Cambria Community
Services District

Cambria Emergency Water Supply

Project Description

Cambria, California
June 2014

CDM Smith

The information contained in the document titled "Cambria Emergency Water Supply Project Description" 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.

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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 Project Description (Project Description), 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

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.

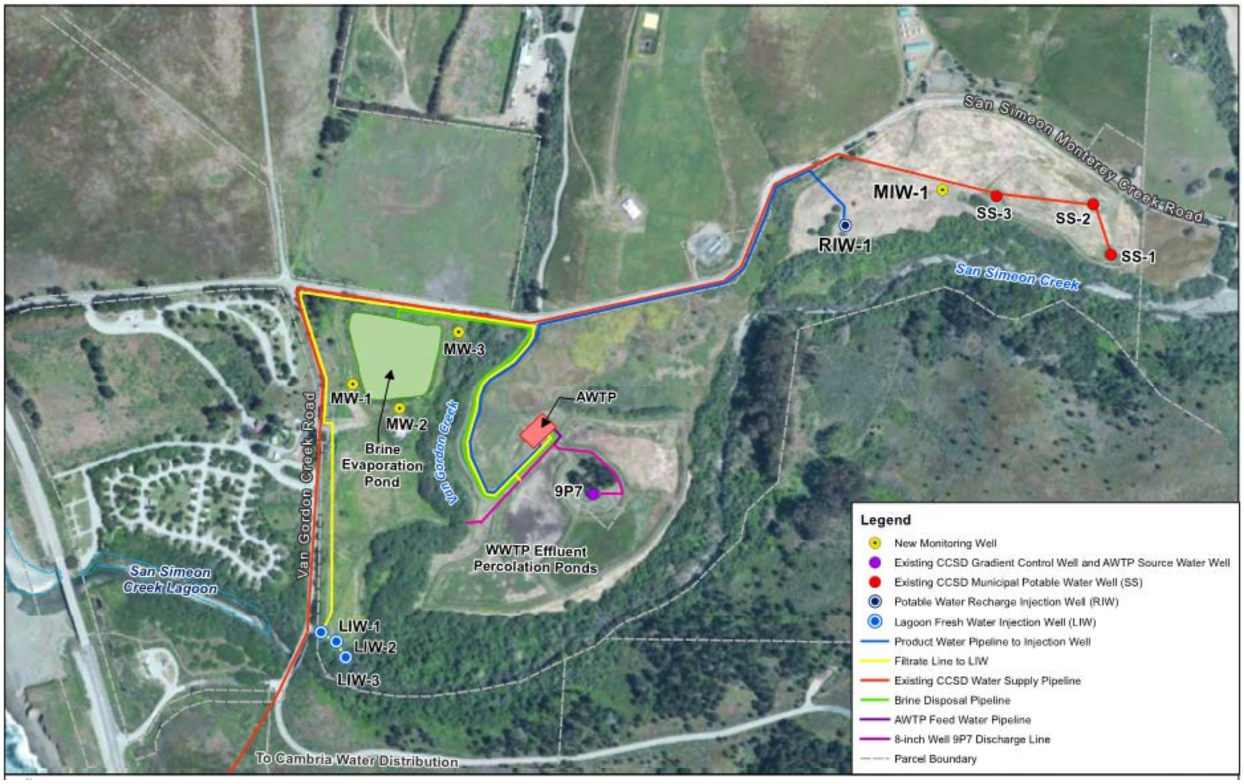

Figure 1-1 Proposed Project Facility

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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.

- *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

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.

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**

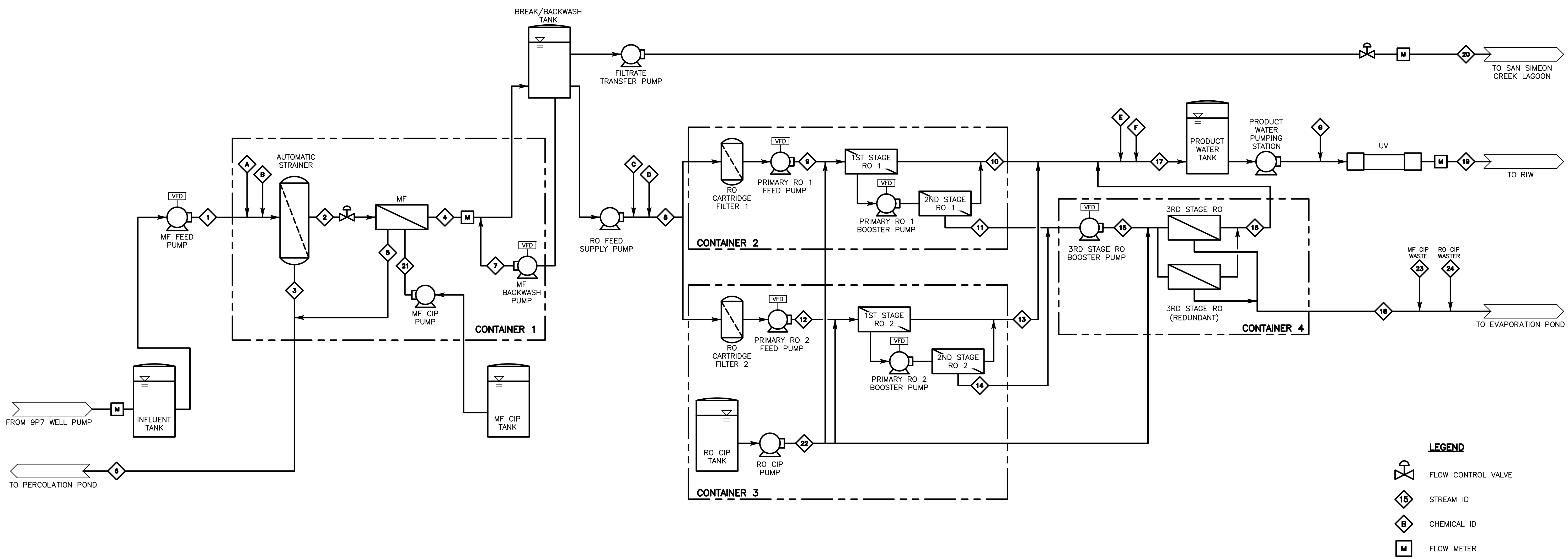
Parameter	Unit	Criteria
MF recovery	%	92
RO recovery	%	92
Influent to AWTP	gpm	691
MF filtrate water capacity	gpm	629
MF filtrate water capacity for San Simeon Creek Lagoon	gpm	100
AWTP Product water capacity for RIW	gpm	484
MF backwash waste	gpm	55
RO brine	gpm	42

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.



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	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

NOT FOR CONSTRUCTION

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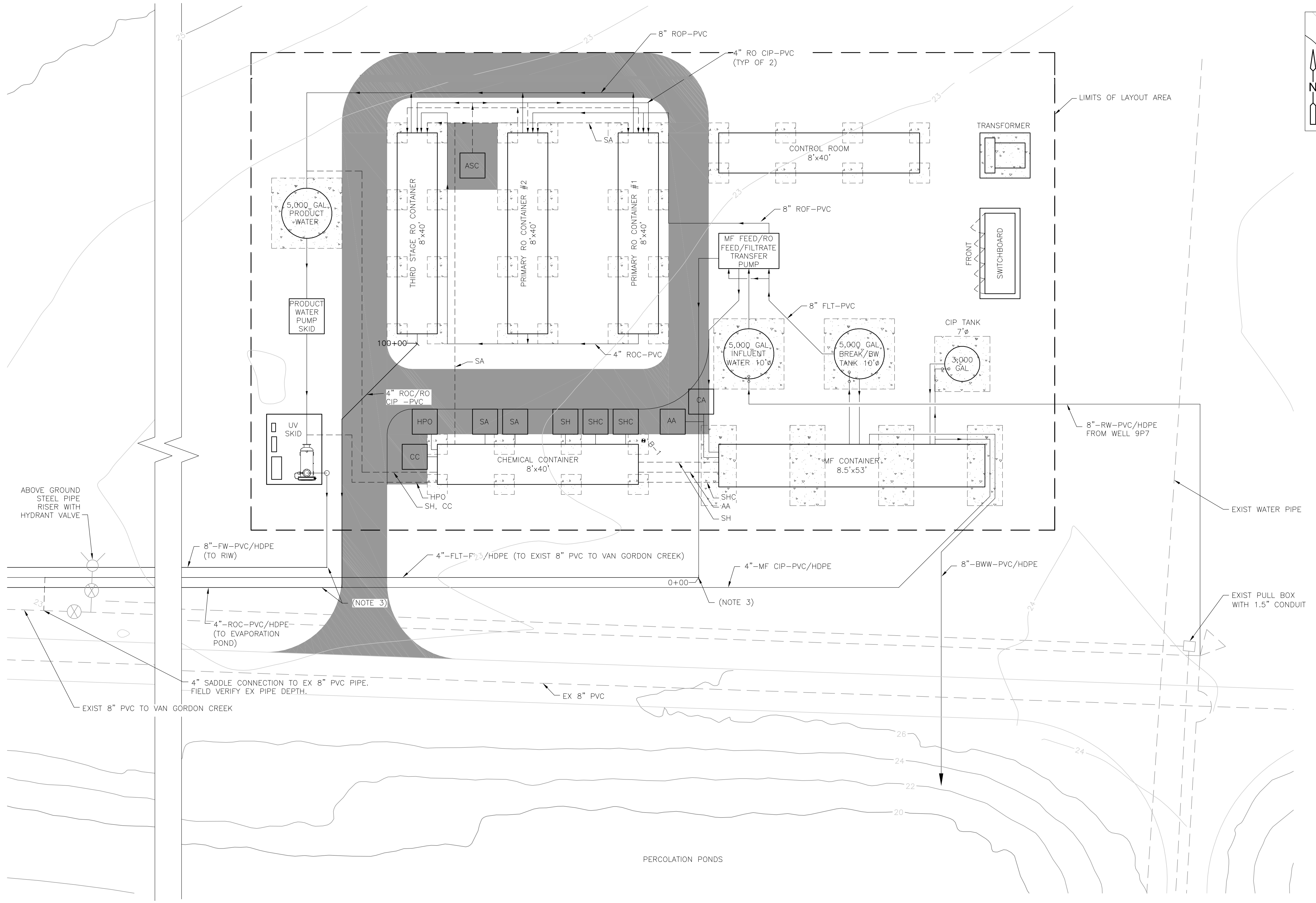

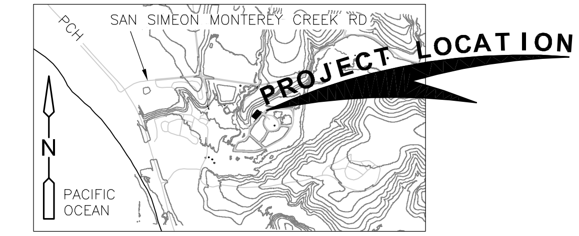

NOTES:

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

CDM Smith
111 Academy Way, Suite 150
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.

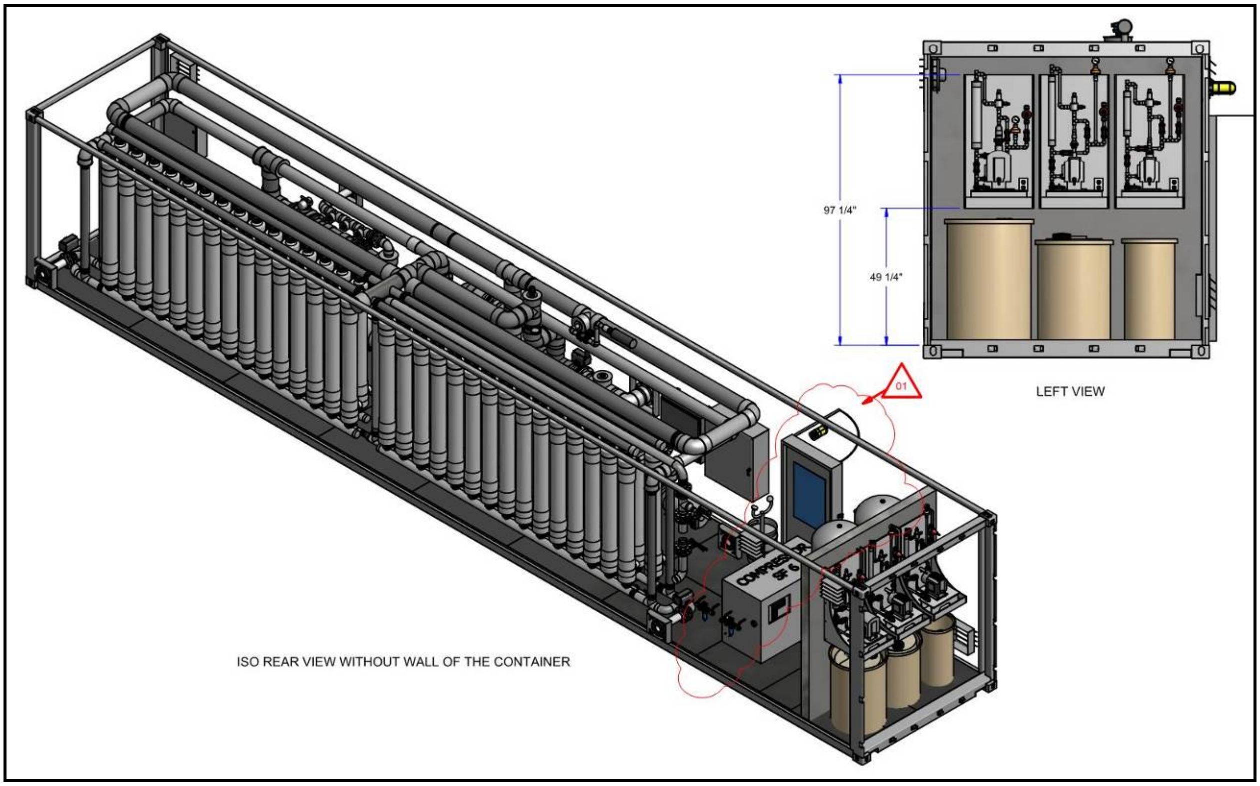

Figure 2-5 MF System Layout

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.

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 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.

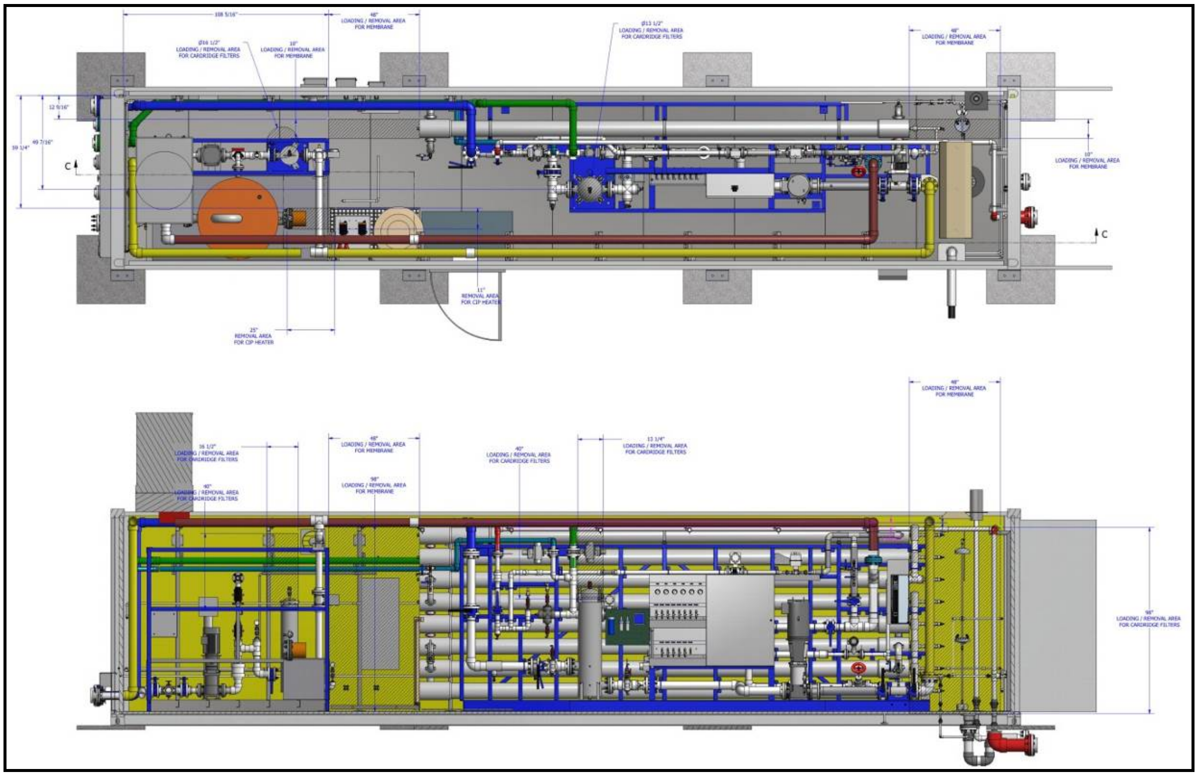

Figure 2-6a RO Train #1 System Layout

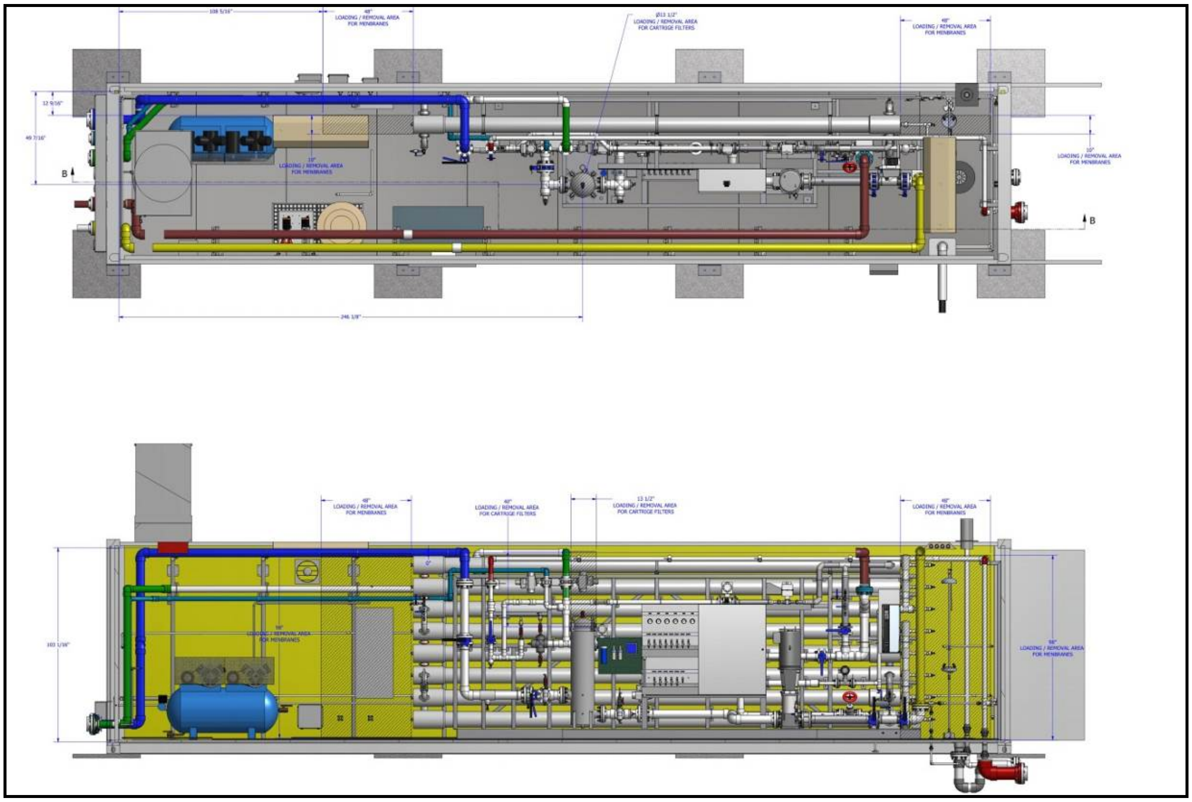

Figure 2-6b RO Train #2 System Layout

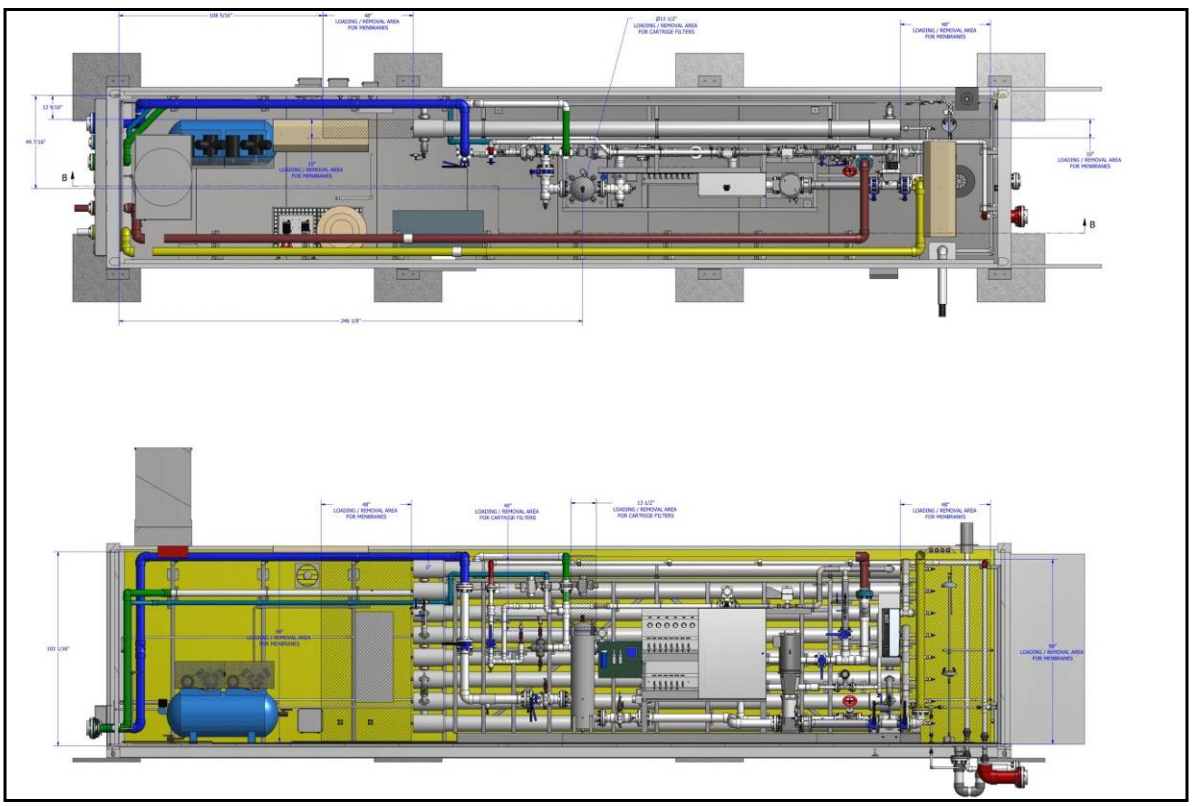

Figure 2-6c Third Stage RO System Layout

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.

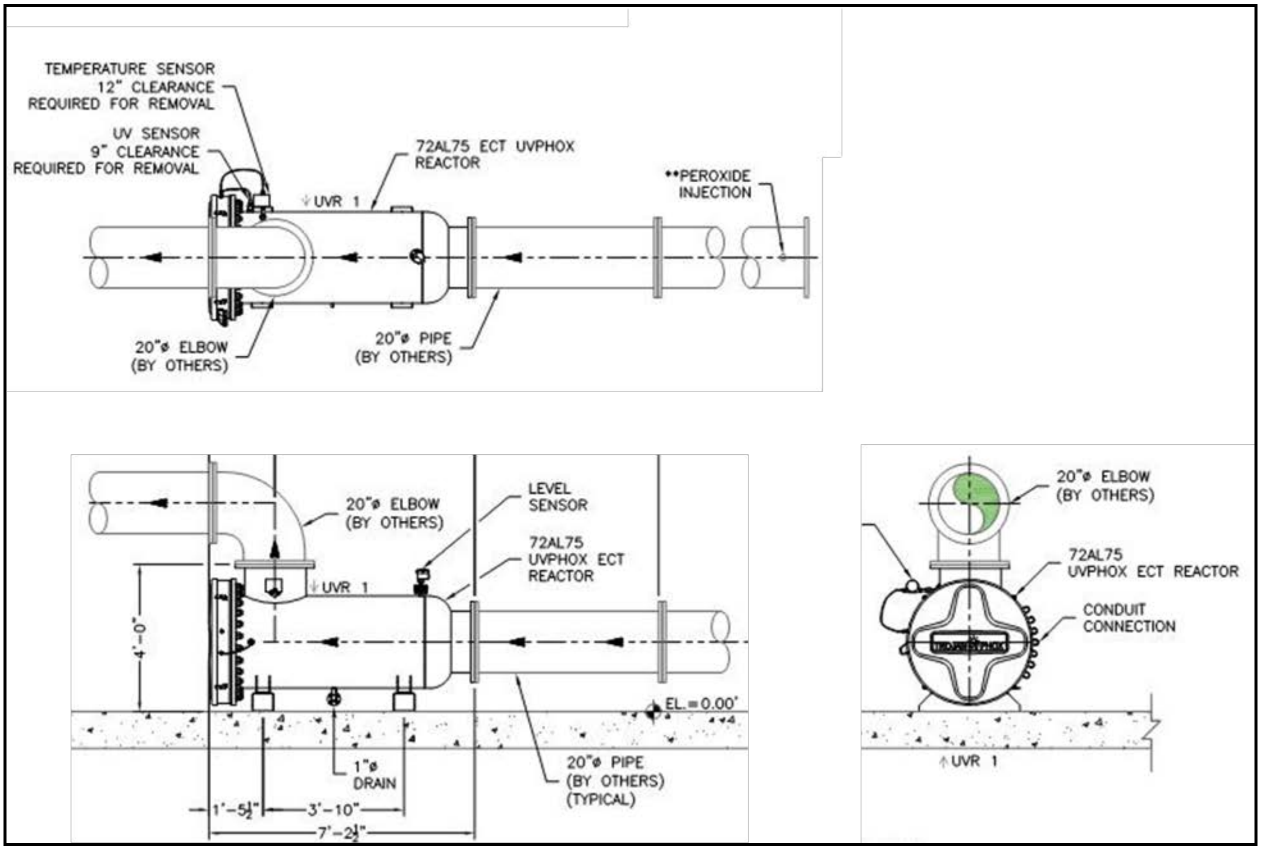

Figure 2-7 UV System Layout

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 connected to an existing PG&E power line servicing Well Site 9P7 via a new power drop from the well site along the well site access road. 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 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	

Description/Location	No. of Duty	No. of Installed Standby	Power/Unit		Max Operating	Average Operating	Installed Load	VFD
			HP	kW	(KW)	(KW)	(kW)	
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.

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

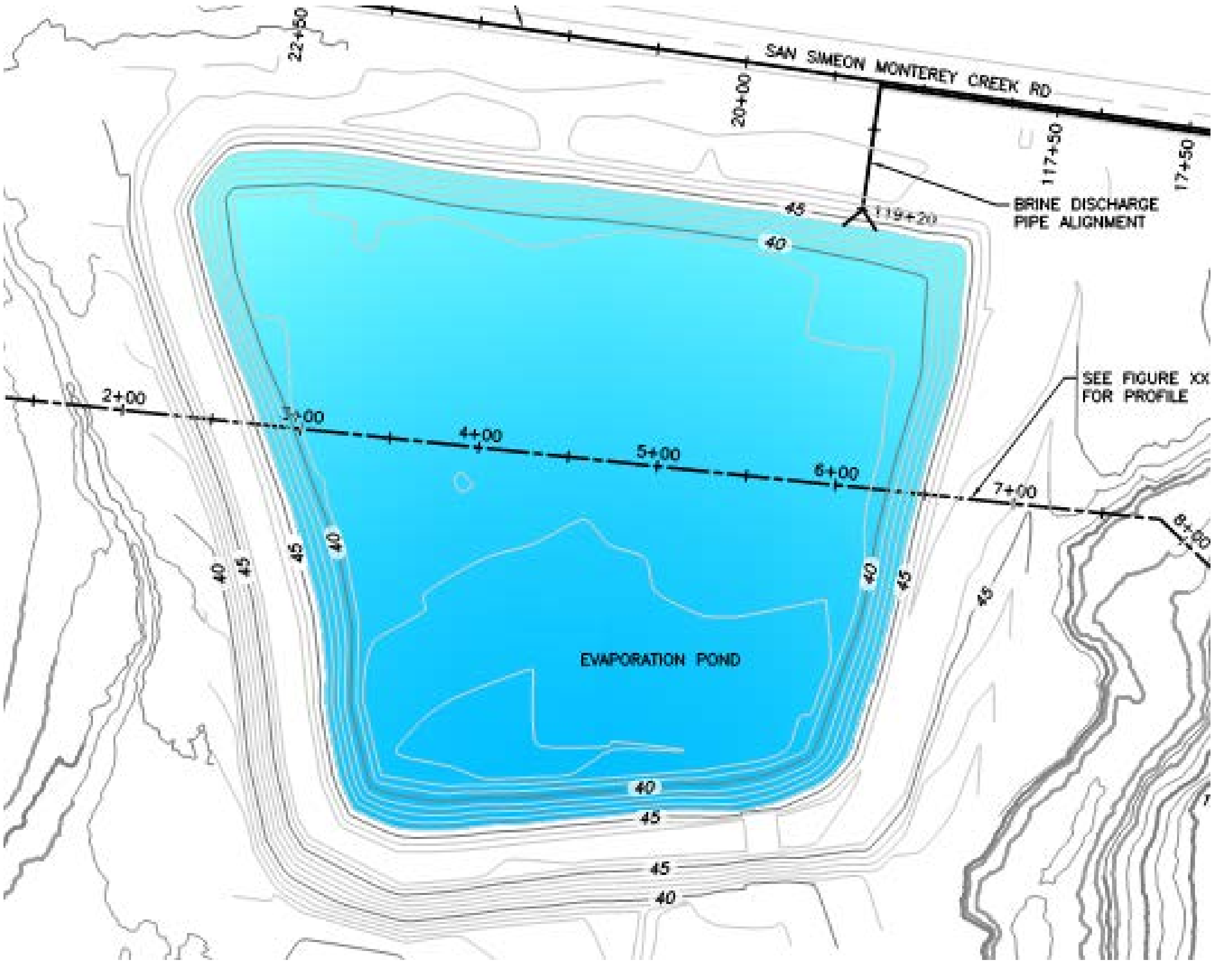

Figure 2-8 Brine Pond Plan

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.

[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.

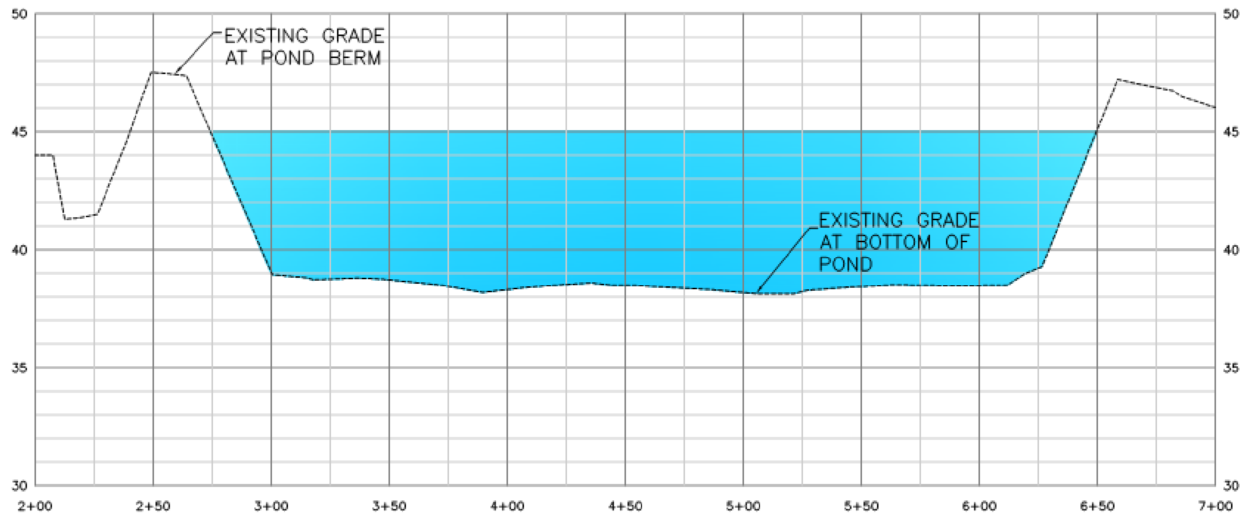

Figure 2-9 Brine Pond Section (Elevation in Feet)

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 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. Figure 2-10 shows spray evaporator and proposed sound enclosure, and Figure 2-11 shows a weather station control panel.

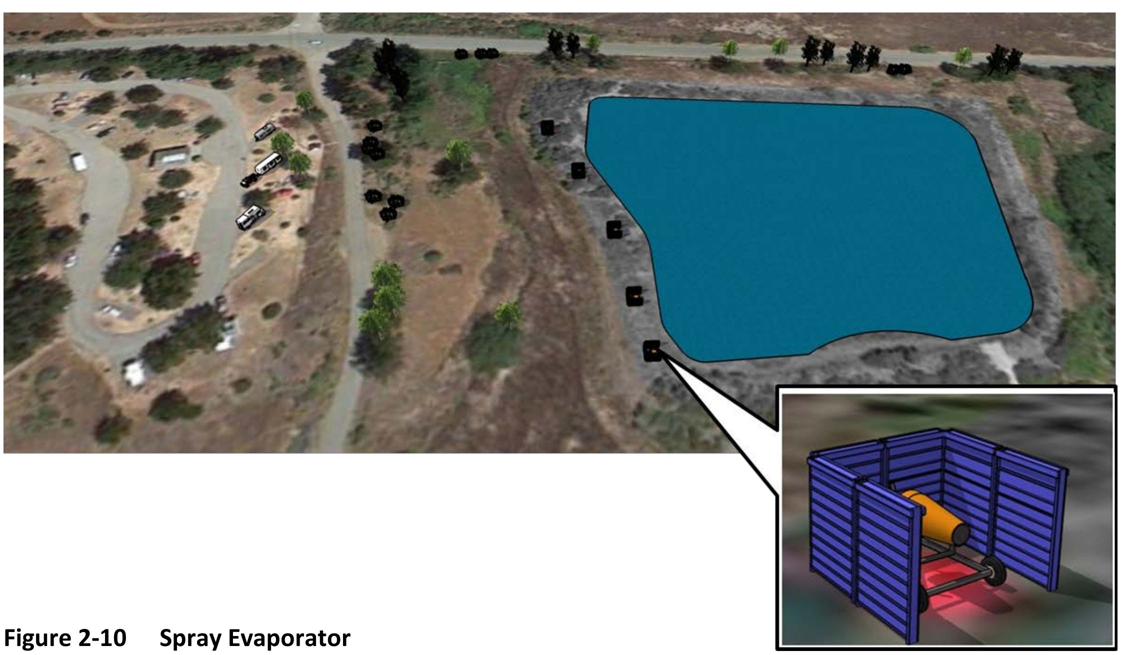

Figure 2-10 Spray Evaporator

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 connected to an existing PG&E overhead power line along San Simeon Road via a new power drop along Van Gordon Creek Road. 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
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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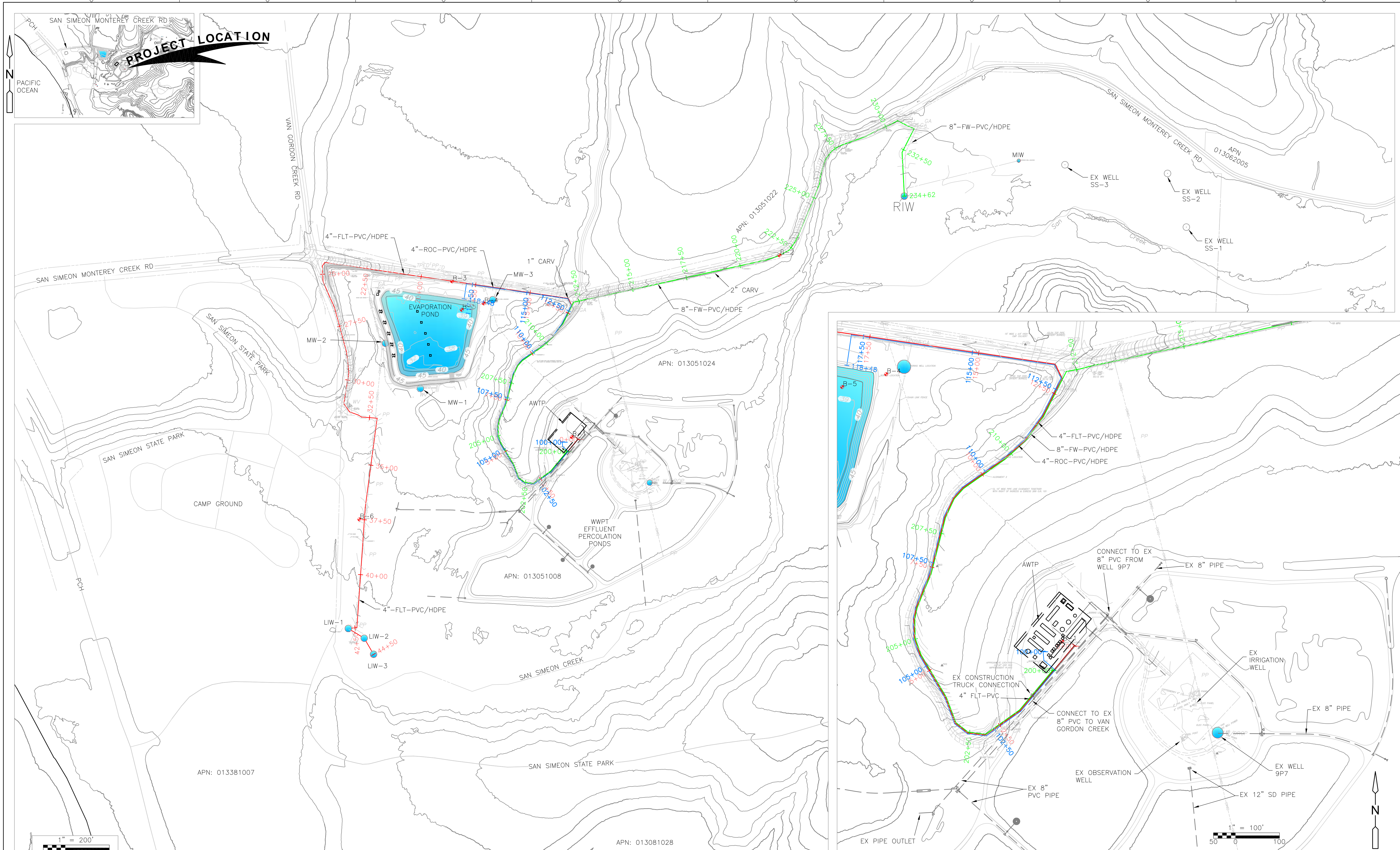

REV. NO.	DATE	DRWN	CHKD	REMARKS

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.

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.

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.

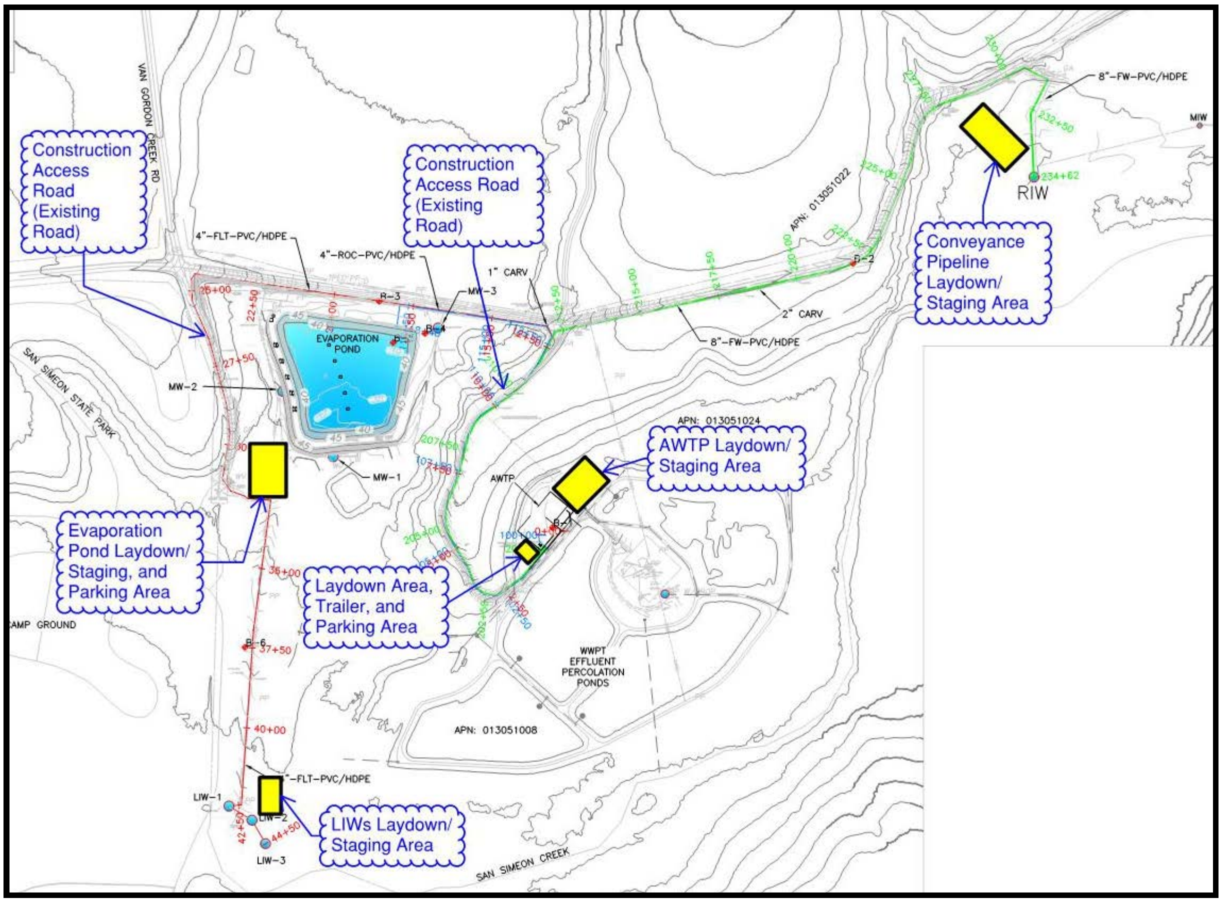

Figure 3-1 Construction Access Road and Laydown/Staging Areas

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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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.

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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

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Appendix A
Design Plans

Appendix B
Specifications