling of the RO membranes. Antiscalant will be fed upstream of the RO cartridge filters. Sulfuric acid will be added to lower the pH of the RO feed water to prevent calcium carbonate and calciumphosphate from limiting the RO recovery.

Each primary RO train will be paired with a dedicated feed pump. The RO feed supply pump will supply the feed water through the cartridge filter vessels with a sufficient suction pressure to the primary RO feed pump.

The RO feed pump dynamic head is a function of the incoming pressure from the RO feed supply pumps, the headloss in the cartridge filters upstream and the associated piping, and the required feed pressure to the RO system. The dynamic head for the primary RO feed pumps will be varied by changes in water quality and RO membrane aging. The primary RO feed pumps will be installed with Variable Frequency Drive (VFD) to accommodate varying dynamic head requirements. The rated design points for the primary RO feed pumps will be selected near the best efficiency point, under the most common RO operating conditions.

A three-stage RO configuration will be provided to increase recovery and reduce brine flow. The RO trains will have 8-inch elements, which are the most common size in the IPR industry to date. Two identical primary RO systems will be used, each treating half the flow with a 2-stage design operating at approximately 85 percent recovery. The concentrate from the two primary RO trains will be combined and delivered to a third stage RO system, located in a separate container. The third stage RO booster pump will provide the additional pressure required by the third stage RO to the primary RO

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concentrate stream. A redundant RO membrane train will be supplied for the third stage RO system to allow continued operation during a membrane cleaning.

Membrane integrity will be monitored continuously through conductivity and intermittently through weekly sampling for sulfate.

The RO skid design is based on a flux rate of 14 gfd. Figures 2-6a through 2-6c show the RO system layout.

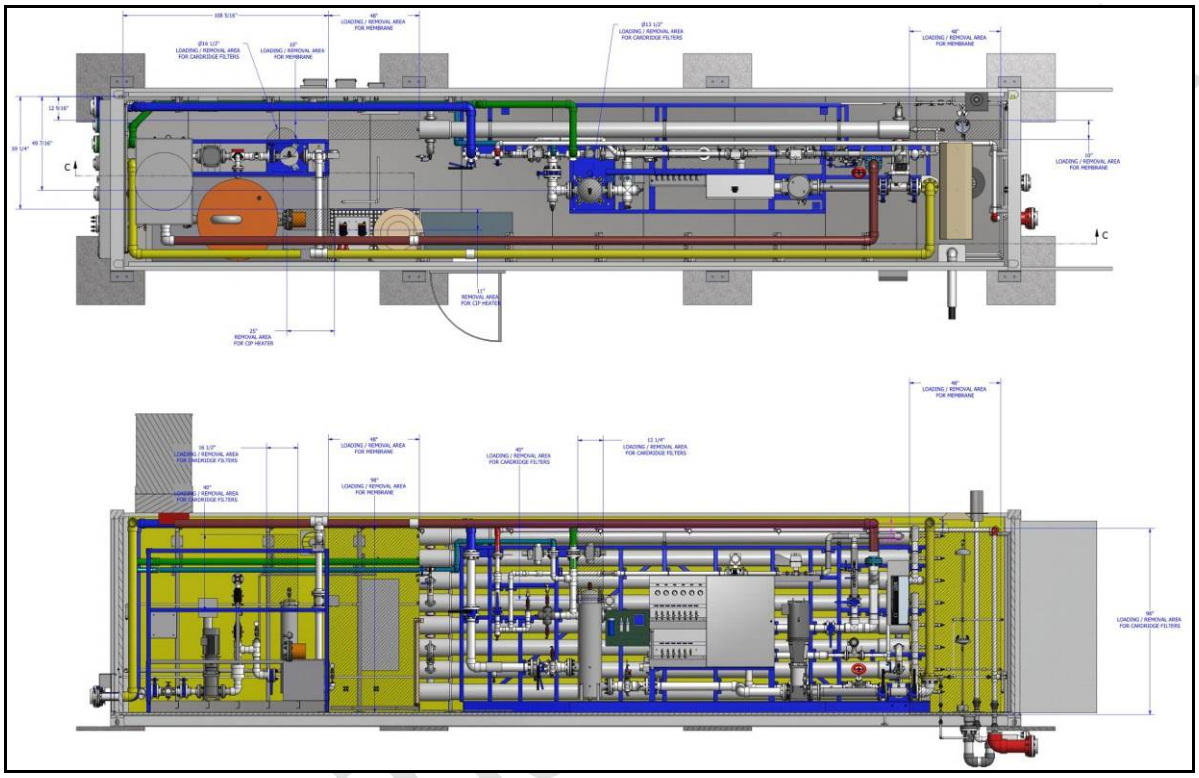

Figure 2-6a RO Train #1 System Layout

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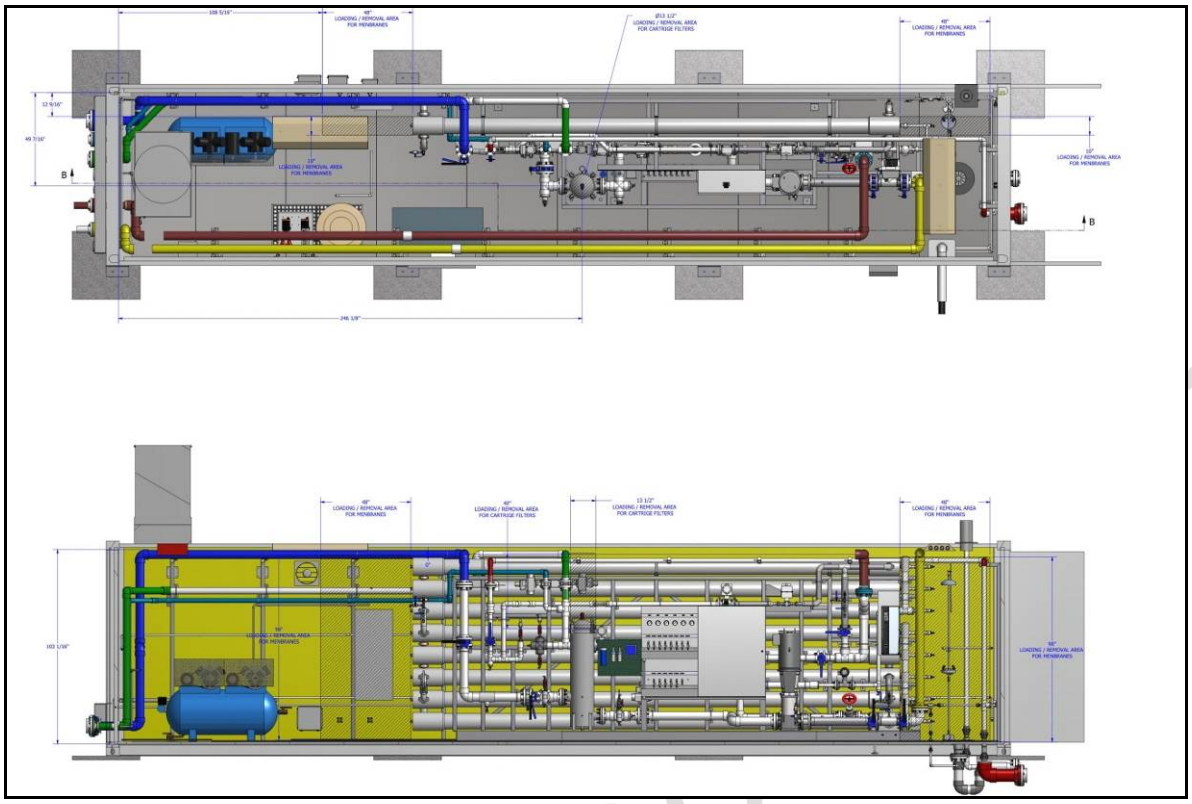

Figure 2-6b RO Train #2 System Layout

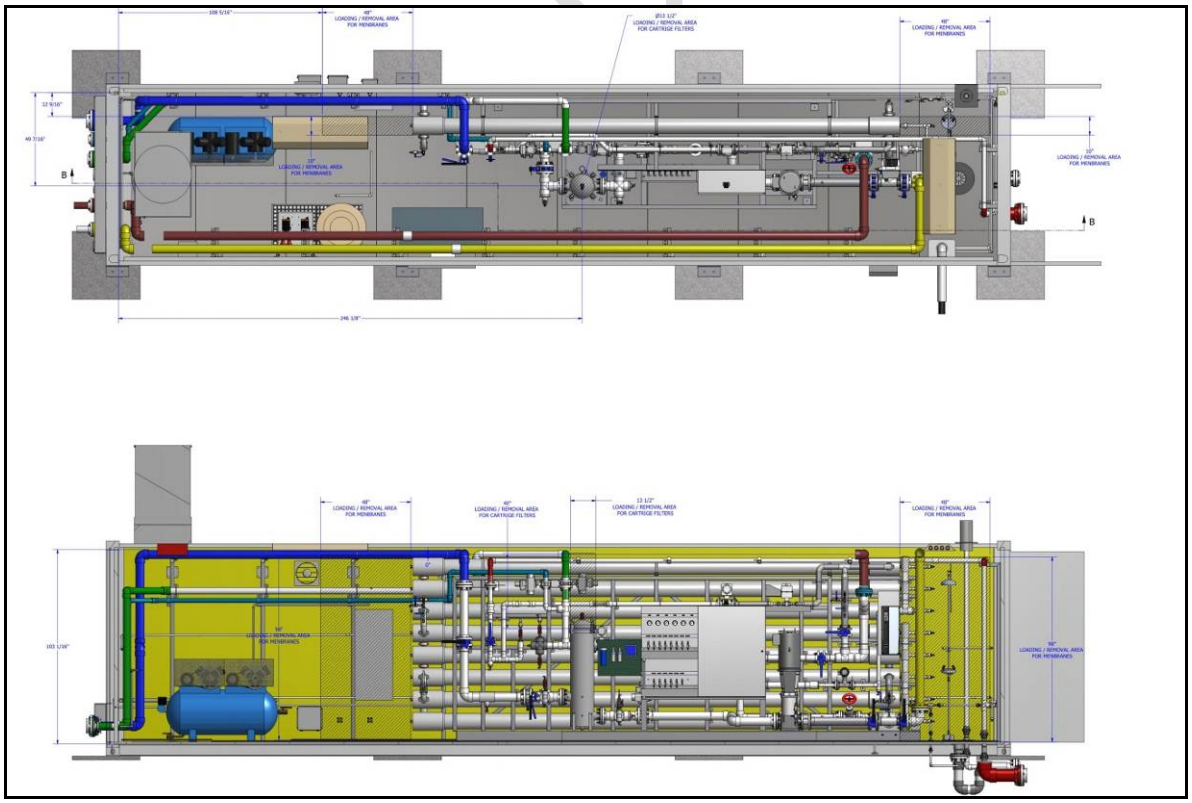

Figure 2-6c Third Stage RO System Layout

2.2.3.3 UV/Advanced Oxidation Process

The final advanced water purification process is disinfection and advanced oxidation, which is required per the draft groundwater recharge regulations. A disinfection process is needed to meet the pathogenic microorganism control requirements included in the regulations. Advanced oxidation is required for full advanced treatment per the draft groundwater recharge regulations. Advanced oxidation is required to complete the full advanced treatment, achieving a minimum 0.5-log reduction of 1,4-dioxane.

The UV reactors serve dual purpose: disinfection and advanced oxidation with addition of hydrogen peroxide upstream. The UV disinfection process will provide 6-log enteric virus reduction (towards the overall requirement of 12-log removal), 6-log Giardia cyst reduction (towards the overall requirement of 10-log removal), and 6-log Cryptosporidium oocyst reduction (towards the overall requirement of 10-log removal).

Advanced oxidation is considered the best available technology to address the destruction of trace organic compounds that are not fully removed by the RO membranes, notably NDMA, flame retardants, and 1,4-dioxane. UV/peroxide destroys trace organic compounds through two simultaneous mechanisms:

- The first mechanism is through UV photolysis (exposure to UV light) where UV photons are able to break the bonds of certain chemicals if the bond's energy is less than the photon energy.
- The second mechanism is through UV light reacting with H_2O_2 to generate hydroxyl radicals. The peroxide is added to the RO permeate upstream of the UV process at a dose of approximately 3.0 mg/L.

As noted above, the UV/peroxide system is the most common AOP technology for IPR, and it has been used extensively for the removal of trace organic compounds found in treated water. The UV/peroxide system has been designed to meet the draft groundwater recharge regulations, providing a minimum 0.5-log reduction of 1,4-dioxane, which serves as a an indicator compound for other trace organic compounds .

The layout for the UV system is shown on Figure 2-7.

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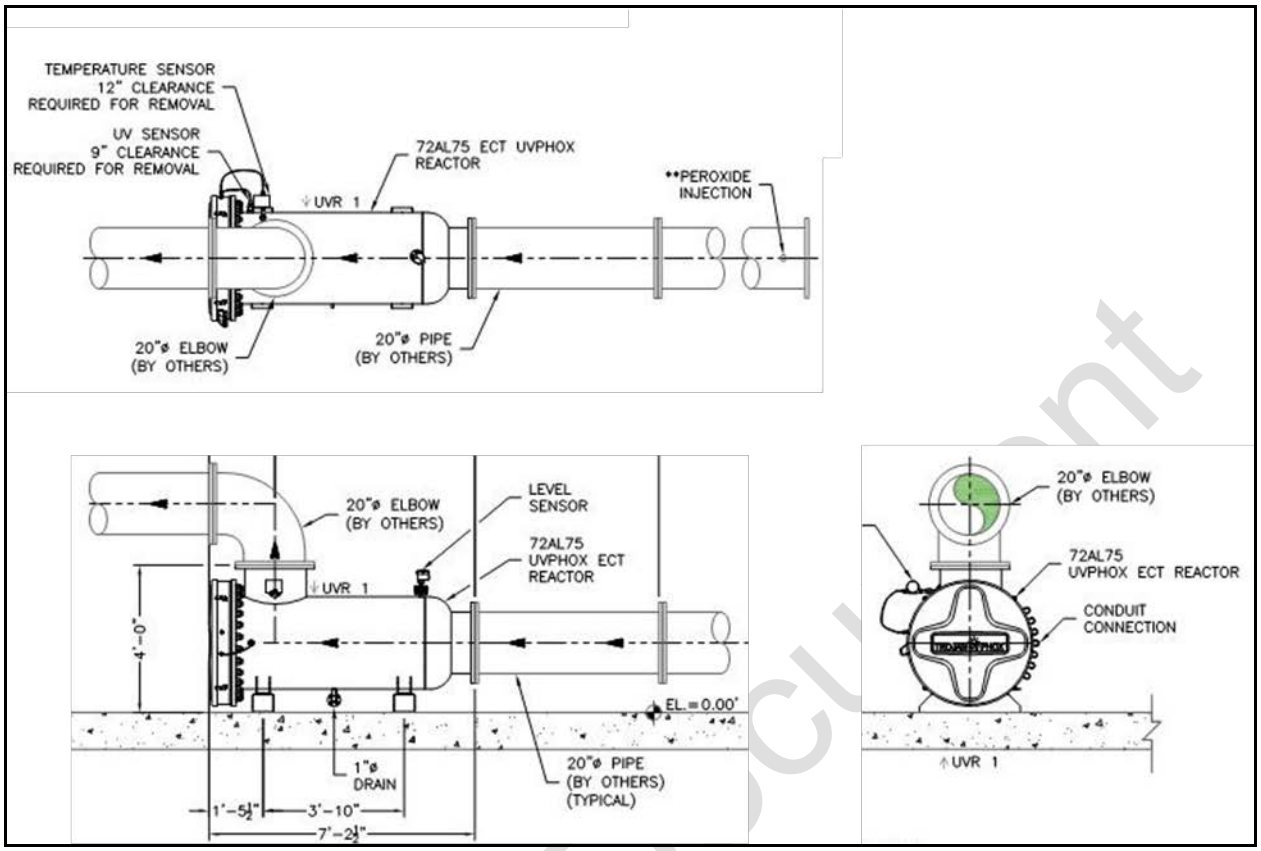

Figure 2-7 UV System Layout

2.2.3.4 Post Treatment/Stabilization

The product water will be pumped to the RIW approximately 3,400 feet northeast of the AWTP. Product water quality must minimize corrosion of the conveyance pipeline and the pumping equipment, requiring product water stabilization using caustic soda and calcium chloride. Table 2-5 summarizes the stabilization goals for the purified water.

Table 2-5 Purified Water Post-Treatment/Stabilization Goals

Constituent	Design Criteria
pH	6.5 – 9.0
Langelier Saturation Index (LSI)	-1.0 to 1.0

The post-treatment strategy includes the addition of calcium chloride to increase hardness and the addition of caustic soda to increase pH. This strategy allows operators to control hardness and pH independently, producing stable product water that can be matched to any desired combination of pH, hardness, and alkalinity.

2.2.3.5 Power Supply and Consumption

Power demand for the AWTP is estimated to be 650 KVA. Power for the AWTP will be obtained from a PG&E supplied pad mount transformer. The estimated capacity of the transformer will be 750 KVA at 480/277 volts. PG&E is responsible for getting primary power to the transformer and supplying and

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setting the transformer. The contractor will provide and install the transformer pad. PG&E will provide and install the secondary conductors from the transformer to the service entrance, and provide and install the current transformers and meter. The contractor will provide and install the meter socket and service entrance main circuit breaker. It is estimated the service will be 1200 amp.

Table 2-6 summarizes an estimated electrical load from the major process equipment in the AWTP.

Table 2-6 AWTP Electric Load

Description/Location	No. of Duty	No. of Installed Standby	Power/Unit		Max Operating	Average Operating	Installed Load	VFD
			HP	kW	(KW)	(KW)	(kW)	
WELL EXTRACTION								
Well 9P7	1	0	20.0	14.9	14.9	14.9	14.9	
UF SYSTEM								
UF Feed Pump	1	0	40.0	29.8	20.4	20.4	20.4	VFD
UF Air Compressor	1	0	25.0	18.6	18.6	3.7	18.6	
UF Backwash Pump	1	0	50.0	37.3	30.9	6.2	30.9	VFD
UF CIP Pump	1	0	30.0	22.4	22.4	2.2	22.4	
RO SYSTEM								
RO Feed Supply Pump	1	1	15.0	11.2	11.2	11.2	22.4	
Primary RO Feed Pump	2	0	50.0	37.3	60.2	60.2	60.2	VFD
Primary RO Booster Pump	2	0	7.5	5.6	9.2	9.2	9.2	VFD
Brine Concentrator RO Booster Pump	1	0	15.0	11.2	8.6	8.6	8.6	VFD
RO CIP/FLUSH SYSTEM								
RO CIP Pump	1	0	50.0	37.3	37.3	0.4	37.3	
AOP								
UV	1	0	20.1	15.0	15.0	15.0	15.0	
WELL INJECTION								
Product Water Pump (for RIW Injection)	1	0	15.0	11.2	11.2	11.2	11.2	
Filtrate Transfer Pump (LIW Injection)	1	0	5.0	3.7	3.7	3.7	3.7	
CHEMICAL DOSING								
Aqueous Ammonia Dosing Pump	1	1	0.75	0.6	0.6	0.6	1.1	
Sodium Hypochlorite Dosing Pump	1	1	0.75	0.6	0.6	0.6	1.1	
Sodium Hypochlorite Dosing Pump (MF Cleaning)	1	1	0.75	0.6	0.6	0.0	1.1	
Citric Acid Dosing Pump (MF Cleaning)	1	1	0.75	0.6	0.6	0.0	1.1	
Sulfuric Acid Dosing Pump	1	1	0.75	0.6	0.6	0.6	1.1	
Antiscalant Dosing Pump	1	1	0.75	0.6	0.6	0.6	1.1	
Hydrogen Peroxide Dosing Pump	1	1	0.75	0.6	0.6	0.6	1.1	
Sodium Hydroxide Dosing Pump	1	1	0.75	0.6	0.6	0.6	1.1	
Total Power (kW)					**268**	**170**	**284**	

Note: AWTP will be operated continuously for six months of year.

2.2.3.6 Waste Discharge

Major waste streams for the AWTP include MF backwash, RO concentrate, and miscellaneous cleaning and analytical wastes. MF backwash waste and strainer backwash will be returned to the secondary effluent percolation ponds by gravity flow, without additional treatment or flow equalization. All chemical cleaning waste, RO concentrate, and analytical waste flows will be disposed of in the Van Gordon Evaporation Pond. Details for this evaporation pond are included below.

2.2.3.7 Time and Hours of Operation

The AWTP is assumed to operate continuously for six months of the year when the drought conditions are most severe.

2.3 Evaporation Pond

2.3.1 Evaporation Pond Site

The AWTP-generated RO concentrate, chemical cleaning waste, and analytical instrument waste will be sent to Van Gordon Evaporation Pond for disposal via evaporation. The existing Van Gordon Reservoir, originally constructed for percolation of the secondary effluent from the CCSD's wastewater treatment plant, will be lined with an impermeable liner to meet Title 27 Class II waste discharge standards. In addition, to accelerate evaporation of the disposed RO brine, five (four duty and one standby) mechanical spray evaporators will be installed. The mechanical spray evaporators will be located along west berm in order to provide the greatest setback from the Van Gordon Creek corridor, and will be enclosed with noise barriers to reduce the noise.

2.3.2 Pond Site Description

The evaporation pond site is located directly south of San Simeon Monterey Creek Road and directly east of Van Gordon Creek Road. It is approximately 1,000 ft away from the new AWTP site. The pond is trapezoidal with a length and width of approximately 300ft and surface area of approximately 105,000 sf to 137,000 sf, or 2.4 acre to 3.1 acre, depending on water level in the pond. The berm elevation is approximately 47 ft with an interior slope of 4:1, an exterior slope of 3:1 and an overall depth varying from 8 to10 feet[1]. The RO brine will be delivered via a pipe on the northeast side of the pond. See Figure 2-8, Brine Evaporation Pond Plan below.

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[1] Based on field survey collected by North Coast Engineering, Inc. in May 2014.

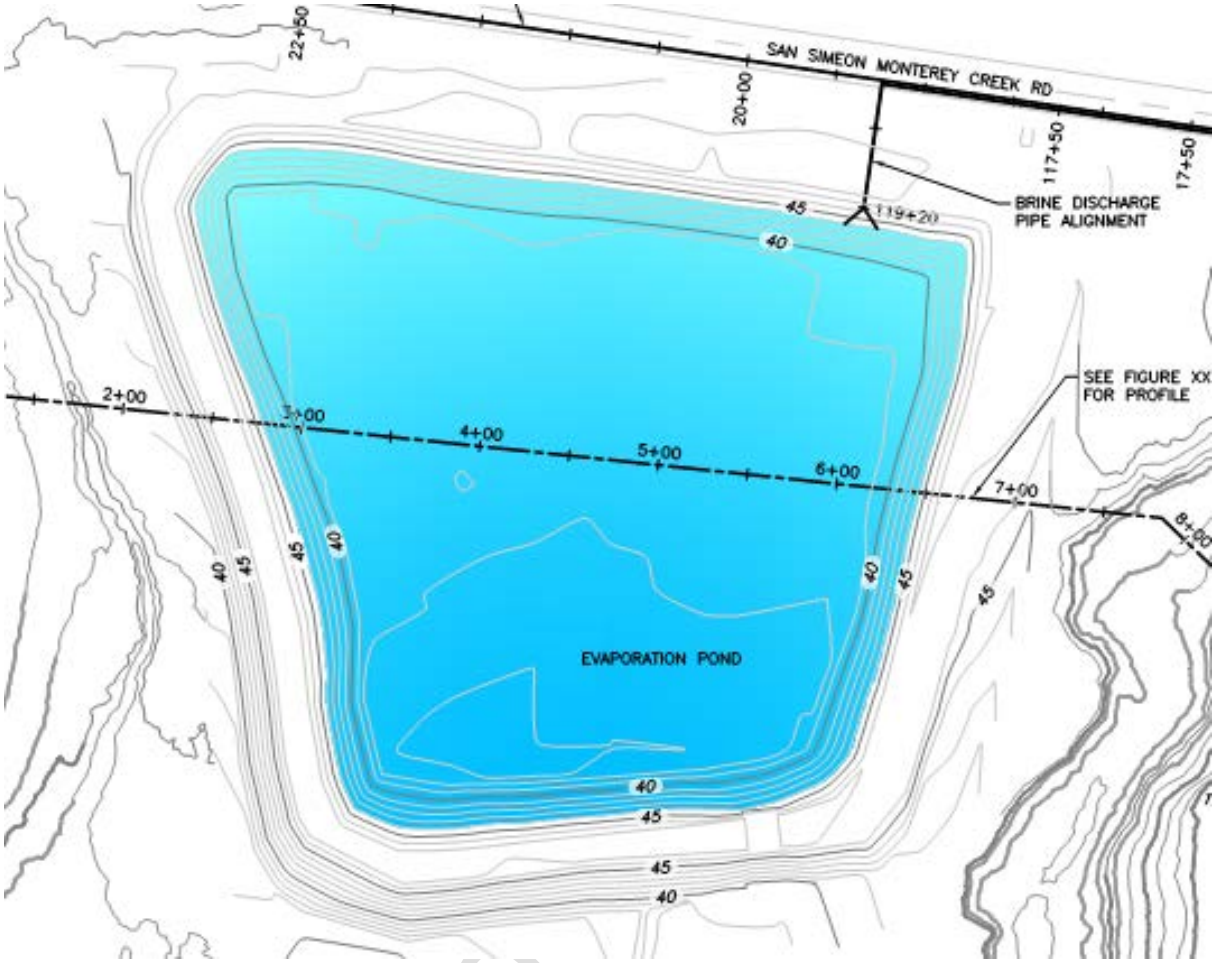

Figure 2-8 Brine Pond Plan

An existing spillway along the pond's southern berm will be demolished and regraded to provide a uniform top of slope elevation around the pond. The pond will operate with a minimum freeboard of 2ft plus 13.4 inches free space to contain 24 hour sustained 1000 yr rainfall, per the Title 27 requirements. The pond will be designed to provide for a 5 ft minimum separation between the groundwater elevation and bottom of the pond, also per Title 27 requirements[2]. See Figure 2-9, Brine Pond Section below, which shows the existing brine pond and groundwater elevation.

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[2] Initial geotechnical field observations conducted in May 2014 observed a groundwater elevation that is approximately 20 ft below the bottom of the existing pond.

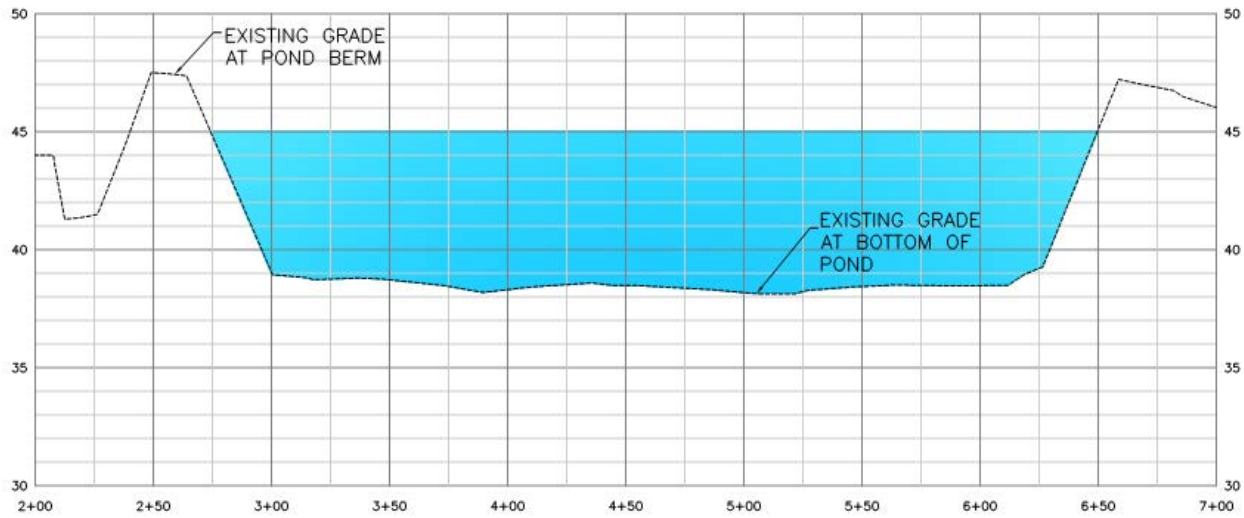

Figure 2-9 Brine Pond Section (Elevation in Feet)

Title 27 requires installation of an impermeable liner, a leachate collection and removal system (LCRS), and a vadose zone monitoring system. The primary liner and the textured drain liner materials will be impermeable. The LCRS will include a perforated conductor pipe and trench along the pond bottom terminating into a collection sump. The LCRS will be designed to maintain less than one foot of head on the secondary liner. The LCRS sump will have a surface entry pipe for the monitoring and removal of any accumulated leachate.

Vadose zone monitoring will be provided via an impermeable HDPE liner sloped down the entire length of the surface impoundment's centerline to a collection point below the LCRS sump. Similar to the LCRS system, the vadose zone monitoring system would have a surface entry pipe for the monitoring and sampling of any liquids.

Mild earthwork will be performed to grade the bottom of the pond and install the LCRS, vadoze zone monitoring system. The pond will be designed to withstand the maximum credible earthquake and the 100-year flood. Based on a recent geotechnical investigation, the existing embankments appear to be able to withstand the maximum credible earthquake. Based on the FEMA map of the 100-year flood plain, the water surface elevation would rise to approximately the bottom of the exterior berm around elevation.

The brine waste will be evaporated via natural evaporation as well as mechanical spray evaporators. Over time, the dissolved salt concentration in the pond will increase until it begins to precipitate from solution. The super-concentrated waste, whether liquid or solid, will eventually be removed from the site for disposal. In concentrated slurry form, the waste will be pumped to trucks and shipped away. In dried solids form, the solids accumulated on pond bottoms will be removed manually using shovels and barrels and disposed offsite.

2.3.3 Mechanical Spray Evaporators

Based on the estimated annual evaporation rate in the region and 42 gpm of average RO brine generation, estimated surface area or 2.8 acres in the Van Gordon Pond is not sufficient to naturally evaporate the full RO brine flow. Therefore, enhanced evaporation utilizing mechanical spray evaporators will be used at the evaporation pond. Using enhanced spray evaporation equipment, the

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required surface area could be conservatively reduced by 10 to 20 times, requiring approximately 2.4 acres, which is within the area available at the Van Gordon Pond.

The design criteria of the mechanical spray evaporator are summarized in Table 2-7.

Table 2-7 Mechanical Spray Evaporator Design Criteria

Parameter	Criteria
Number of spray evaporators	5 units (4 duty, 1 standby)
Brine flow pumping rate	65 gpm/unit
Evaporation efficiency	30 %
Evaporator operation time	50% of 365 d/yr
Power	32.5 hp/unit total; 7.5 hp for a submersible pump and 25 hp for a spray fan

Noise and drift are some of the concerns with the use of mechanical spray evaporators when considering the proximity of the evaporation pond to San Simeon campgrounds and in design of the operations and control features for the evaporators. Sound enclosures will be installed around three sides of the mechanical evaporators to reduce noise to a level in compliance with Coastal Zone noise ordinances.

Drift will be controlled by pond dimensions, evaporator location, and with weather stations, which will turn the evaporators on or off depending on wind speed and direction.. The weather stations, installed onsite, will measure site weather conditions, including wind velocity, wind direction, humidity and temperature. The evaporators will be operated only when wind direction, wind velocity, temperature and humidity are within the preset ranges to keep the particles within the pond limits. For the evaporator sizing it is assumed that the evaporator will be in operation approximately 50 percent of time on average. Figures 2-10a and 2-10b shows spray evaporator in operation and proposed sound enclosure, and Figure 2-11 shows a weather station control panel.

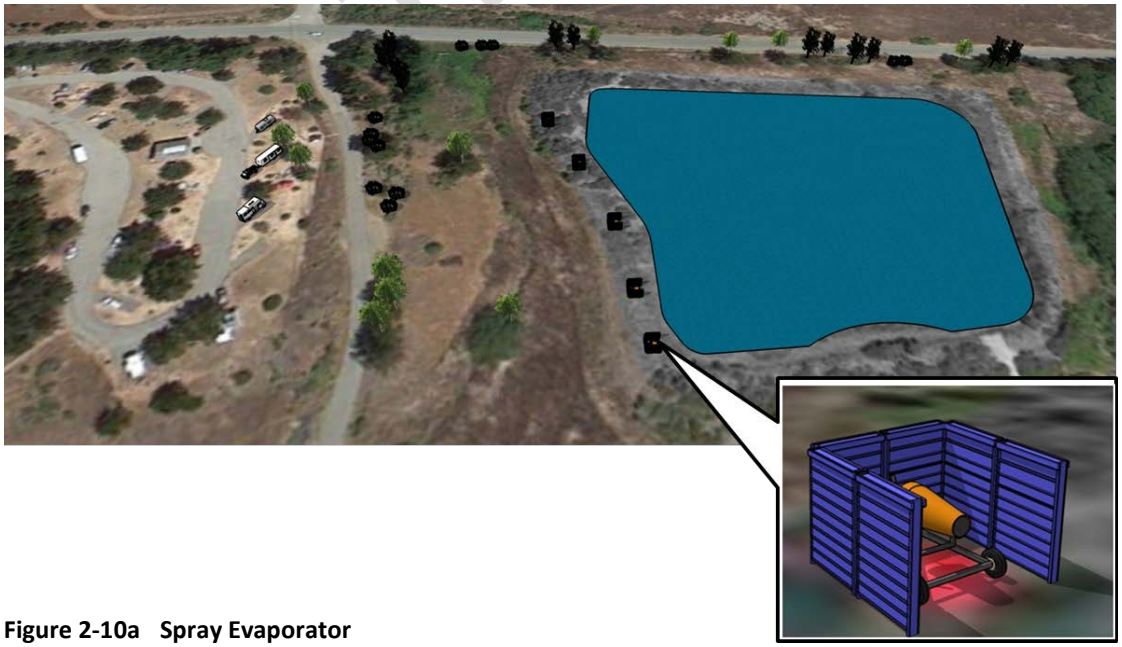

Figure 2-10a Spray Evaporator

Figure 2-10b Sound Enclosure

Figure 2-11 Weather Station Control Panel

2.3.4 Power Supply and Consumption

Power demand for the Evaporation Ponds is estimated to be 250 KVA. Power for the Evaporation Ponds will be obtained from a PG&E supplied pad mount transformer. The estimated capacity of the transformer will be 300 KVA at 480/277 volts. PG&E is responsible for getting primary power to the transformer and supplying and setting the transformer. The contractor will provide and install the transformer pad. PG&E will provide and install the secondary conductors from the transformer to the service entrance, and provide and install the current transformers and meter. The contractor will provide and install the meter socket and service entrance main circuit breaker. It is estimated the service will be 500 amp.

Table 2-8 summarizes an estimated electrical load from the spray evaporators at the Brine Evaporation Pond.

Table 2-8 Brine Evaporator System Electric Load

Description/Location	No. of Duty	No. of Installed Standby	Power/Unit		Max Operating	Average Operating	Installed Load	VFD
			HP	kW	(KW)	(KW)	(kW)	
BRINE EVAPORATION								
Submersible Pumps	4	1	7.5	5.6	22.4	11.2	28.0	
Spray Fans	4	1	25.0	18.6	74.6	37.3	93.2	
Total Power (kW)					**97**	**48**	**121**	

Note: Evaporators will be operators approximately 12 hrs per day, during day time, and year round

2.3.5 Time and Hours of Operation

The spray evaporator operation will be controlled by the weather stations and will operate only when wind direction, wind velocity, temperature and humidity are within the preset ranges. Considering the foggy weather in the area and the nearby Hearst San Simeon State Park campgrounds it is assumed that the spray evaporators will be operated approximately 12 hours per day, during day time, and year round (i.e., approximately 50 percent of time on annual average).

2.4 Project Piping System

2.4.1 Yard Piping

The schedule of yard piping within AWTP site is provided in Table 2-9 below, and shown in Figure 2-4. All yard piping will be installed below grade.

Table 2-9 Yard Piping Schedule

Pipe	Size	Material	Pressure Rating	Note
Process Water Pipes Low Pressure	4” to 8”	PVC or HDPE	150 psi	Yard piping will be buried below grade
Process Water Pipes High Pressure	4” to	Stainless Steel	200 psi	Yard piping will be buried below grade
Air Piping	1/4” to 1”	Stainless Steel	150 psi	Yard piping will be buried below grade
Chemical Feed Pipes (Carrier Pipes)	1/4” to 1”	Schedule 80 PVC, Schedule 80 CPVC, PP, PE, EPDM, PVDF or PTFE tubing	150 psi	Yard piping will be buried below grade

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Pipe	Size	Material	Pressure Rating	Note
Chemical Feed Pipes (Containment Pipes)	2” to 4”	Schedule 40 PVC, or HDPE	N/A	Double contained, Yard piping will be buried below grade

Note:
CPVC – Chlorinated polyvinyl chloride
EPDM – Ethylene Propylene diene monomer
HDPE – High density polyethylene
PE – Polyethylene
PP – Polypropylene
PTFE – Polytetrafluoroethylene (Teflon)
PVC – Polyvinyl chloride
PVDF – Polyvinylidene Fluoride

2.4.2 Conveyance Piping

The schedule of conveyance piping is provided in Table 2-10 below and shown in Figure 2-12. Conveyance piping will be installed mostly above grade.

Table 2-10 Conveyance Pipeline Schedule

Pipe	Size	Material	Pressure Rating	Length
Raw Water (Existing Well 9P7 pipeline to AWTP)	8”	PVC or HDPE	150 psi	Approx. 140 feet
Product Water (AWTP to RIW-1)	8”	PVC or HDPE	150 psi	Approx. 3,400 ft
Brine (AWTP to Brine Evaporation Pond)	4”	PVC or HDPE	150 psi	Approx. 2,000 ft
MF Filtrate (AWTP to LIW)	4”	PVC or HDPE	150 psi	Approx. 4,400 ft

Note:
HDPE – High density polyethylene
PVC – Polyvinyl chloride

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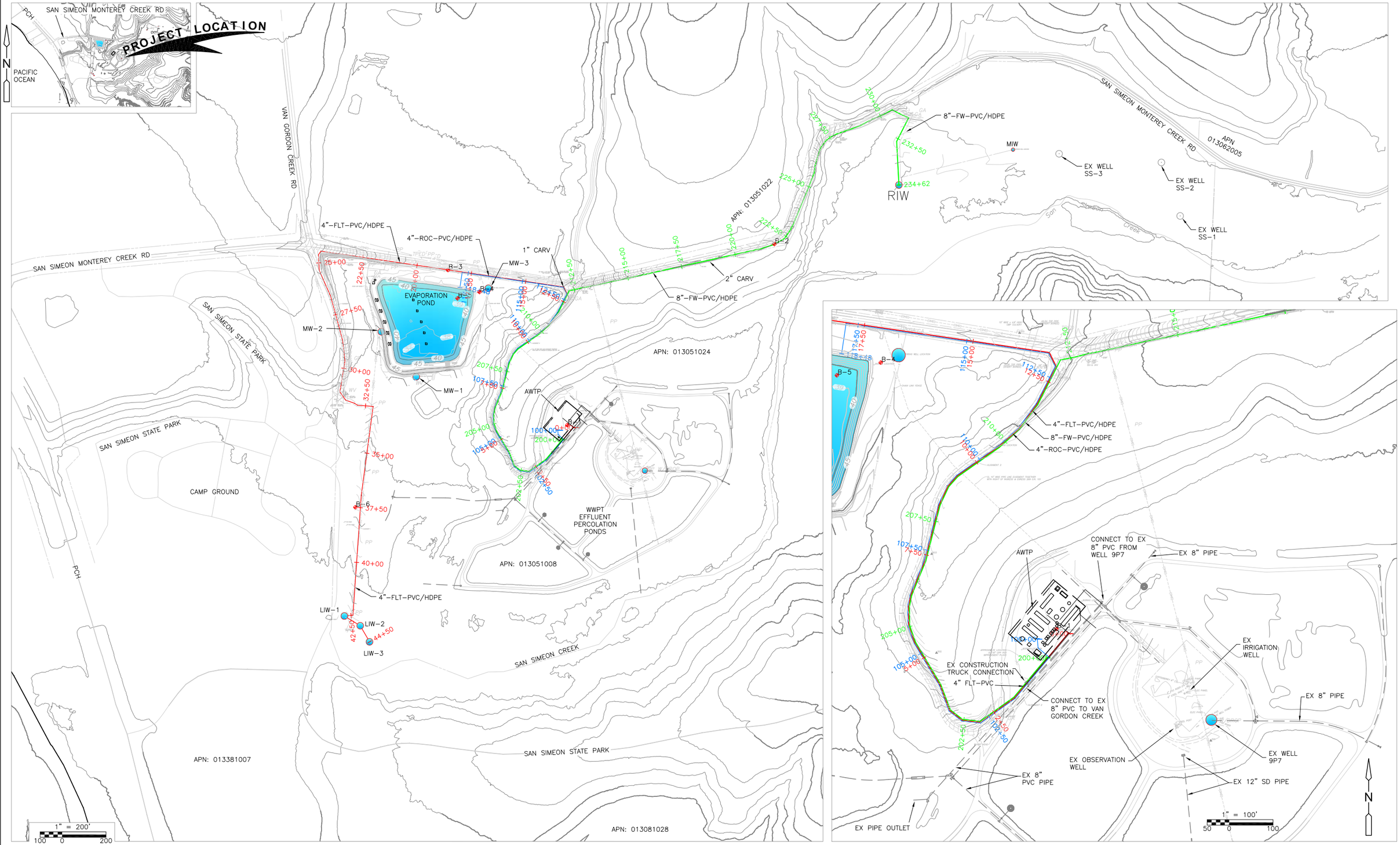

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: E.Y.
DRAWN BY: O.N.
SHEET CHK'D BY: –
CROSS CHK'D BY: –
APPROVED BY: –
DATE: JUNE, 2014

WARNING
0 1/2" 1"
IF THIS BAR SCALE DOES NOT MEASURE 1" THIS DWG HAS BEEN REDUCED SCALE ACCORDINGLY

CDM Smith
111 Academy Way, Suite 150
Irvine, California 92617
Tel: (949) 752-5452

CAMBRIA EMERGENCY WATER SUPPLY PROJECT
CAMBRIA COMMUNITY SERVICE DISTRICT

CONVEYANCE PIPING PLAN

PROJECT NO. 138760-104133
FILE NAME:

FIGURE 2-12

NOT FOR CONSTRUCTION

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2.5 Injection Well RIW-1

The stabilized AWTP finished product water will be pumped for injection into the groundwater basin at the San Simeon Well Field utilizing a new RIW-1. RIW-1 will be constructed to the west of the existing potable supply water well SS-3. In addition, a monitoring well will be installed in between RIW-1 and SS-3 well.

2.5.1 RIW Well Site Description

Injection well RIW-1 will be installed on the east side of the CCSD property approximately 300 feet north of San Simeon Creek and 500 feet south of San Simeon Creek Road. Well RIW-1 is approximately 1,300 feet west of wells SS-1 and SS-2, and approximately 1,700 feet northeast of the proposed water treatment facility and existing effluent ponds. The property is a 92-acre, unimproved, open field vegetated with grass, shrubs and some trees varying in elevation from approximately 20 to 25 feet above mean sea level. The CCSD production wells, SS-1, SS-2 and SS-3 are located on the eastern end of the property, and a gravel road connects the wells and transverses this portion of the property.

2.5.2 Injection Capacity and Brief Description

Well RIW-1 is 100 feet deep and constructed of 10-inch diameter mild steel well casing with 45 feet of type 304L stainless steel, wire-wrap screen with 0.08-inch wide slot openings. It is screened from 50 to 95 feet bgs. RIW-1 has a 5-foot, stainless steel sediment trap below the well screen. CDM Smith anticipates injecting 454 gpm into the well.

The wellhead facilities will be completed above grade. Wellhead facilities will include steel pipe, control valve to control the flow into the injection well, a flow meter to measure the flow, and isolation valves to be able to remove above ground equipment. There will be no pumps or noise generating equipment installed at the injection well site. A small panel will be provided for the controls for the foot valves which will be located below ground in the well to maintain a backpressure on the well piping.

2...5.3 Monitoring Well

Well MIW-1 is 95 feet deep and constructed of 4-inch diameter, schedule 40 PVC well casing with 45 feet of Schedule 40 PVC, mill slot screen with 0.04-inch wide slot openings. It is screened from 45 to 95 feet bgs. The well is complete 2.5 feet above ground in a lockable, 8-inch diameter steel stand pipe. There is a 4-inch thick, 3-foot by 3-foot concrete pad around the stand pipe.

2.6 Water for Lagoon Protection

To maintenance and improve the fresh water conditions in the San Simeon Creek fresh water lagoons, a side stream of MF filtrate will be pumped and discharged into Van Gordon Creek at 100 gpm. For this purpose, a new conveyance piping may be routed to the LIWs, or existing discharge piping of Well 9P7 may be utilized to discharge to Van Gordon Creek adjacent to the AWTP. The option with connection to existing discharge piping of Well 9P7 is shown in Figure 2-12.

For the option utilizing LIWs, the MF treated side stream water will be conveyed using an on-grade laid pipeline to shallow LIWs. The LIWs will be installed to the north of San Simeon Creek and on the west bank of the Van Gordon Creek.

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2.6.1 LIWs Option

2.6.1.3 LIW Well Site Description

Three permanent LIWs will be installed on west side of the CCSD property near the existing effluent percolation ponds southeast of the intersection of San Simeon Creek Road and Van Gordon Creek Roads. The property is a 92-acre, unimproved, open field vegetated with grass, shrubs and some trees with an elevation approximately 40 feet above mean sea level.

2.6.1.2 Injection Capacity and Brief Description

The LIWs will be approximately 40 feet deep and constructed of 6-inch diameter PVC well casing and mill slot screen with 0.04-inch wide slot openings. They will be screened from approximately 30 to 40 feet bgs. CDM Smith anticipates injecting 25 to 33 gpm into each well.

The lagoon injection wellhead facilities will be completed above grade. Wellhead facilities will include steel pipe, control valve to control the flow into the injection well, a flow meter to measure the flow, and isolation valves to be able to remove above ground equipment. There will be no pumps or noise generating equipment installed at the injection well site. A small panel will be provided for the controls for the foot valves which will be located below ground in the well to maintain a backpressure on the well piping.

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Section 3
Construction

This project will utilize a fast-paced, design-build construction delivery method. The project construction activities would include construction and installation of the proposed facilities described above. Construction activities include grading, trenching and excavation as well as installation of equipment on structural footings and concrete housekeeping pads. The project would be constructed within existing CCSD boundaries.

3.1 Access Road and Laydown/Staging Area for Construction

The access roads and laydown/staging areas for construction are shown in Figure 3-1 below.

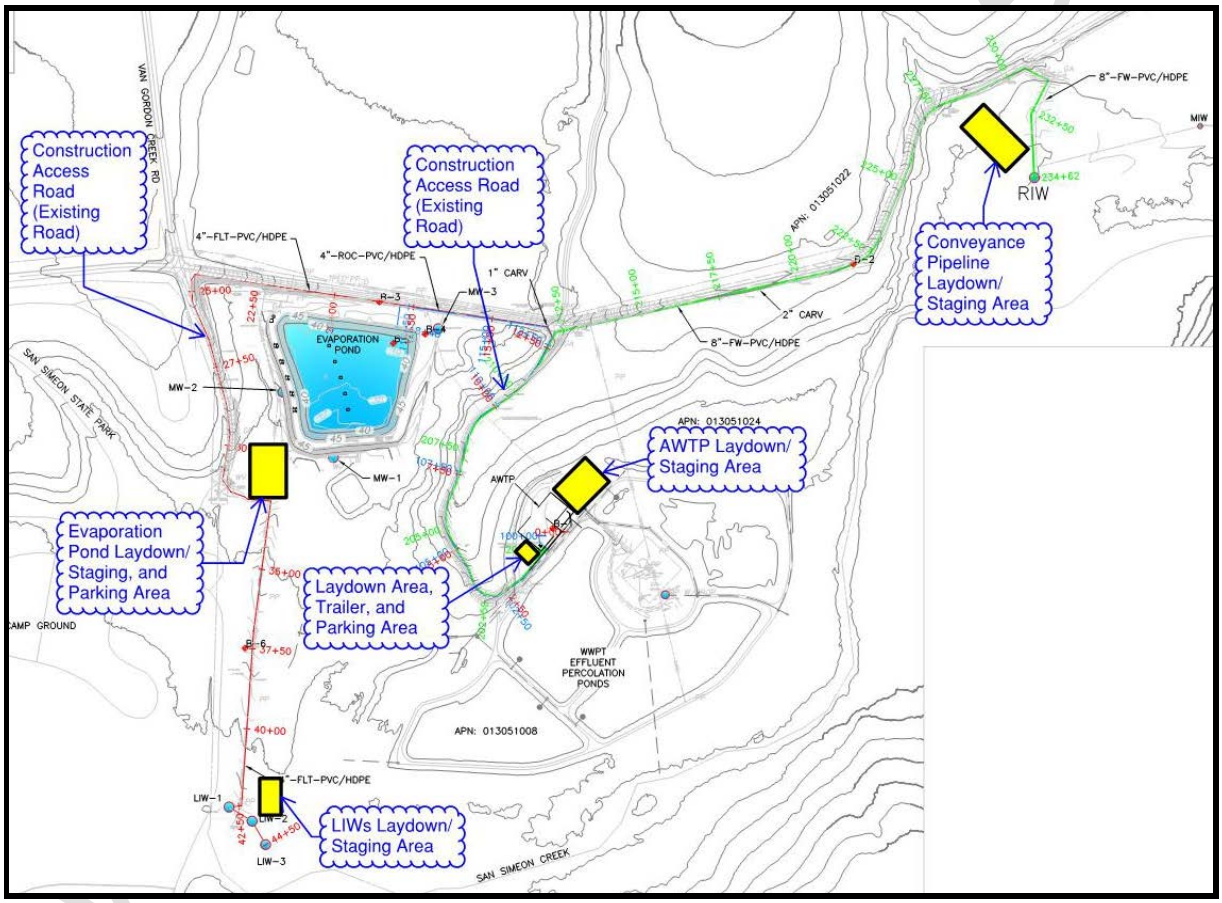

Figure 3-1 Construction Access Road and Laydown/Staging Areas

3.2 Construction Time and Hours

The estimated construction period is six months, from May 15 to November 14, 2014. Construction work times will be six days per week. The construction hours will be 7:00 a.m. to 5:00 p.m. Mondays to Fridays, and 8:00 a.m. to 5:00 p.m. Saturdays, as permitted by CZLUO Section 23.06.042.

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Working Document

Section 4
System Operations

Operating and maintaining the equipment would not require full time staff on-site since the plant will be designed to operate automatically with no operators on-site. Up to two employees would visit the site daily to operate and maintain the plant. CCSD's operations and maintenance staff will not change as a result of the proposed treatment plant. The plant operation information will be connected to CCSD's wastewater treatment plant control room for off-site monitoring and control.

Working Document

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Working Document

Section 5
Project Approvals

- CCSD Board: CEQA Clearance
- RWQCB: Title 27 Permit
- RWQCB: WDR
- CDPH Clearance: Ground Water Recharge Findings of Facts and Conditions
- SLO: Emergency Coastal Development Permit
- SLO: Regular Coastal Development Permit

Working Document

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Working Document

Appendix A
Design Plans

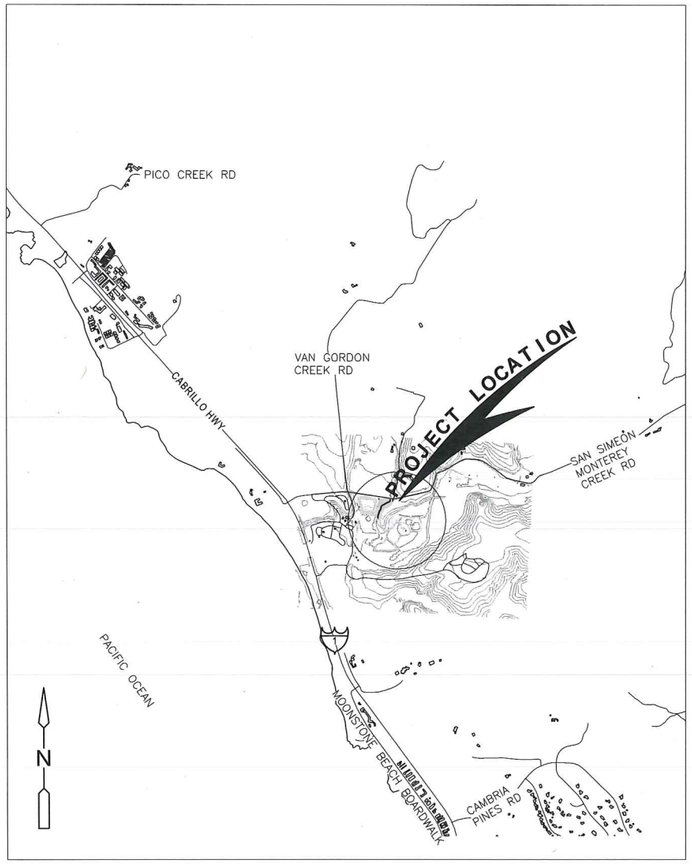
Working Document

CAMBRIA, CALIFORNIA

EMERGENCY WATER SUPPLY PROJECT

PWC # XXX

PRELIMINARY DESIGN SUBMITTAL
JUNE, 2014



VICINITY MAP

LOCATION MAP

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C-6	BRINE EVAPORATION POND SECTION AND DETAILS I
C-7	BRINE EVAPORATION POND SECTION AND DETAILS II
C-8	CIVIL DETAILS I
C-9	CIVIL DETAILS II
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I-7	P&ID - BREAK/BACKWASH TANK, FILTRATE TRANSFER AND RO FEED SUPPLY PUMPS
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I-10	P&ID - THIRD STAGE RO CONTAINER
I-11	P&ID - PRODUCT WATER PUMPING STATION AND RO FLUSH PUMP
I-12	P&ID - MF CLEANING SODIUM HYPOCHLORITE AND CITRIC ACID DOSING SYSTEMS
I-13	P&ID - MF CLEANING SODIUM HYDROXIDE DOSING SYSTEMS
I-14	P&ID - CHEMICAL DOSING SYSTEM CONTAINER - 1
I-15	P&ID - CHEMICAL DOSING SYSTEM CONTAINER - 2
I-16	P&ID - RO CIP SYSTEM
I-17	P&ID - AIR COMPRESSOR SYSTEM
VENDOR P&IDs	
O-14024-C01-0290	MF FEED PUMP SKID - P&ID
O-14024-C01-0300	MF STRAINER STATION - P&ID
O-14024-C01-0310	MICROFILTRATION UNIT W/ FCV - P&ID
O-14024-C01-0360	MF BACKPULSE SYSTEM - P&ID
O-14024-C01-0370	MF CIP SYSTEM W/ VFD CONTROLLED PUMP - P&ID
O-14024-C01-0400	RO FEED PUMP SKID - P&ID
O-14024-C01-0410	RO CONTAINER #1 - P&ID
O-14024-C01-0411	RO CONTAINER #2 - P&ID
O-14024-C01-0470	RO CIP SYSTEM - P&ID
O-14024-C01-0800-1	DOSING SKIDS - SINGLE PUMP SKID - P&ID
O-14024-C01-0800-2	DOSING SKIDS - SINGLE PUMP SKID - P&ID
O-14024-C01-0810	CHEMICAL TREATMENT BUILDING - P&ID
O-14024-C01-0950	AIR COMPRESSOR SYSTEM - AIR SCOUT & MIT AS SEPARATE LINES - P&ID
O-14024-C01-0990	UF BACKPULSE SYSTEM - P&ID
TYPICAL	P&ID - UV
TYPICAL	P&ID - HYDROGEN PEROXIDE DOSING SYSTEM

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: E.Y.
DRAWN BY: O.N.
SHEET CHK'D BY: –
CROSS CHK'D BY: –
APPROVED BY: –
DATE: JUNE, 2014

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CAMBRIA EMERGENCY WATER SUPPLY PROJECT
CAMBRIA COMMUNITY SERVICE DISTRICT

TITLE SHEET AND SHEET INDEX

PROJECT NO. 138760-104133
FILE NAME:
SHEET NO.
G-01

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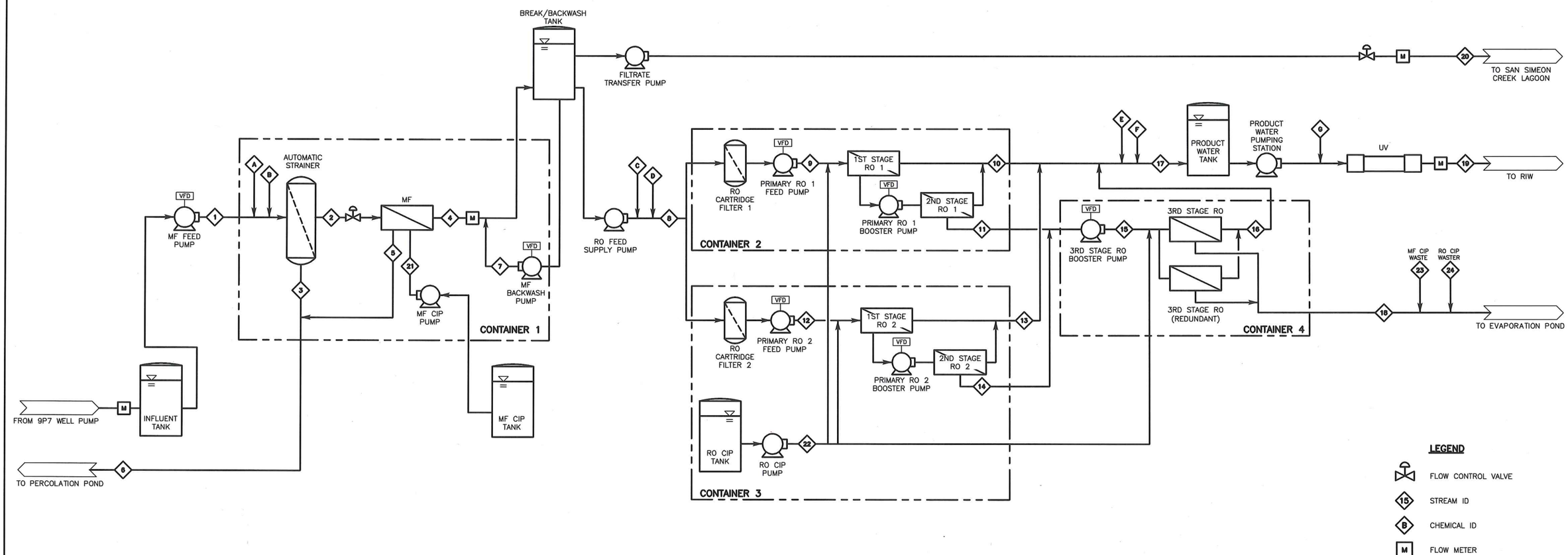

FLOW BALANCE

AUTOMATIC STRAINER RECOVERY	99%
MF RECOVERY	92%
OVERALL RO RECOVERY	92%
CIP WASTE	0.5%

FLOW STREAM	AWTP FEED	MF FEED	AUTOMATIC STRAINER WASTE	MF FILTRATE	MF BACKWASH WASTE (NOTE 1)	MF AND AUTOMATIC STRAINER COMBINED WASTE	MF BACKWASH FEED (NOTE 1)	COMBINED RO FEED	PRIMARY RO 1 FEED	PRIMARY RO 1 PERMEATE	PRIMARY RO 1 CONCENTRATE	PRIMARY RO 2 FEED	PRIMARY RO 2 PERMEATE	PRIMARY RO 2 CONCENTRATE	THIRD STAGE RO FEED	THIRD STAGE RO PERMEATE	COMBINED RO PERMEATE	THIRD STAGE RO CONCENTRATE	PRODUCT WATER TO RECHARGE INJECTION WELL (RIW)	MF FILTRATE TO SAN SIMEON CREEK LAGOON	MF CIP FEED (NOTE 1)	RO CIP FEED (NOTE 1)	MF CIP WASTE (NOTE 1)	RO CIP WASTE (NOTE 1)
FLOW STREAM ID	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**	**16**	**17**	**18**	**19**	**20**	**21**	**22**	**23**	**24**
Average Flow (GPM)	691	684	7	629	55	62	55	529	265	212	53	265	212	53	106	64	487	42	484	100	2	1	2	1
Pressure (psi)	40	30	5	5	5	5	30	30	122	15	115	122	15	115	215	15	15	20	30	30	20	20	20	20
TDS (mg/L)	1374	1374	1374	1374	-	1374	1374	1374	1366	101	6756	1366	101	6756	6756	1108	222	14529	222	1374	-	-	-	-

CHEMICAL	ACQUEOUS AMMONIA	SODIUM HYPOCHLORITE	THRESHOLD INHIBITOR	SULFURIC ACID	SODIUM HYDROXIDE	CALCIUM CHLORIDE	HYDROGEN PEROXIDE
CHEMICAL STREAM ID	A	B	C	D	E	F	G
Bulk Chemical Concentration	19.00%	12.50%	100.00%	50.00%	25.00%	34.70%	27.00%
Chemical Dose, Max	1.5 mg/L	6.0 mg/L	3.0 mg/L	180 mg/L	50 mg/L	35 mg/L	5.0 mg/L
Dosing Rate, Max	8.3 gpd	38 gpd	1.8 gpd	49.0 gpd	112 gpd	52 gpd	11.8 gpd

NOTES
1. INTERMITTENT FLOW.
2. ALL THE CHEMICAL DOSING SKIDS EXEPT THRESHOLD INHIBITOR WILL BE INSTALLED IN CONTAINER 5 (NOT SHOWN). THRESHOLD INHIBITOR DOSING SKIDS WILL BE INSTALLED IN CONTAINER 2 AND CONTAINER 3.
3. MAIN CONTROL ROOM AND OFFICE SPACE WILL BE SUPPLIED IN CONTINER 6 (NOT SHOWN).
4. RO FLOW CONDITIONS ARE BASED ON AN AVERAGE MEMBRANE AGE OF 3 YEARS.

REV. NO.	DATE	DRWN	CHKD	REMARKS

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DRAWN BY: RH
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CROSS CHK'D BY: –
APPROVED BY: –
DATE: JUNE, 2014

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CAMBRIA EMERGENCY WATER SUPPLY PROJECT
CAMBRIA COMMUNITY SERVICE DISTRICT

PROCESS FLOW DIAGRAM

PROJECT NO. XXXXX–XXXXXX
FILE NAME:
SHEET NO.
P-01

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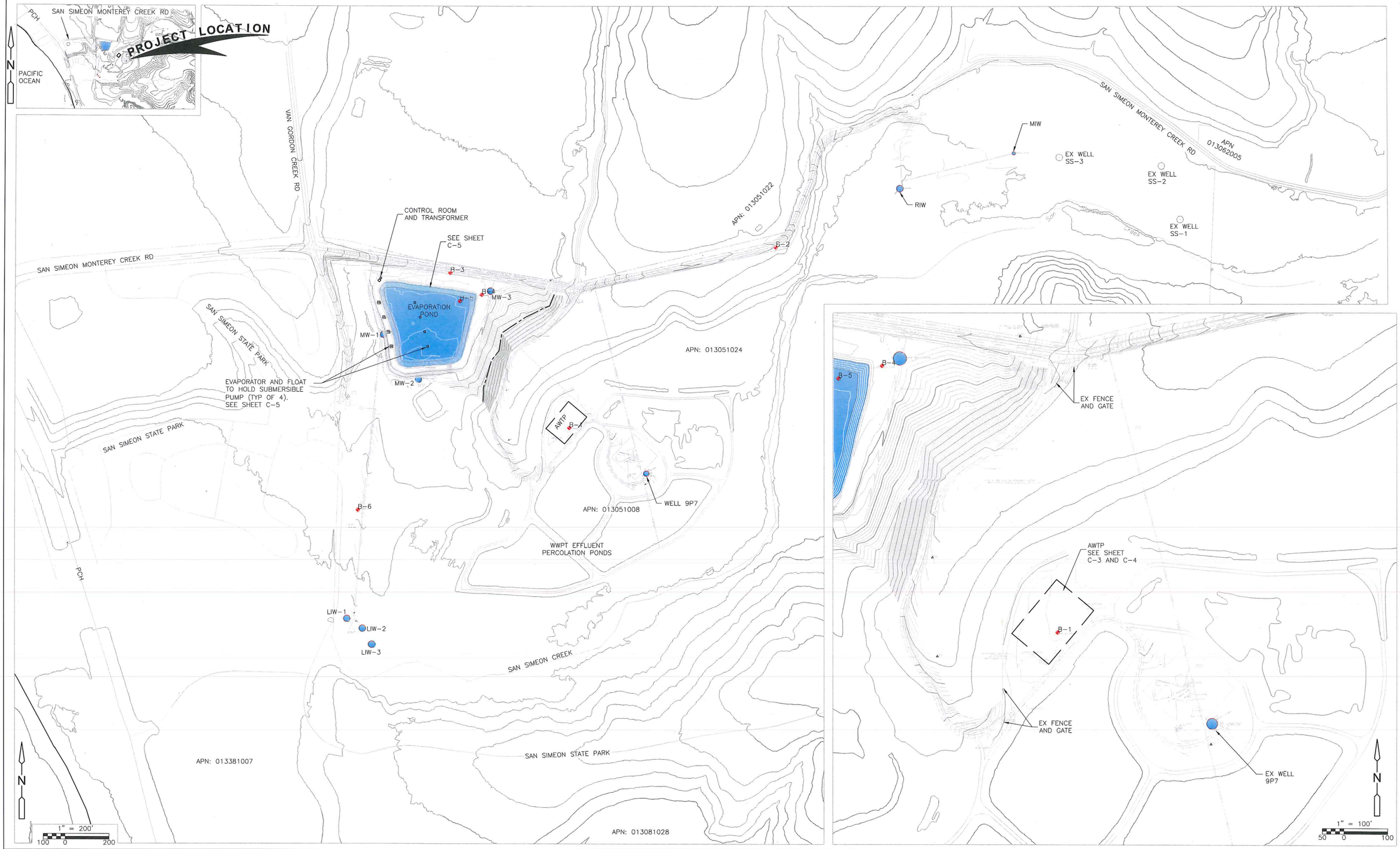

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CAMBRIA EMERGENCY WATER SUPPLY PROJECT
CAMBRIA COMMUNITY SERVICE DISTRICT

OVERALL SITE PLAN

PROJECT NO. 138760-104133
FILE NAME:
SHEET NO.
C-01

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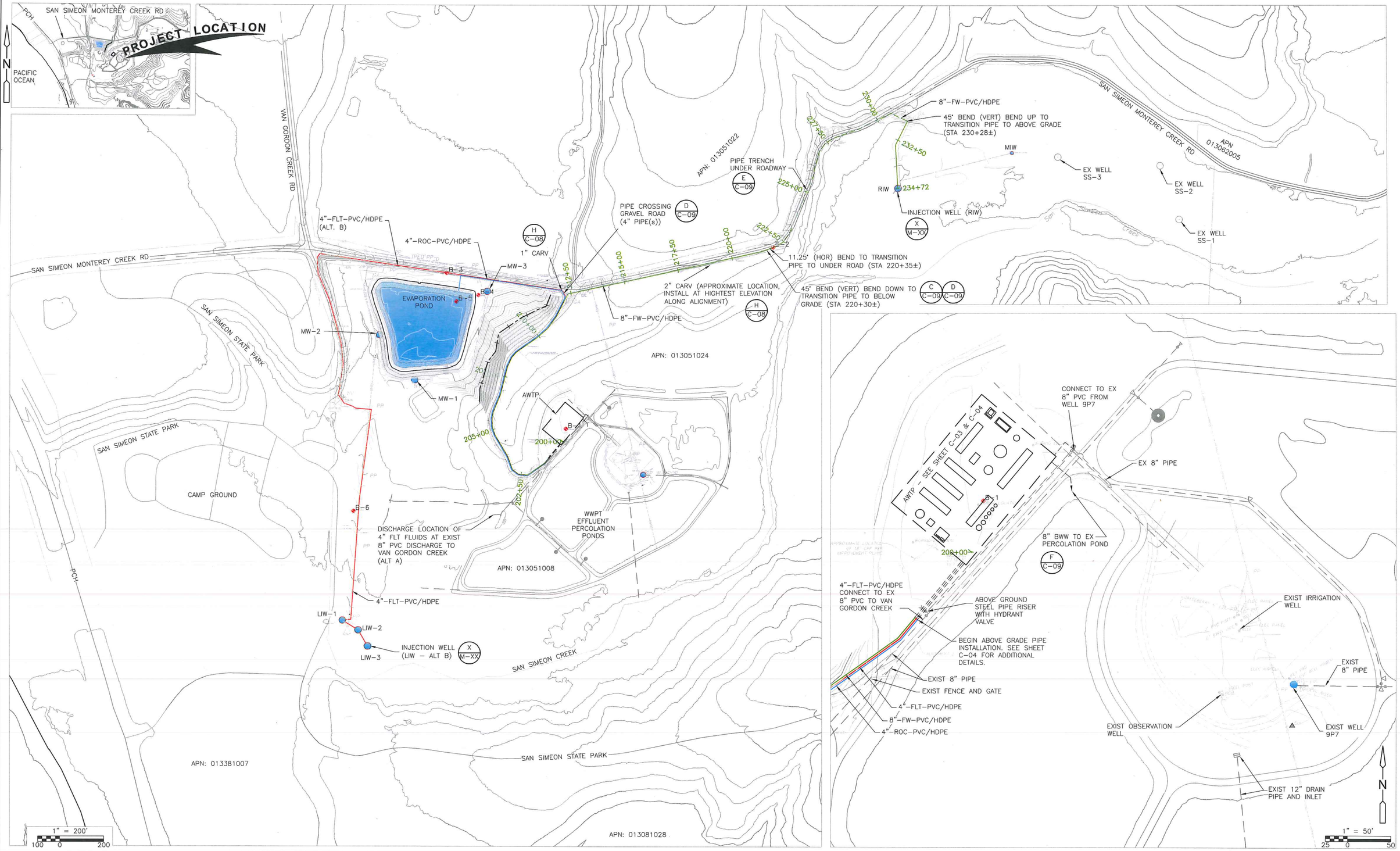

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CAMBRIA EMERGENCY WATER SUPPLY PROJECT
CAMBRIA COMMUNITY SERVICE DISTRICT

CONVEYANCE PIPING PLAN

PROJECT NO. 138760-104133
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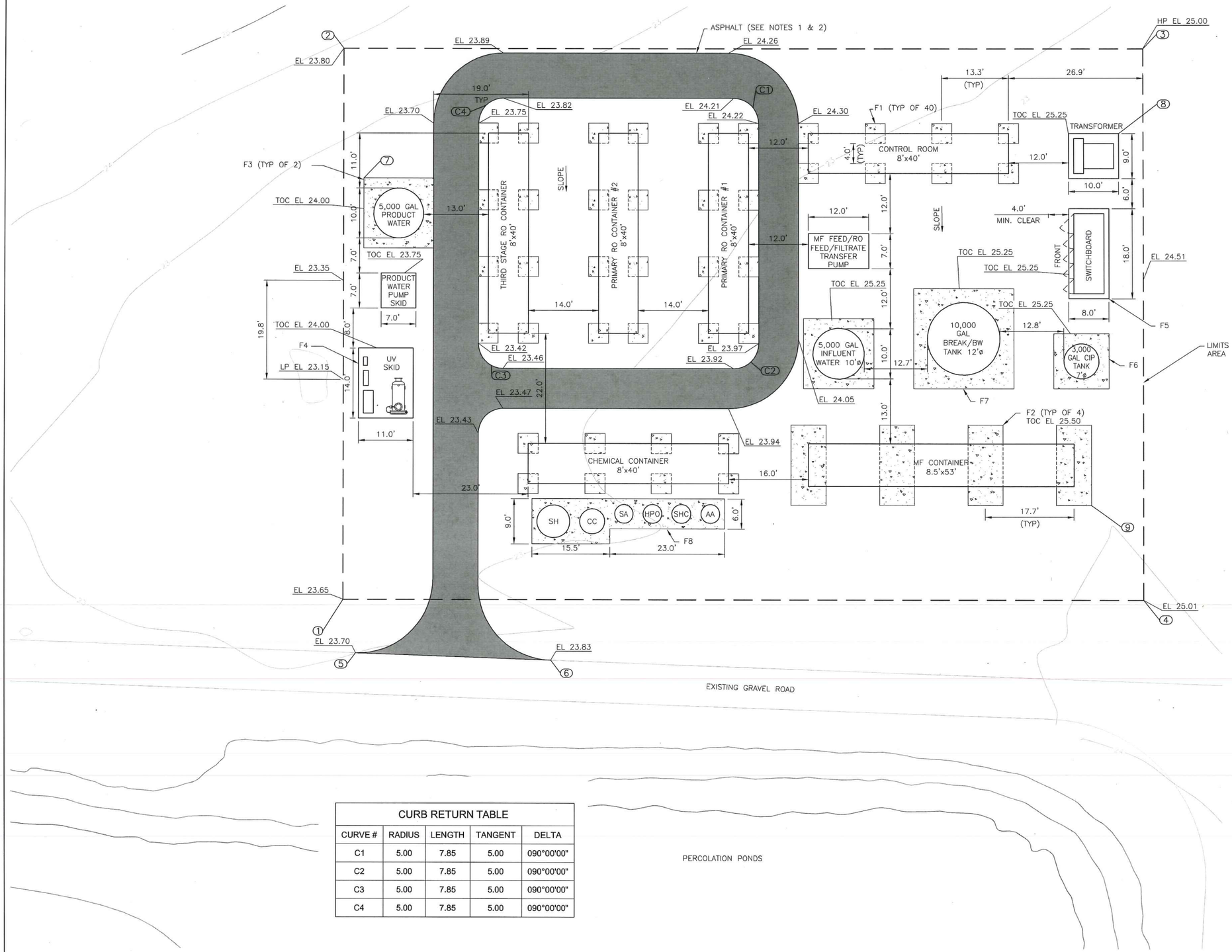

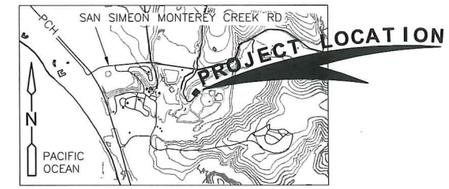

FOOTINGS				
DESIGNATION	LENGTH	WIDTH	THICKNESS	NOTES
F1	4'–0"	4'–0"	24"	
F2	16'–0"	7'–0"	24"	
F3	14'–0"	14'–0"	24"	
F4	14'–0"	11–0"	12"	TURNDOWN EXTERIOR PER DETAIL G/S–02
F5	18'–0"	8'–0"	12"	TURNDOWN EXTERIOR PER DETAIL G/S–02
F6	11'–0"	11'–0"	24"	
F7	20'–0"	20'–0"	24"	
F8	SEE DIMS	SEE DIMS	12"	

* REINFORCE ALL FOOTINGS WITH #5@12" EW T&B, UNO

PAVEMENT NOTES:

1. PAVE WITH ASPHALT WHERE INDICATED. ROAD BASE MATERIAL SHALL BE CRUSHED AGGREGATE BASE IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION 200–2.2 OF THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION. PRIME COAT SHALL BE TYPE SC–70 LIQUID ASPHALT CONFORMING TO THE REQUIREMENTS OF SECTION 203–2 OF THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION. ASPHALTIC CONCRETE SHALL CONFORM TO THE REQUIREMENTS OF SECTIONS 200, 201 AND 203 OF THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION. ASPHALTIC CONCRETE SURFACING SHALL BE A DENSE GRADED MIX WITH A MAXIMUM AGGREGATE SIZE OF ¾–INCH. PAVING AGGREGATE USED IN THE PLANT MIX SHALL BE TYPE B PER SECTION 203–6.3. ASPHALT CEMENT SHALL BE AR–4000 PER SECTION 203–1. MINIMUM STABILITY SHALL BE AT LEAST 35 PER CALIFORNIA TEST 304 AND 366. SEAL COAT SHALL CONFORM TO SECTION 203–9 AND 302–8 OF THE STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION. REFER TO DETAIL X ON C–09.
2. AREAS WITHIN THE LIMITS OF LAYOUT AREA THAT ARE NOT PAVED WITH ASPHALT SHALL BE COVERED WITH 3/4" GRAVEL MINIMUM 2" DEEP.

COORDINATE TABLE			
POINT #	NORTHING	EASTING	DESCRIPTION
1	2418138.8065	5634695.2852	LIMITS OF LAYOUT AREA
2	2418209.2453	5634610.7964	LIMITS OF LAYOUT AREA
3	2418332.1382	5634713.2529	LIMITS OF LAYOUT AREA
4	2418261.6994	5634797.7417	LIMITS OF LAYOUT AREA
5	2418133.9414	5634705.0964	DRIVEWAY
6	2418162.9879	5634731.1600	DRIVEWAY
7	2418195.8128	5634633.2972	EQUIPMENT PAD CORNER
8	2418317.5562	5634723.0778	EQUIPMENT PAD CORNER
9	2418265.7856	5634776.5858	EQUIPMENT PAD CORNER

CURB RETURN TABLE				
CURVE #	RADIUS	LENGTH	TANGENT	DELTA
C1	5.00	7.85	5.00	090°00'00"
C2	5.00	7.85	5.00	090°00'00"
C3	5.00	7.85	5.00	090°00'00"
C4	5.00	7.85	5.00	090°00'00"

N

1" = 10'
5 0 10

REV. NO.	DATE	DRWN	CHKD	REMARKS

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DRAWN BY: O.N.
SHEET CHK'D BY: –
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DATE: JUNE, 2014

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CAMBRIA EMERGENCY WATER SUPPLY PROJECT
CAMBRIA COMMUNITY SERVICE DISTRICT

AWTP SITE GRADING AND DRAINAGE PLAN

PROJECT NO. 138760–104133
FILE NAME:
SHEET NO.
C-03

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Xrefs: [DMS_22x34_SwB-MF-Grouse-SwB-AMB-MF-Grouse-SwB-AMB-MF-Grouse.dwg] [Image.jpg]
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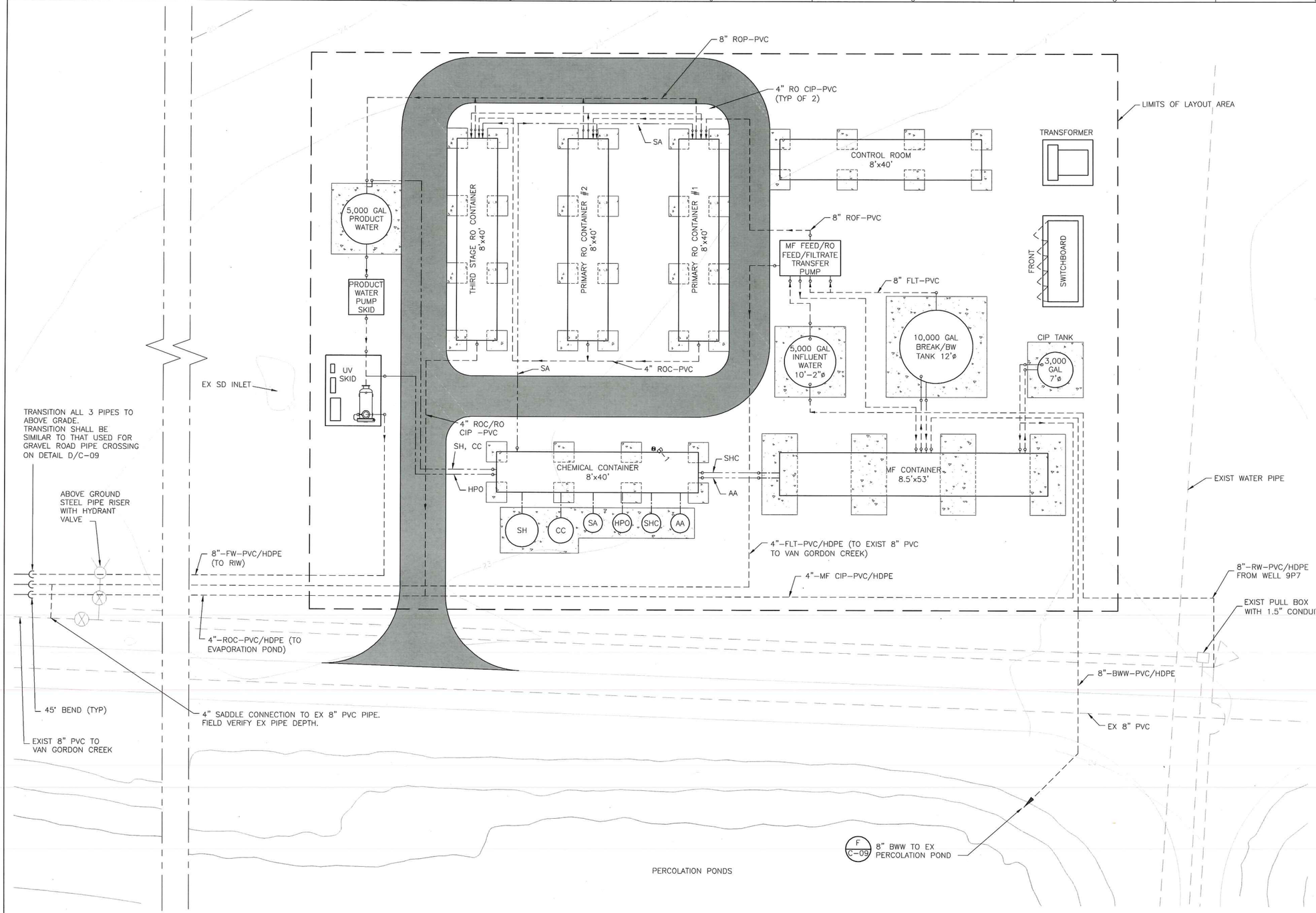

NOTES:

1. ALL CHEMICAL LINES TO BE ¼" FLEXIBLE PVC HOSE (REINFORCED), OR HDPE (FOR AQUEOUS AMMONIA AND SODIUM HYPOCHLORITE AT A MINIMUM) PLACED IN 2" TO 3" PVC PIPE AS SECONDARY CONTAINMENT.
2. ALL PIPING AND HOSE TO BE INSTALLED BELOW GRADE WITHIN THE LAYOUT AREA OF THE AWTP AS INDICATED BY DASHED BOX. PIPE AND/OR HOSE TO TURN VERTICALLY TO SURFACE NO MORE THAN 3 FEET FROM PROCESS CONNECTIONS LOCATED ABOVE GRADE. EXCEPTION IS CHEMICAL TUBING BETWEEN CHEMICAL TANKS AND CHEMICAL CONTAINER WHICH ARE ABOVE GRADE.

ABBREVIATIONS:

CC	CALCIUM CHLORIDE
HPO	HYDROGEN PEROXIDE
SA	SULFURIC ACID
ASC	ANTI-SCALANT/THRESHOLD INHIBITOR
SHC	SODIUM HYPOCHLORITE
AA	AQUEOUS AMMONIA
SH	SODIUM HYDROXIDE
CA	CITRIC ACID
BWW	BRACKISH WASTE
FLT	FILTRATE
FW	FINISHED WATER
ROC	RO CONCENTRATE
ROF	RO FEED
ROP	RO PRODUCT
RW	RAW WATER
UVP	UV PRODUCT

LEGEND

- BELOW GRADE CHEMICAL HOSE (DOUBLE CONTAINED)
- ABOVE GRADE CHEMICAL HOSE (DOUBLE CONTAINED)
- ABOVE GRADE PROCESS PIPING
- BELOW GRADE PROCESS PIPING

MATERIAL

HDPE	HIGH DENSITY POLYETHYLENE
PVC	POLYVINYL CHLORIDE

REV. NO.	DATE	DRWN	CHKD	REMARKS

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DRAWN BY: O.N.
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CAMBRIA EMERGENCY WATER SUPPLY PROJECT
CAMBRIA COMMUNITY SERVICE DISTRICT

AWTP CIVIL YARD PIPING PLAN

PROJECT NO. 138760-104133
FILE NAME:
SHEET NO.
C-04

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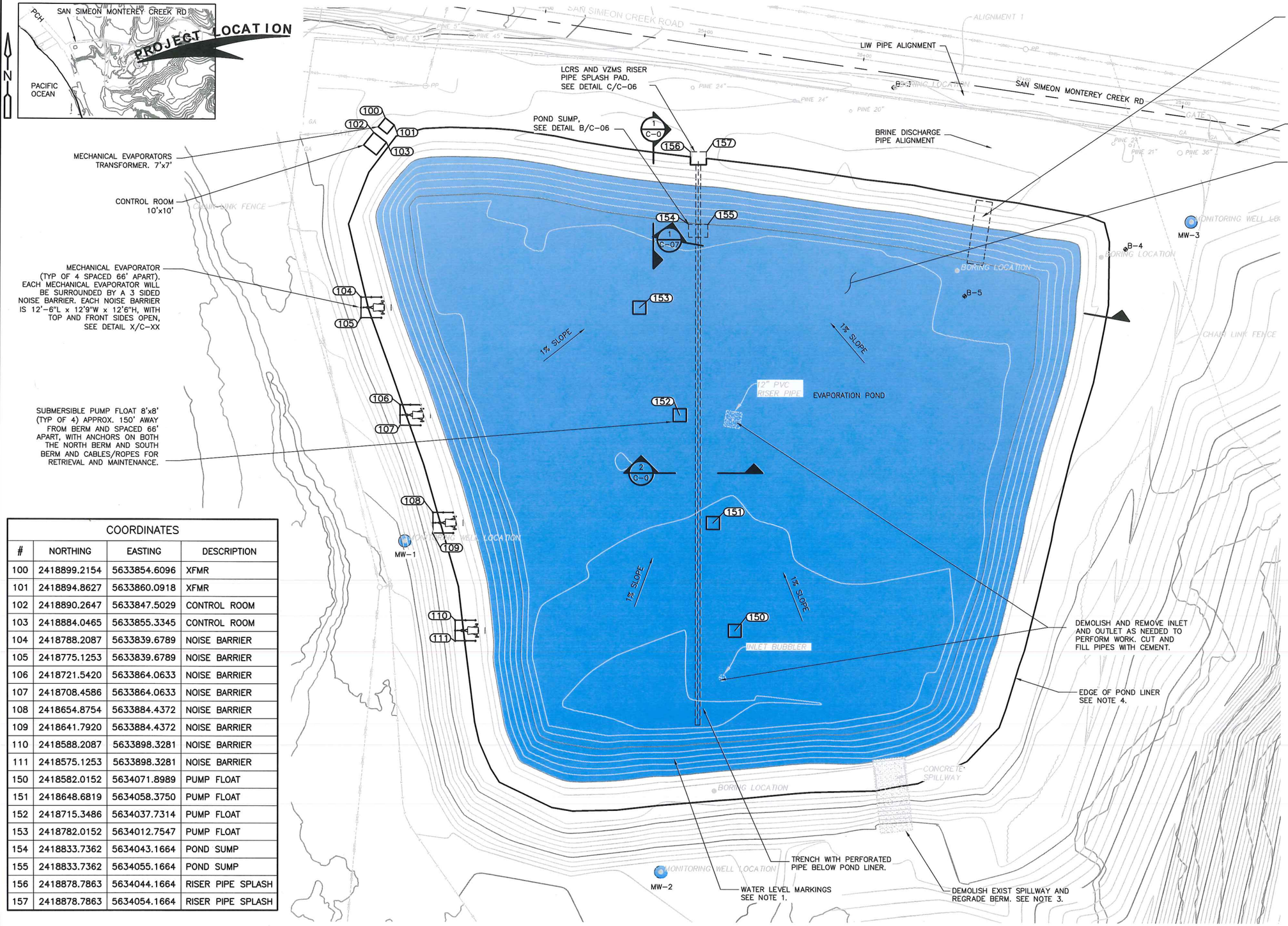

NOTES:

1. MARKINGS ON SOUTH SIDE OF POND INTERIOR SHALL IDENTIFY ELEVATIONS EVERY FOOT. THE TEXT SHALL BE AT 2 FOOT INTERVALS AND BY 18" TALL; THE HORIZONTAL ELEVATION MARKINGS SHALL BE 6" TALL AND AT LEAST 3 FT WIDE.
2. PROOFROLL AND COMPACT THE BOTTOM OF THE POND, SIDE SLOPE AND THE TOP OF BERM TO PROVIDE A COMPETENT SURFACE FOR SUPPORT OF THE LINER.
3. REMOVE AND RECOMPACT THE UPPER 12 INCHES BELOW THE EXPOSED SUBGRADE OF THE DEMOLISHED SPILLWAY TO PROVIDE A COMPETENT SUBGRADE PRIOR TO PLACING FILL TO MATCH THE TOP OF THE ADJACENT BERM. ALL FILL SHALL BE COMPACTED TO AT LEAST 90 PERCENT RELATIVE COMPACTION IN ACCORDANCE WITH ASTM D1557 AT A MOISTURE AT LEAST 2 PERCENT HIGHER THAN OPTIMUM.
4. REMOVE AND RECOMPACT THE FOOTPRINT TO PROVIDE A ZONE OF COMPACTED FILL FOR PAD SUPPORT. PROVIDE AT LEAST 2' OF COMPACTED FILL. THE FILL SHALL EXTEND AT LEAST 3' LATERALLY BEYOND THE LIMITS OF THE PAD.

COORDINATES

#	NORTHING	EASTING	DESCRIPTION
100	2418899.2154	5633854.6096	XFMR
101	2418894.8627	5633860.0918	XFMR
102	2418890.2647	5633847.5029	CONTROL ROOM
103	2418884.0465	5633855.3345	CONTROL ROOM
104	2418788.2087	5633839.6789	NOISE BARRIER
105	2418775.1253	5633839.6789	NOISE BARRIER
106	2418721.5420	5633864.0633	NOISE BARRIER
107	2418708.4586	5633864.0633	NOISE BARRIER
108	2418654.8754	5633884.4372	NOISE BARRIER
109	2418641.7920	5633884.4372	NOISE BARRIER
110	2418588.2087	5633898.3281	NOISE BARRIER
111	2418575.1253	5633898.3281	NOISE BARRIER
150	2418582.0152	5634071.8989	PUMP FLOAT
151	2418648.6819	5634058.3750	PUMP FLOAT
152	2418715.3486	5634037.7314	PUMP FLOAT
153	2418782.0152	5634012.7547	PUMP FLOAT
154	2418833.7362	5634043.1664	POND SUMP
155	2418833.7362	5634055.1664	POND SUMP
156	2418878.7863	5634044.1664	RISER PIPE SPLASH
157	2418878.7863	5634054.1664	RISER PIPE SPLASH

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: –
DRAWN BY: O.N.
SHEET CHK'D BY: –
CROSS CHK'D BY: –
APPROVED BY: –
DATE: JUNE, 2014

WARNING
0 1/2" 1"
IF THIS BAR SCALE DOES NOT MEASURE 1" THIS DWG HAS BEEN REDUCED SCALE ACCORDINGLY

CDM Smith
111 Academy Way, Suite 150
Irvine, California 92617
Tel: (949) 752-5452

CAMBRIA EMERGENCY WATER SUPPLY PROJECT
CAMBRIA COMMUNITY SERVICE DISTRICT

EVAPORATION POND PLAN

PROJECT NO. 138760-104133
FILE NAME:
SHEET NO.
C-05

NOT FOR CONSTRUCTION

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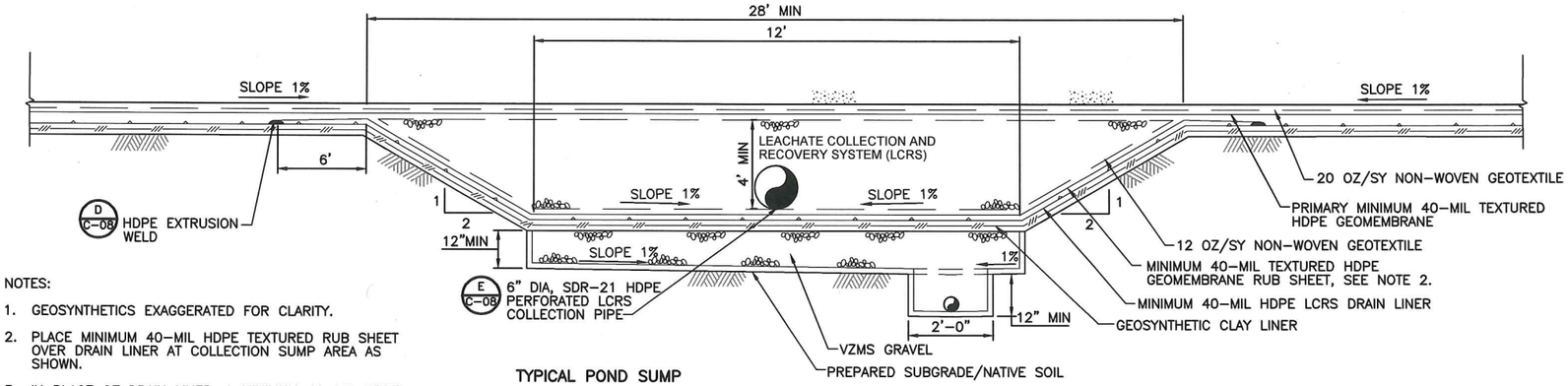
C-06-BRINE EVAPORATION POND SECTIONS AND DETAILS I - EH-060914-V001



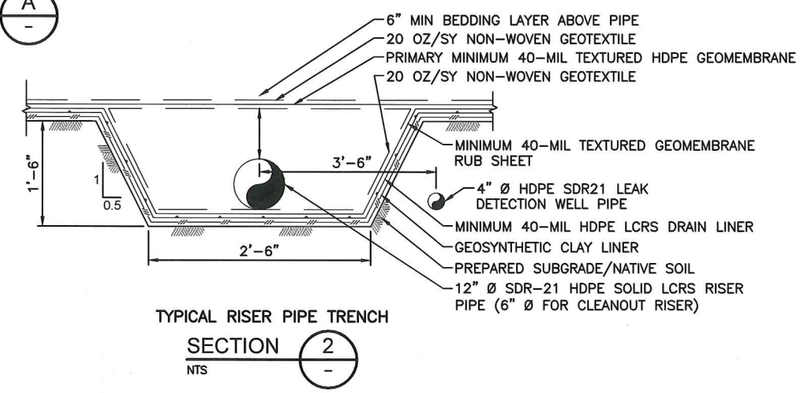
NOTES:

1. GEOSYNTHETICS EXAGGERATED FOR CLARITY.
2. PLACE MINIMUM 40-MIL HDPE TEXTURED RUB SHEET OVER DRAIN LINER AT COLLECTION SUMP AREA AS SHOWN.
3. IN PLACE OF DRAIN LINER, A MINIMUM 40-MIL HDPE GEOMEMBRANE AND GEONET CAN BE USED.

TYPICAL POND SUMP

DETAIL A

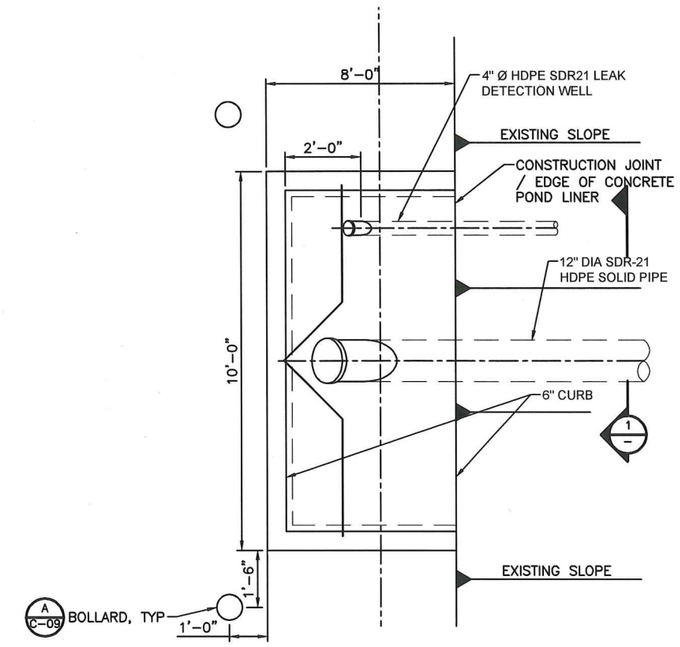
NTS



TYPICAL RISER PIPE TRENCH

SECTION 2

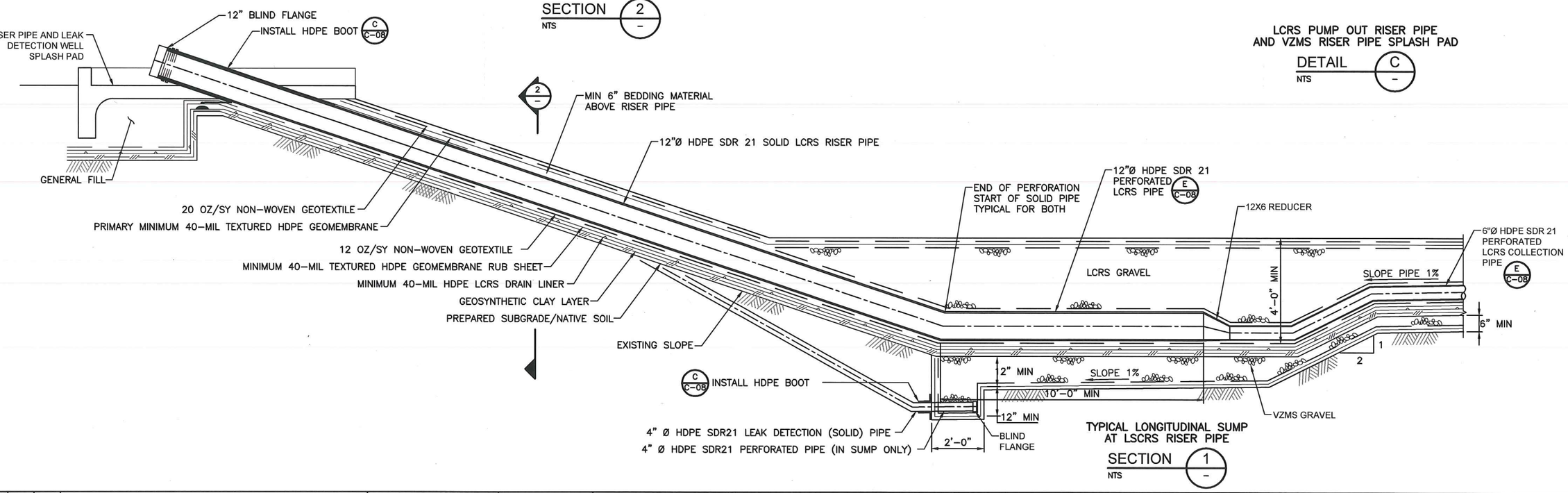
NTS



LCRS PUMP OUT RISER PIPE AND VZMS RISER PIPE SPLASH PAD

DETAIL C

NTS



TYPICAL LONGITUDINAL SUMP AT LSCRS RISER PIPE

SECTION 1

NTS

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: –
DRAWN BY: C.B.
SHEET CHK'D BY: –
CROSS CHK'D BY: –
APPROVED BY: –
DATE: JUNE, 2014

WARNING
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CAMBRIA EMERGENCY WATER SUPPLY PROJECT
CAMBRIA COMMUNITY SERVICE DISTRICT

POND SECTIONS I

PROJECT NO. 138760-104133
FILE NAME:
SHEET NO.
C-06

NOT FOR CONSTRUCTION

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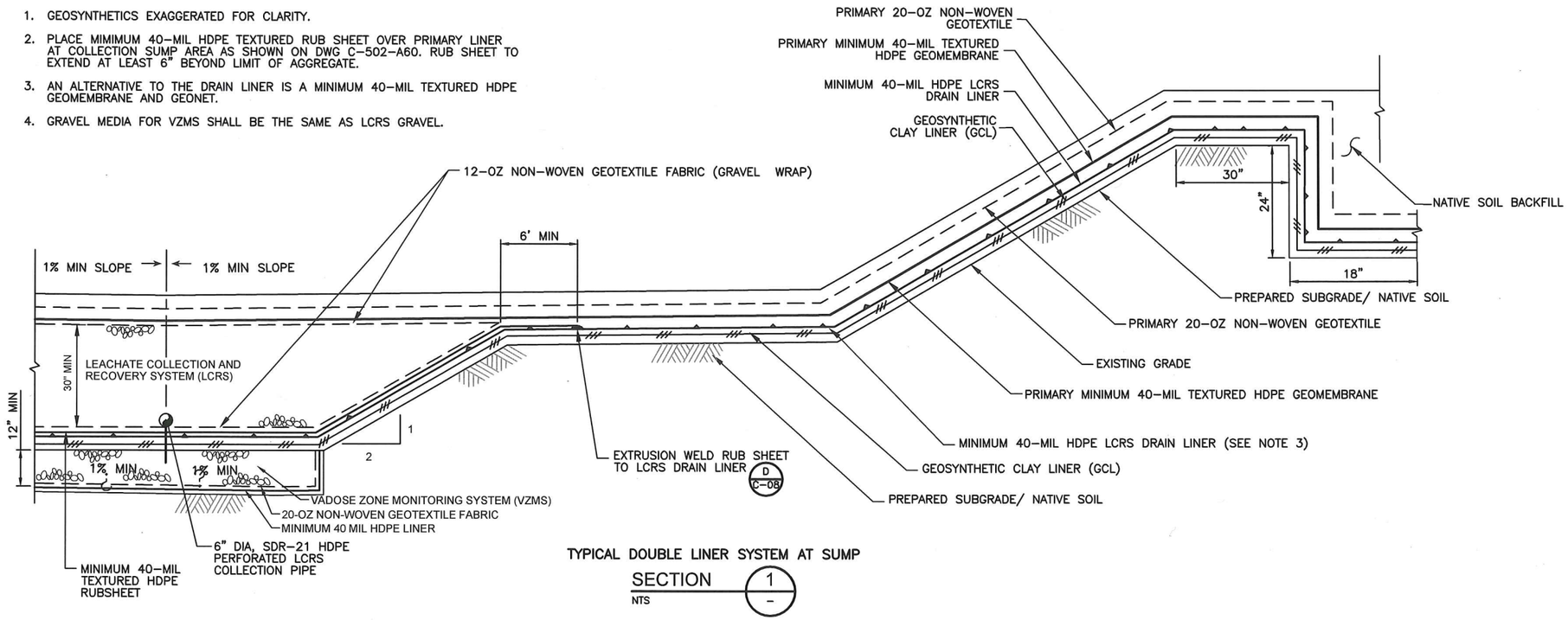
C-07-BRINE EVAPORATION POND SECTIONS AND DETAILS II - EH-060914-V001

NOTES:

1. GEOSYNTHETICS EXAGGERATED FOR CLARITY.
2. PLACE MIMIMUM 40-MIL HDPE TEXTURED RUB SHEET OVER PRIMARY LINER AT COLLECTION SUMP AREA AS SHOWN ON DWG C-502-A60. RUB SHEET TO EXTEND AT LEAST 6" BEYOND LIMIT OF AGGREGATE.
3. AN ALTERNATIVE TO THE DRAIN LINER IS A MINIMUM 40-MIL TEXTURED HDPE GEOMEMBRANE AND GEONET.
4. GRAVEL MEDIA FOR VZMS SHALL BE THE SAME AS LCRS GRAVEL.



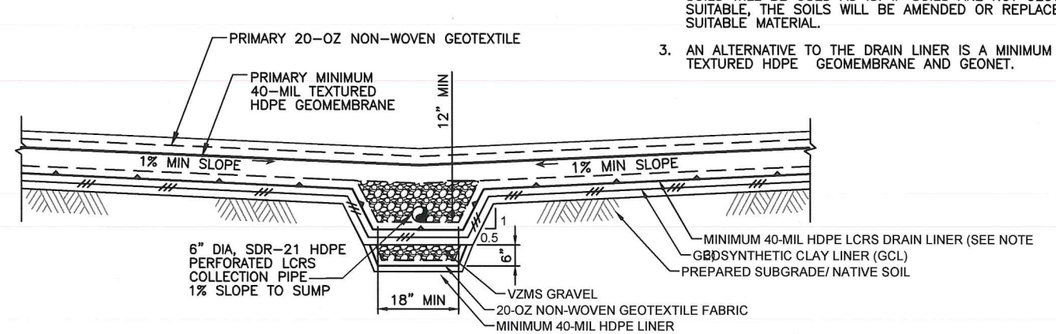
TYPICAL DOUBLE LINER SYSTEM AT SUMP

SECTION 1 / -

NTS

NOTES:

1. EXISTING SOILS DO NOT MEET 1X10-6 CM/SEC HYDRAULIC CONDUCTIVITY REQUIREMENT,THEREFORE A CLAY OR GCL LAYER IS REQUIRED.
2. IF EXISTING SOILS ARE SUITABLE IN GRAIN SIZE FOR SUBGRADE, SOILS WILL BE USED AS IS. IF SOILS ARE NOT GEOTECHNICALLY SUITABLE, THE SOILS WILL BE AMENDED OR REPLACED WITH SUITABLE MATERIAL.
3. AN ALTERNATIVE TO THE DRAIN LINER IS A MINIMUM 40-MIL TEXTURED HDPE GEOMEMBRANE AND GEONET.



TYPICAL DOUBLE LINER SYSTEM

SECTION 2 / -

NTS

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: -
DRAWN BY: C.B.
SHEET CHK'D BY: -
CROSS CHK'D BY: -
APPROVED BY: -
DATE: JUNE, 2014

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CAMBRIA EMERGENCY WATER SUPPLY PROJECT
CAMBRIA COMMUNITY SERVICE DISTRICT

POND SECTIONS II

PROJECT NO. 138760-104133
FILE NAME:
SHEET NO.
C-07

NOT FOR CONSTRUCTION

Xref(s): LOMS_22=... MB-MF ... ...nd]
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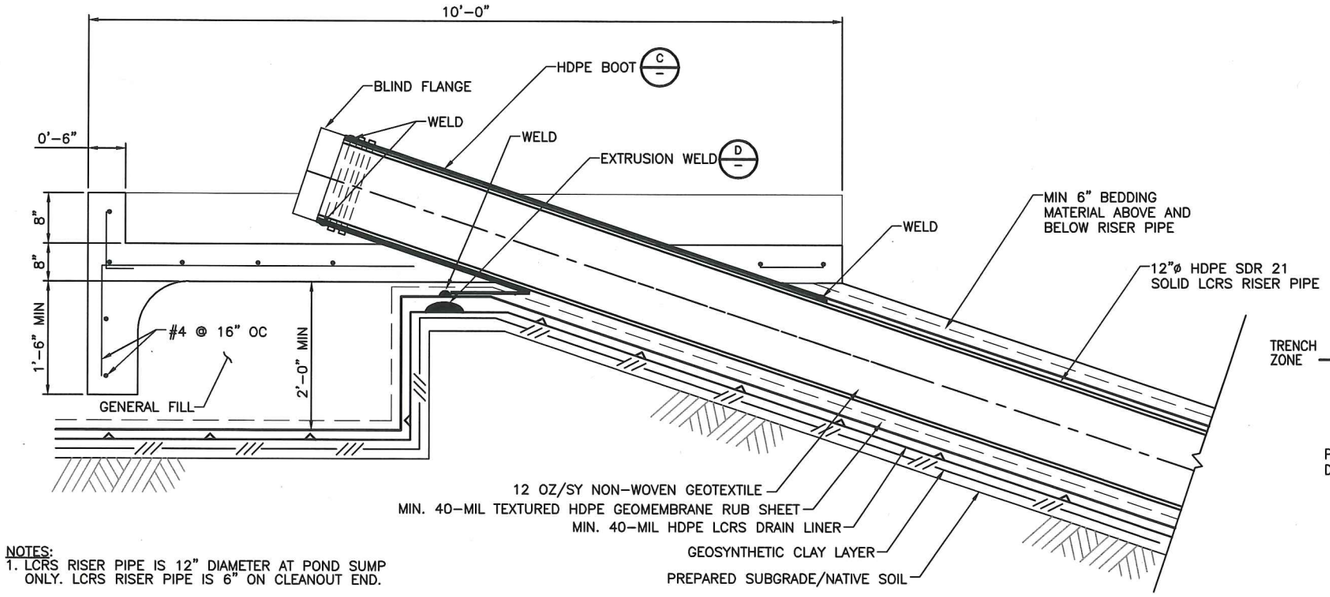
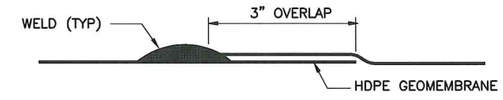


NOTES:
1. LCRS RISER PIPE IS 12" DIAMETER AT POND SUMP ONLY. LCRS RISER PIPE IS 6" ON CLEANOUT END.

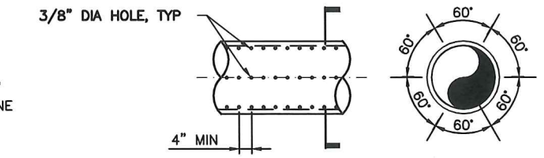
SPLASH PAD DETAIL SECTION AT LCRS RISER PIPE

DETAIL A
NTS



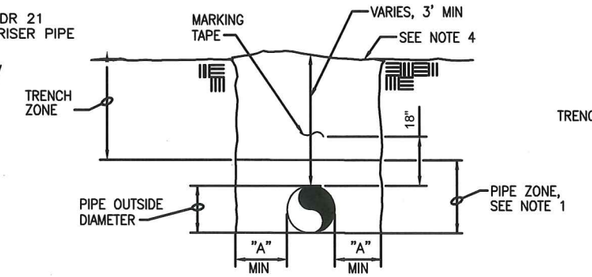
TYPICAL EXTRUDED WELD

DETAIL D
NTS



COLLECTOR PIPE PERFORATION

DETAIL E
NTS

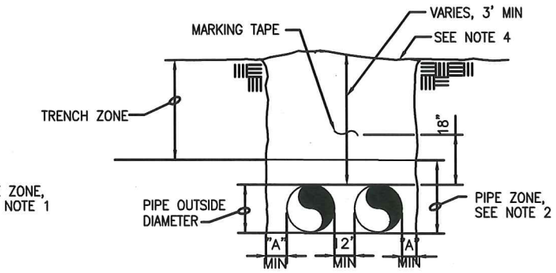


PIPE ZONE		
NOMINAL PIPE DIA (IN.)	HEIGHT ABOVE TOP OF PIPE (IN.)	"A" (IN.)
4	6	2
6	6	3
8	6	4

NOTE
1. PIPE ZONE DEPTH AND "A" SHALL BE VALUES SHOWN IN TABLE ABOVE.
2. PIPE ZONE AND TRENCH ZONE SHALL BE BACKFILLED AND COMPACTED PER SPECIFICATIONS.
3. TRENCH EXCAVATION LESS THAN 5 FEET MAY REQUIRE SHORING DUE TO SOIL INSTABILITY.
4. SEE DETAIL E ON SHEET C-09 FOR PAVEMENT REPLACEMENT IN AREAS WHERE PIPING IS INSTALLED BELOW ROADS,

SINGLE PIPE TRENCH BACKFILL

DETAIL F
NTS

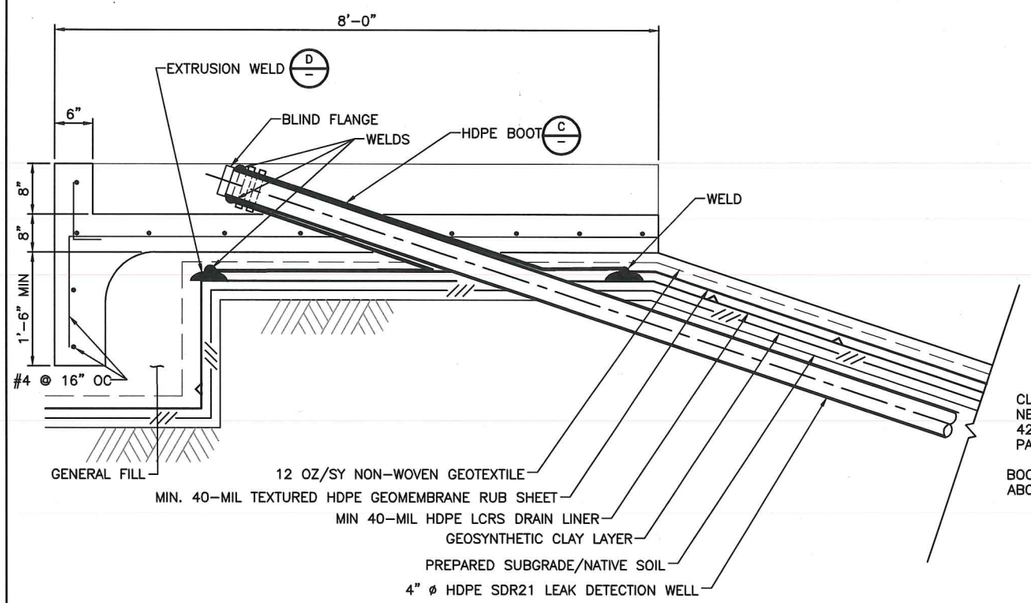


PIPE ZONE		
NOMINAL PIPE DIA (IN.)	HEIGHT ABOVE TOP OF PIPE (IN.)	"A" (IN.)
4	6	2
6	6	3
8	6	4

NOTE
1. PIPE ZONE DEPTH AND "A" SHALL BE VALUES SHOWN IN TABLE ABOVE.
2. PIPE ZONE AND TRENCH ZONE SHALL BE BACKFILLED AND COMPACTED PER SPECIFICATIONS.
3. TRENCH EXCAVATION LESS THAN 5 FEET MAY REQUIRE SHORING DUE TO SOIL INSTABILITY.
4. SEE DETAIL E ON SHEET C-09 FOR PAVEMENT REPLACEMENT IN AREAS WHERE PIPING IS INSTALLED BELOW ROADS,

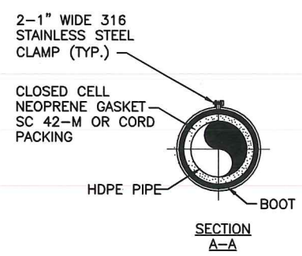
MULTIPLE PIPE TRENCH BACKFILL

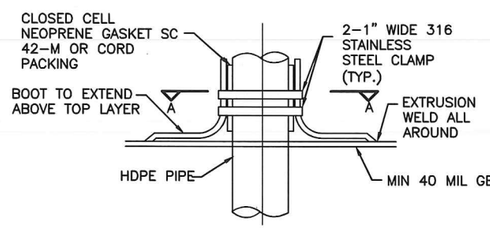
DETAIL G
NTS



SPLASH PAD DETAIL SECTION AT VZMS RISER PIPE

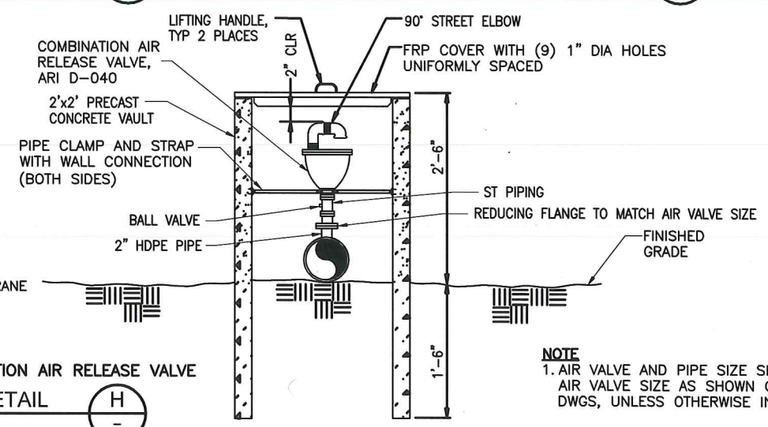
DETAIL B
NTS





COLLECTION PIPE PERFORATION

DETAIL C
NTS



NOTE
1. AIR VALVE AND PIPE SIZE SHALL MATCH AIR VALVE SIZE AS SHOWN ON THE DWGS, UNLESS OTHERWISE INDICATED.

COMBINATION AIR RELEASE VALVE

DETAIL H
NTS

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: –
DRAWN BY: C.B.
SHEET CHK'D BY: –
CROSS CHK'D BY: –
APPROVED BY: –
DATE: JUNE, 2014

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CAMBRIA EMERGENCY WATER SUPPLY PROJECT
CAMBRIA COMMUNITY SERVICE DISTRICT

TYPICAL CIVIL DETAILS I

PROJECT NO. 138760-104133
FILE NAME:
SHEET NO.
C-08

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Xrefs: [LDMS_22-5, CAMB-MF-Layers, CAMB-MF-Layers-Road] Images: []
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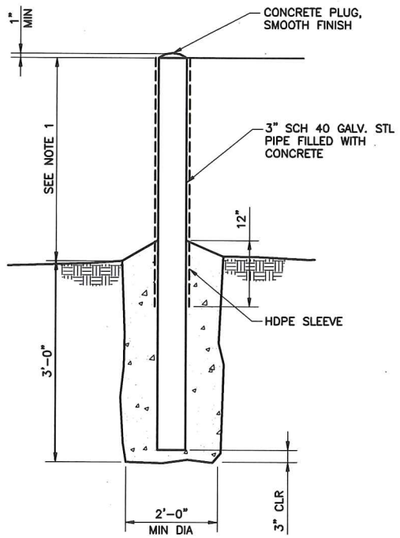
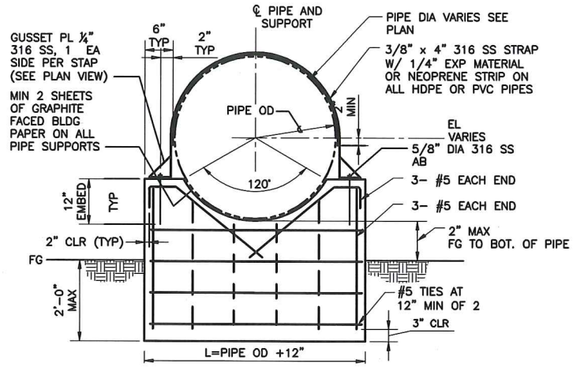
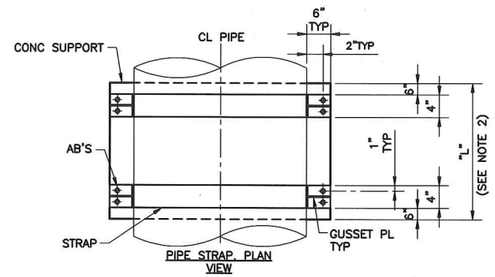


NOTES
1. HEIGHT ABOVE GRADE SHALL BE 1'-6" FOR 8" PIPING AND 1'-0" FOR 4" PIPING.
2. TO BE INSTALLED EVERY 10'-0" ON ALTERNATING SIDES OF PIPE PYLON-TYPE.

HDPE PIPE STABILIZER

DETAIL A
NTS



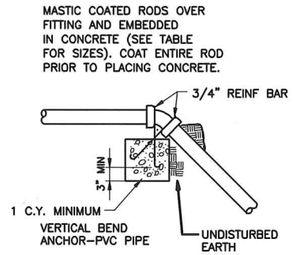


PIPE STRAP, PLAN VIEW

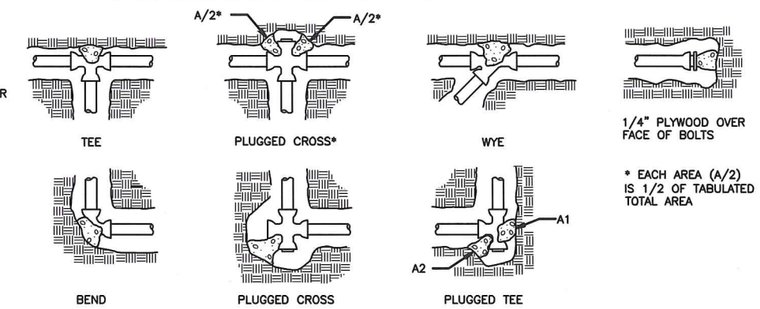
NOTE:
1. SEE STRUCTURAL FOR ADDITIONAL INFORMATION ON CONCRETE AND REBAR.
2. L=36" FOR 8" PIPES, 24" FOR 4" PIPES.

CONCRETE SADDLE SUPPORT FOR HDPE PIPE

DETAIL B
NTS



PROFILE



VOLUME OF THRUST BLOCK IN CUBIC YARDS (VERTICAL BENDS)			
FITTING SIZE	BEND ANGLE (DEGREES)		
	45°	22 1/2°	11 1/4°
4	1.1	0.4	0.2
6	2.7	1.0	0.4
8	4.0	1.5	0.6

FITTING SIZE	ROD SIZE	EMBEDMENT
12"AND LESS	#6	30"

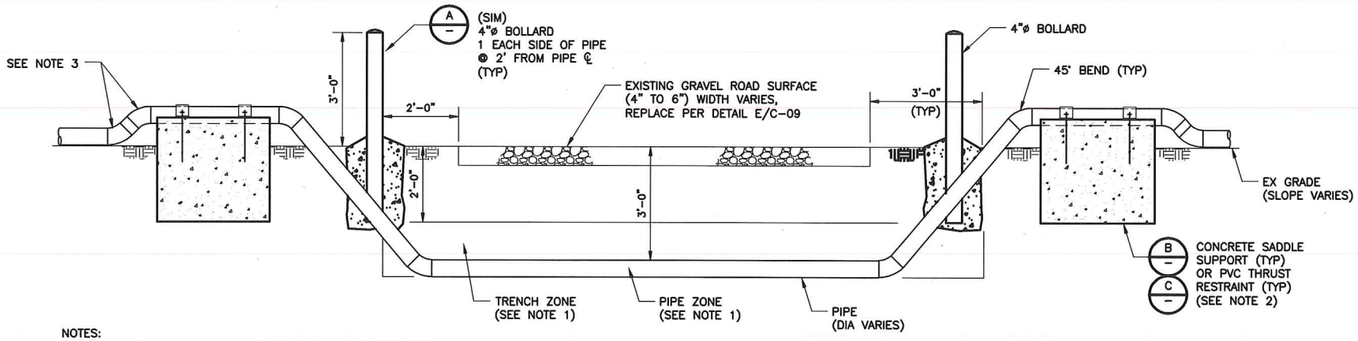
BEARING AREA OF THRUST BLOCKS IN SQ. FT. (HORIZONTAL BENDS)							
FITTING SIZE	TEE, WYE, PLUG, OR CAP	90° BEND PLUGGED CROSS	TEE PLUGGED RUN		BEND ANGLE (DEGREES)		
			A1	A2	45°	22 1/2°	11 1/4°
4	1.0	1.4	1.9	1.4	1.0	–	–
6	2.1	3.0	4.3	3.0	1.6	1.0	–
8	3.8	5.3	7.6	5.4	2.9	1.5	1.0

THRUST BLOCK NOTES:

1. BEARING AREAS, VOLUMES, AND SPECIAL BLOCKING DETAILS SHOWN ON DRAWINGS TAKE PRECEDENCE OVER THIS STANDARD.
2. CONCRETE THRUST BLOCKING SHALL BE POURED AGAINST UNDISTURBED EARTH.
3. COMPACT TO 95% RELATIVE DENSITY UNDER, OVER AND AROUND EACH THRUST BLOCK.
4. KEEP CONCRETE CLEAR OF JOINT AND JOINT ACCESSORIES.
5. REQUIRED VOLUMES OR BEARING AREAS AT FITTINGS SHALL BE AS INDICATED, ADJUSTED, IF NECESSARY, TO CONFORM TO THE TEST PRESSURE(S) AND ALLOWABLE SOIL BEARING STRESS(ES) PROVIDED BY THE ENGINEER.
6. THRUST BLOCK VOLUMES FOR VERTICAL BENDS HAVING UPWARD RESULTANT THRUSTS ARE BASED ON TEST PRESSURE OF 150 PSIG AND THE WEIGHT OF CONCRETE = 4050 LBS/CU YD. TO COMPUTE VOLUMES FOR DIFFERENT TEST PRESSURES, USE THE FOLLOWING EQUATION:
   VOLUME = (TEST PRESS./150) x (TABLE VALUE).
7. BEARING AREAS FOR HORIZONTAL BEND THRUST BLOCKS ARE BASED ON TEST PRESSURE OF 150 PSIG AND AN ALLOWABLE SOIL BEARING STRESS OF 2000 LBS/SQ FT. TO COMPUTE BEARING AREAS FOR DIFFERENT TEST PRESSURES AND SOIL BEARING STRESSES, MULTIPLY TABLE VALUES BY THE FACTOR (13.33)(P'/S'b), WHERE: P' =ACTUAL TEST PRESSURE, PSIG
   S'b=ACTUAL ALLOWABLE SOIL BEARING PRESSURE, PSF.
8. THRUST BLOCKS FOR VERTICAL BENDS HAVING DOWNWARD RESULTANT THRUSTS SHALL BE THE SAME AS FOR HORIZONTAL BENDS.
9. BEARING AREA OF THRUST BLOCK SHALL NOT BE LESS THAN 1.0 SQ FT.
10. VERTICAL BENDS THAT REQUIRE A THRUST BLOCK VOLUME EXCEEDING 5 CUBIC YARDS REQUIRE SPECIAL BLOCKING DETAILS. SEE DRAWINGS FOR VOLUMES SHOWN TO LEFT OF SOLID LINE IN TABLE.
11. TEST PRESSURE SHALL BE 100 PSI UNLESS SHOWN OTHERWISE.
12. ALLOWABLE SOIL BEARING PRESSURE SHALL BE 600 PSF UNLESS SHOWN OTHERWISE.
13. COATING FOR RODS TO BE SYSTEM 29 PER SPECIFICATIONS.

PIPE SUPPORT/THRUST RESTRAINT FOR PVC PIPE

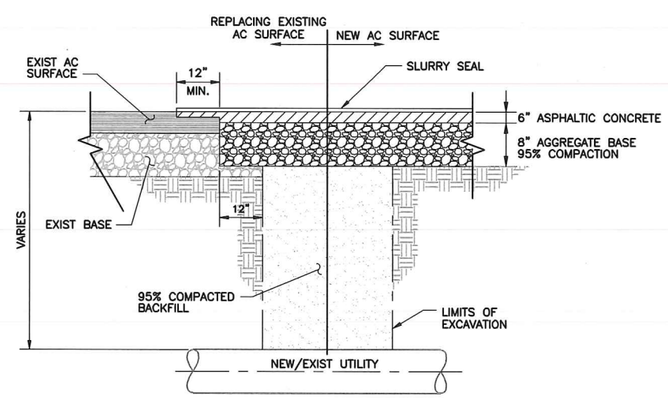
DETAIL C
NTS



NOTES:
1. SEE DETAIL F, G, SHEET C-08 (AS APPLICABLE) FOR PIPE TRENCH DETAILS.
2. PIPE ALIGNMENTS APPROACHING CROSSING FROM DOWN SLOPE EXISTING GRADE MAY OMIT 45° BENDS AS NEEDED.
3. HORIZONTAL PIPE BENDS UP TO 90 DEGREES MAY BE USED BEFORE OR AFTER CONCRETE SADDLE SUPPORT TO ACCOMODATE PIPE ALIGNMENT.

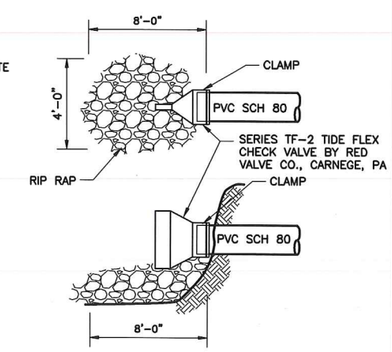
GRAVEL ROAD PIPE CROSSING

DETAIL D
NTS



AC PAVEMENT SURFACING

DETAIL E
NTS



DRAINAGE OUTLET ASSEMBLY

DETAIL F
NTS

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: –
DRAWN BY: C.B.
SHEET CHK'D BY: –
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APPROVED BY: –
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CAMBRIA EMERGENCY WATER SUPPLY PROJECT
CAMBRIA COMMUNITY SERVICE DISTRICT

TYPICAL CIVIL DETAILS II

PROJECT NO. 138760-104133
FILE NAME:
SHEET NO.
C-09

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GENERAL STRUCTURAL NOTES

DESIGN CRITERIA:

CODES:

CBC–2013 (CALIFORNIA BUILDING CODE 2013)

ACI 318–11 (BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE)

DESIGN LOADS:

LIVE LOADS:

PROCESS FLOORS AND SLABS	200 PSF (NON–REDUCIBLE)

RISK CATEGORY IV

WIND DESIGN DATA:

BASIC WIND SPEED, Vasd	115 MPH (ULTIMATE) 89 MPH (NOMINAL)
EXPOSURE CATEGORY	C

SEISMIC DESIGN DATA:

SOIL SITE CLASS	D
MAPPED SPECTRAL RESPONSE ACCELERATIONS	
SHORT PERIOD	Ss = 1.590g
ONE SECOND PERIOD	S1 = 0.601g
SPECTRAL RESPONSE COEFFICIENTS	
SHORT PERIOD	Sds = 1.060g
ONE SECOND PERIOD	Sd1 = 0.601g
SEISMIC DESIGN CATEGORY	D
SEISMIC IMPORTANCE FACTOR, Ie	1.5

SNOW:

GROUND SNOW LOAD Pg	0 PSF

SEISMIC REQUIREMENTS – NON–STRUCTURAL COMPONENTS:

IN ACCORDANCE WITH THE REQUIREMENTS OF CBC AND BY REFERENCE ASCE 7–10, ALL MECHANICAL, ELECTRICAL AND NON–STRUCTURAL COMPONENTS AND EQUIPMENT AND ANCHORAGES FOR RISK CATEGORY IV AREAS SHALL BE DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF SECTION 13 OF ASCE 7 WITH A COMPONENT IMPORTANCE FACTOR Ip=1.5.

COMPONENTS WITH HAZARDOUS SUBSTANCES SHALL BE SEISMICALLY CERTIFIED BY THE MANUFACTURER AS MAINTAINING CONTAINMENT FOLLOWING THE DESIGN EARTHQUAKE DESIGN MOTION PER ASCE 7–10.

FOR THIS PURPOSE ALL COMPONENTS AND EQUIPMENT SHALL BE CONSIDERED TO HAVE THE SAME SEISMIC DESIGN CATEGORY AS THAT OF THE STRUCTURE THEY OCCUPY OR TO WHICH THEY ARE ATTACHED.

FOUNDATIONS:

FOUNDATIONS ARE DESIGNED FOR ALLOWABLE SOIL PRESSURE OF 600 PSF.

ALL EXTERIOR FOUNDATIONS SHALL EXTEND TO A DEPTH = 18".

GENERAL CONDITIONS:

ALL STRUCTURAL DRAWINGS SHALL BE USED IN CONJUNCTION WITH THE OTHER PROJECT DRAWINGS AND SPECIFICATIONS.

STANDARD DETAILS SHALL BE USED AT ALL APPLICABLE LOCATIONS, UNLESS NOTED OTHERWISE ON DRAWINGS.

SEE CIVIL SITE PLANS FOR STRUCTURE LOCATION COORDINATES.

FIELD VERIFY ALL EXISTING DIMENSIONS PRIOR TO CONSTRUCTION.

WRITTEN DIMENSIONS SHALL TAKE PRECEDENCE OVER SCALED SIZES.

CONSTRUCTION NOTES:

PRIOR TO INSTALLATION OF EQUIPMENT, COORDINATE AND CONFIRM THE ANCHORAGE REQUIREMENTS WITH THE MANUFACTURER. THE ANCHORAGE SYSTEM SHALL NOT DAMAGE THE CONCRETE.

CONTRACTOR SHALL VERIFY ALL DIMENSIONS IN THE FIELD. THE PROJECT MANAGER SHALL BE NOTIFIED OF ANY DISCREPANCY BETWEEN DRAWINGS IMMEDIATELY UPON DISCOVERY.

CONCRETE ANCHORS AND DOWELS:

CONTRACTOR SHALL LOCATE EXISTING REBAR USING NON–DESTRUCTIVE METHODS PRIOR TO DRILLING HOLES FOR ADHESIVE AND EXPANSION ANCHORS. ADJUST SPACING OF ANCHORS TO MISS REINFORCING A MAXIMUM OF 1 ½" FROM DETAILED LOCATIONS.

ADHESIVE FOR EMBEDED DOWELS AND ANCHORS SHALL BE HILTI HIT–RE 500–SD (ICC EVALUATION REPORT 2322), OR APPROVED EQUAL. DRILLED HOLES SHALL BE SIZED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS.

EXPANSION ANCHORS SHALL BE HILTI KWIK BOLT TZ, (ICC EVALUATION REPORT 1917), OR ICC APPROVED EQUAL.

ICC REPORTS SHALL STATE THAT ANCHORS ARE COMPLIANT WITH THE 2012 IBC AND CAN BE USED TO RESIST EARTHQUAKE LOADS IN CRACKED, NORMAL–WEIGHT CONCRETE.

CAST–IN–PLACE CONCRETE:

REINFORCED CONCRETE SHALL CONFORM TO ACI 318.

REINFORCING STEEL FABRICATION SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE CRSI MANUAL OF STANDARD PRACTICE.

CONCRETE WORK SHALL CONFORM TO ACI 301 (SPECIFICATIONS FOR STRUCTURAL CONCRETE).

MINIMUM CONCRETE COVER SHALL BE TO NEAREST EXPOSED SURFACE.

ALL EXPOSED CORNERS OF CONCRETE SHALL HAVE 3/4" CHAMFER, UNLESS OTHERWISE NOTED.

WALL REINFORCEMENT AT CORNERS OR JUNCTIONS OF WALLS SHALL BE CONTINUOUS, LAPPED, OR TERMINATED IN AN ACI STANDARD 90 DEGREE STANDARD HOOK DETAIL. LAP SPLICES SHALL CONFORM WITH THE TABLE ON THIS SHEET.

UNLESS OTHERWISE INDICATED ON THE DRAWINGS, BARS SHALL BE DOWELED. DOWELS SHALL BE THE SAME SIZE AND SPACING AS THE REINFORCEMENT WHICH IS SPLICED TO THE DOWELS UNLESS OTHERWISE NOTED.

SLABS, BEAMS, AND COLUMN REINFORCING BARS SHALL HAVE A MINIMUM EXTENSION OR ANCHORAGE INTO SUPPORTS IN ACCORDANCE WITH ACI 318.

STIRRUP SUPPORT BARS SHALL BE PROVIDED AS REQUIRED TO SECURE TOP BARS AGAINST DISPLACEMENT.

UNLESS OTHERWISE INDICATED ON THE DRAWINGS, CONCRETE COVER OVER #11 AND SMALLER REINF BARS SHALL BE AS FOLLOWS:

SLABS AND JOISTS:
- FORMED CONCRETE SURFACES AND UNFORMED TOP SURFACES FOR DRY CONDITIONS.....2"
- FORMED CONCRETE SURFACES AND UNFORMED TOP SURFACES EXPOSED TO WEATHER, IN CONTACT WITH SOIL OR FLUIDS, OR LOCATED OVER FLUIDS.....2"

BEAMS AND COLUMNS:
- FORMED CONCRETE SURFACES FOR DRY CONDITIONS:
  - STIRRUPS, SPIRALS AND TIES.....2"
  - PRINCIPAL REINFORCEMENT.....2 1/2"
- FORMED CONCRETE SURFACES EXPOSED TO WEATHER, IN CONTACT WITH SOIL OR FLUIDS, OR BEAMS LOCATED OVER FLUIDS:
  - STIRRUPS AND TIES.....2"
  - PRINCIPAL REINFORCEMENT.....2 1/2"

WALLS:
- FORMED CONCRETE SURFACES FOR DRY CONDITIONS.....2"
- FORMED CONCRETE SURFACES EXPOSED TO WEATHER OR IN CONTACT WITH SOIL OR FLUIDS.....2"

FOOTINGS AND SLABS ON GRADE:
- FORMED CONCRETE SURFACES.....2"
- AT UNFORMED CONCRETE SURFACES CAST AGAINST THE SOIL OR CONCRETE WORK MATS.....3"

CONCRETE JOINT:

CONSTRUCTION JOINTS SHALL NOT BE PLACED AT LOCATIONS OTHER THAN THOSE SHOWN ON THE DRAWINGS WITHOUT THE PRIOR WRITTEN APPROVAL OF THE ENGINEER.

TYPICAL STRUCTURAL MATERIALS:

SEE PROJECT SPECIFICATIONS AND NOTES ON DRAWINGS FOR INDIVIDUAL STRUCTURES FOR DETAILED OR SPECIAL REQUIREMENTS.

CONCRETE
- FILL, DUCT ENCASEMENT, WHERE NOTED: CLASS A (f'c = 2500 PSI)
- STRUCTURAL CONCRETE; W/C ≤ 0.54 CLASS B (f'c = 3000 PSI)
- REINFORCING STEEL: ASTM A615, GRADE 60 (Fy = 60,000 PSI)
- REINFORCING STEEL (WELDABLE): ASTM A706, GRADE 60 (Fy = 60,000 PSI)
- CEMENT: ASTM C150, TYPE II
- AIR ENTRAINMENT: 3.5 TO 5.0 PERCENT

STRUCTURAL STEEL
- SHAPES – W AND WT: ASTM A992 (Fy = 50 KSI)
- SHAPES – S, M, HP, C, MC, L, PLATE AND BAR: ASTM A36 (Fy = 36 KSI)
- HOLLOW STRUCTURAL SECTIONS:
  - ROUND: ASTM A500, GRADE B (Fy = 42 KSI)
  - SQUARE AND RECTANGULAR: ASTM A500, GRADE B (Fy = 46 KSI)
- ANCHOR RODS: ASTM F1554, ¾"ø MINIMUM UNO (Fy = 36 KSI)
- WELDING ELECTRODES: E70XX (Ft = 70 KSI)
- ASSEMBLY BOLTS: HIGH STRENGTH ASTM A325–N

SPECIAL INSPECTION REQUIREMENTS

SPECIAL INSPECTIONS SHALL BE CONDUCTED IN ACCORDANCE WITH THE REQUIREMENTS SET FORTH IN CHAPTER 17 OF THE CALIFORNIA BUILDING CODE.

IN ACCORDANCE WITH THE REQUIREMENTS OF CHAPTER 17 OF THE BUILDING CODE, THE PERMIT APPLICANT WILL PROVIDE QUALIFIED PERSONNEL TO PERFORM THE FOLLOWING SPECIAL INSPECTIONS AND SHALL FURNISH INSPECTION REPORTS FROM THE SPECIAL INSPECTOR TO THE ENGINEER AND BUILDING OFFICIAL. THIS DOES NOT RELIEVE THE CONTRACTOR OF ANY RESPONSIBILITY TO PERFORM THE WORK IN ACCORDANCE WITH THE CONTRACT DOCUMENTS. THE CONTRACTOR SHALL NOTIFY THE INSPECTOR 24 HOURS IN ADVANCE OF ALL INSPECTIONS.

SECONDARY CONTAINMENT SHALL RECEIVE SPECIAL INSPECTION:
- CONCRETE CONSTRUCTION (1704.4)
- SOILS (1704.7)

ABBREVIATIONS:

#	NUMBER
&	AND
@	AT
AB	ANCHOR BOLT
ABV	ABOVE
ADDL	ADDITIONAL
AGG	AGGREGATE
AL	ALUMINUM
ALT	ALTERNATE (ING)
APPROX	APPROXIMATELY
ARCH	ARCHITECT (URAL) (URE)
B TO B	BACK TO BACK
BEV	BEVEL (ED)
BLK	BLOCK
BLKG	BLOCKING
B.O.	BOTTOM OF
BOT	BOTTOM
BRG	BEARING
C TO C	CENTER TO CENTER
CIRC	CIRCUMFERENTIAL
CJ	CONSTRUCTION JOINT
CL OR ℄	CENTERLINE
CLR	CLEAR
CMU	CONCRETE MASONRY UNITS
COL	COLUMN
COMP	COMPRESSIBLE
CONC	CONCRETE
CONN	CONNECTION
CONT	CONTINUOUS
CPLG	COUPLING
CRS	COURSE (S)
CSK	COUNTERSINK
CTG	COATING
CTR	CENTER (ED)
d	PENNY
DET	DETAIL
ø OR DIA	DIAMETER
DIAG	DIAGONAL
DIR	DIRECTION
DL	DEAD LOAD
DO	DITTO
DWG	DRAWING
DWL	DOWEL
EA	EACH
EB	EXPANSION BOLT
EF	EACH FACE
EL	ELEVATION
ELEC	ELECTRIC (AL)
EMBED	EMBEDMENT
EQ	EQUAL (LY)
EQPT	EQUIPMENT
ES	EACH SIDE
EW	EACH WAY
EXP ANCH	EXPANSION ANCHOR
EXP JT	EXPANSION JOINT
EXST	EXISTING
EXT	EXTERIOR
f'c	CONCRETE COMPRESSION STRESS
f'm	MASONRY PRISM STRESS
FAB	FABRICATE (OR) (ED)
FD	FLOOR DRAIN
FDN	FOUNDATION
FF	FAR FACE
FHMS	FLATHEAD MACHINE SCREW
FHWS	FLATHEAD WOOD SCREW
FIN	FINISH (ED)
FL	FLOOR
FRP	FIBERGLASS REINFORCED PLASTIC
FT	FEET/FOOT
FTG	FOOTING/FITTING
GA	GAGE
GALV	GALVANIZED
GI	GALVANIZED IRON
GLB	GLASS BLOCK
GR	GRADE
GRTG	GRATING
HAS	HEADED ANCHOR STUD
HD	HEAVY DUTY
HDR	HEADER
HOR	HORIZONTAL
HP	HIGH POINT
HR	HANDRAIL
HSS	HOLLOW STRUCTURAL SECTION
HVAC	HEATING, VENTILATING & AIR CONDITIONING
IAW	IN ACCORDANCE WITH
ID	INSIDE DIAMETER
IF	INSIDE FACE
IN	INCH
INT	INTERIOR
INVT	INVERT
JT	JOINT
KO	KNOCKOUT
L	ANGLE
LLH	LONG LEG HORIZONTAL
LLV	LONG LEG VERTICAL
LNTL	LINTEL
LOC	LOCATION/LOCATED
LONG	LONGITUDINAL
LP	LOW POINT
LT	LEFT
LW	LIGHTWEIGHT
MAS	MASONRY
MATL	MATERIAL
MAX	MAXIMUM
MB	MACHINE BOLTS
MCJ	MASONRY CONTROL JOINT
MECH	MECHANICAL
MIN	MINIMUM
MISC	MISCELLANEOUS
MO	MASONRY OPENING
NF	NEAR FACE
NSG	NON–SHRINK GROUT
NTS	NOT TO SCALE
OC	ON CENTER OR OCCUPANCY CATEGORY
OD	OUTSIDE DIAMETER
OF	OUTSIDE FACE
OPNG	OPENING
OPP	OPPOSITE
OPP HD	OPPOSITE HAND
OPT	OPTION (AL)
PCF	POUNDS PER CUBIC FOOT
PCJ	PARTIAL CONTRACTION JOINT
PJF	PREMOLDED JOINT FILLER
PL OR ℙ	PLATE
PLYWD	PLYWOOD
PREFAB	PREFABRICATED
PROJ	PROJECTION
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PVMT	PAVEMENT
R	RISER (S)
RAD	RADIUS
RC	REINFORCED CONCRETE
REF	REFERENCE/REFER
REINF	REINFORCE (D, ING)
REQD	REQUIRED
REV	REVISION
RLG	RAILING
RO	ROUGH OPENING
RT	RIGHT
SCHED	SCHEDULE
SCJ	SLAB CONTROL JOINT
SECT	SECTION
SFR	SYNTHETIC FIBER REINFORCED
SIM	SIMILAR
SP	SPACE (S) (ED)
SPECS	SPECIFICATION/SPECIFIED
SQ	SQUARE
SST	STAINLESS STEEL
STD	STANDARD
STIF	STIFFENER
STIR	STIRRUP (S)
SYM	SYMMETRICAL
T	TREAD (S)
T&B	TOP AND BOTTOM
TF	TOP FACE
THD	THREADED
TOC	TOP OF CONCRETE
TOW	TOP OF WALL
TRNSV	TRANSVERSE
TSL	TOP OF SLAB
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
VB	VAPOR BARRIER
VERT	VERTICAL
W	WIDE FLANGE
W/	WITH
W/O	WITHOUT
WP	WORKING POINT
WS	WATERSTOP
WWF	WELDED WIRE FABRIC

ABBREVIATION NOTES:

ABBREVIATIONS AND DESIGNATIONS FOR STEEL MEMBERS MAY BE FOUND IN THE CURRENT MANUAL OF STEEL CONSTRUCTION BY AISC.

ABBREVIATIONS OF TECHNICAL SOCIETIES AND TRADE ASSOCIATIONS MAY BE FOUND IN THE SPECIFICATIONS.

WELDING SYMBOLS AND ABBREVIATIONS MAY BE FOUND IN AWS 2.4.

STRUCTURAL LEGEND AND SYMBOLS:

(E) INDICATES EQUIPMENT PAD PER DETAILS J OR K ON SHEET S–200–003. COORDINATE SIZE WITH EQUIPMENT REQUIREMENTS.

HYDROPHILIC (EXPANSIVE) WATERSTOP

GRATING SPAN DIRECTION

EARTH FILL
UNDISTURBED EARTH
CONCRETE
CONCRETE MASONRY
STEEL
ALUMINUM
GRATING
CHECKERED PLATE
GRANULAR FILL
SAND
GROUT
SHALE

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: A. HAHN
DRAWN BY: A. JOHNSON
SHEET CHK'D BY: –
CROSS CHK'D BY: –
APPROVED BY: –
DATE: JUNE, 2014

WARNING
0 1/2" 1"
IF THIS BAR SCALE DOES NOT MEASURE 1" THIS DWG HAS BEEN REDUCED SCALE ACCORDINGLY

CDM Smith
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Tel: (949) 752-5452

CAMBRIA EMERGENCY WATER SUPPLY PROJECT
CAMBRIA COMMUNITY SERVICE DISTRICT

AWTP STRUCTURAL GENERAL NOTES

PROJECT NO. 138760–104133
FILE NAME: S–01.dwg
SHEET NO.
S–01

NOT FOR CONSTRUCTION

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