Appendix Y

Overview of Combined MPWSP with 6.4-mgd Desalination Plant and GWR Project

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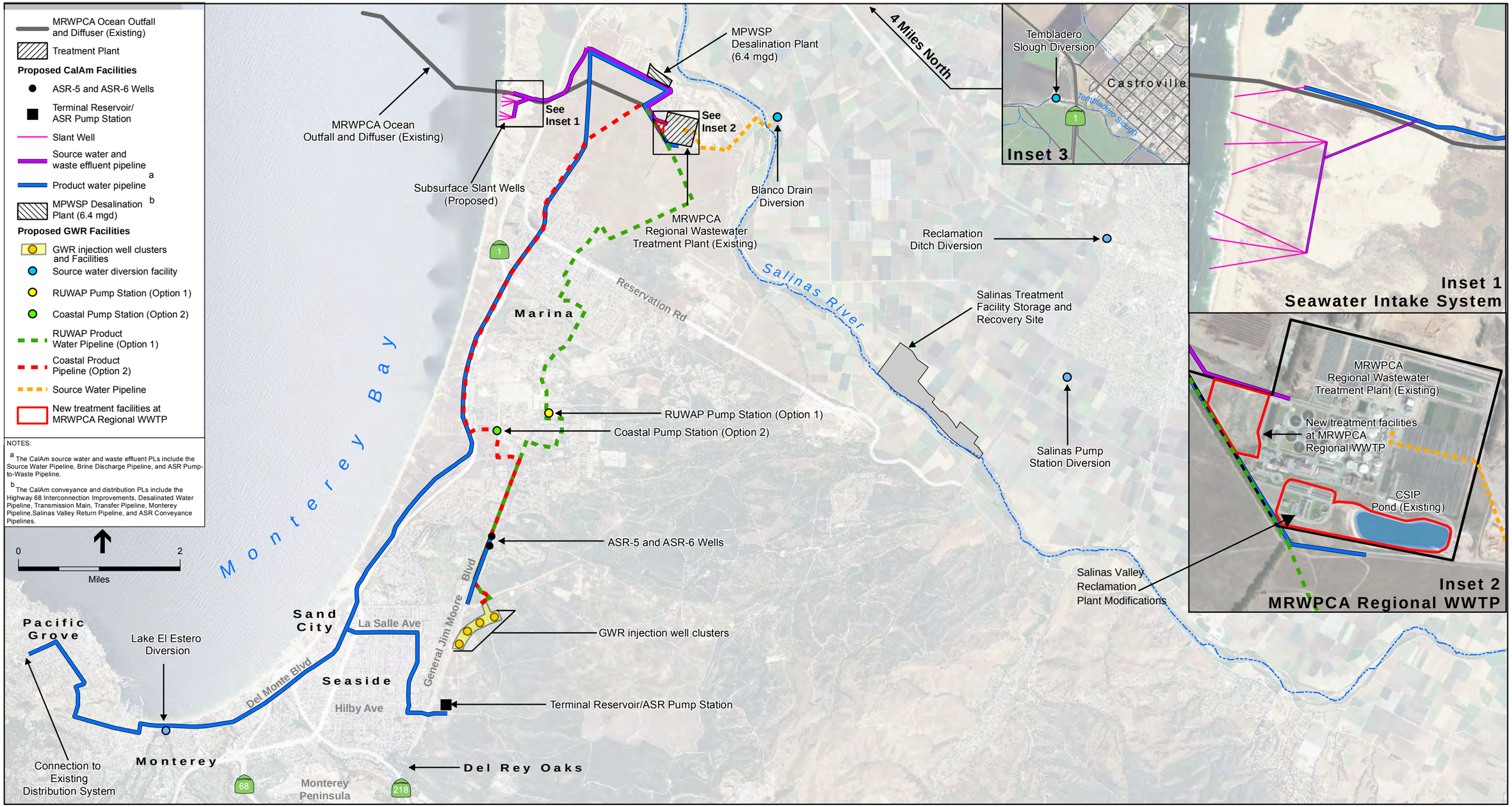

SOURCE: ESA, 2014

TABLE Y-1

MPWSP WITH 6.4 MGD DESALINATION PLANT (ALSO KNOWN AS CALAM FACILITIES OF THE MPWSP VARIANT)

(Source: ESA, March 21, 2015)

Facility	Description	Purpose
Seawater Intake System		
Subsurface Slant Wells	• Seven slant wells (*vs. ten slant wells under the proposed project*) extending offshore beneath the Monterey Bay (the conversion of an existing test slant well into a permanent well plus six new wells), with up to five wells (*vs. eight wells under the proposed project*) operating at any given time and two wells maintained on standby • The slant wells would be grouped into two well clusters (*vs. three well clusters under the proposed project*), one with four wells and the other with three wells • Each slant well would be equipped with a 2,200-gallon-per-minute (gpm) submersible well pump • Each well would be approximately 700 to 800 feet long and extend offshore to a depth of approximately 200 to 220 feet below mean sea level (msl) • The wells would be screened in the Dune Sands Aquifer and the 180-Foot-Equivalent Aquifer of the Salinas Valley Groundwater Basin	These wells would draw approximately 15 mgd of seawater (*vs. 24 mgd under the proposed project*) from beneath the ocean floor for use as source water for the MPWSP Desalination Plant.
Source Water Pipeline	• 2.7-mile-long 42-inch-diameter pipeline	This pipeline would convey the combined source water from the slant well clusters to the MPWSP Desalination Plant.
Desalination Facilities		
Pretreatment System	• Pressure filters or multimedia gravity filters would be housed within a 6,000-square-foot pretreatment building • Two 300,000-gallon backwash supply and filtered water equalization tanks • Two 0.25-acre, 6-foot-deep lined backwash settling basins with decanting system	The pretreatment system would treat source water to remove suspended and dissolved contaminants that could damage the RO system, and thus increase the efficiency and lifespan of the RO system.
Reverse Osmosis (RO) System	• Dual-pass RO system consisting of four active modules and one standby module, with each module producing 1.6 mgd of "permeate" (the purified water produced through the RO membrane) • UV disinfection system (if required) • The RO and post-treatment systems and chemical storage tanks would be housed within a 30,000-square-foot process and electrical building	The RO system would remove salts and other minerals from pretreated source water. If required by the California Department of Public Health, the UV Disinfection system would provide additional primary disinfection
Post-treatment System	• Chemical feedlines and injection stations (for carbon dioxide, lime, sodium hydroxide, phosphate-based corrosion inhibitor, and sodium hypochlorite)	The post-treatment system would adjust the hardness, pH, and alkalinity of the desalinated product water and disinfect the water in accordance with drinking water requirements.
Chemical Storage	• Chemical storage tanks with secondary containment • Sumps and sump pumps	This facility would provide for chemical storage. The capacity of the chemical storage tanks would range from less than 5,000 gallons to 20,000 gallons, depending on the treatment chemical.
Administrative Building	• 4,000- to 6,000-square-foot building	This building would house restrooms, locker rooms, break rooms, conference rooms, electrical controls, laboratory facilities, equipment storage and maintenance, and electrical service equipment.
Brine Storage and Disposal Facilities		
Brine Storage and Disposal	• 3-million-gallon brine storage basin • 1-mile-long, 30-inch-diameter Brine Discharge Pipeline	Approximately 8.99 mgd of brine (*vs. 13.98 mgd of brine under the proposed project*) would be generated by the RO process. Brine concentrate produced during the RO process would be conveyed to the brine storage basin located at the MPWSP Desalination Plant. The Brine Discharge Pipeline would convey decanted effluent from the pretreatment filtration backwash cycle and RO concentrate produced by the RO system to an existing ocean outfall.
MRWPCA Ocean Outfall Pipeline and Diffuser (existing)	• 2.3-mile long, 60-inch-diameter pipe (onshore portion) • 2.1-mile-long, 60-inch-diameter pipe • 1,100-foot-long diffuser with 172 ports (120 ports are open and 52 are closed), each 2 inches in diameter and spaced 8 feet apart	Brine and pretreatment backwash effluent from the desalination plant would be conveyed to the existing ocean outfall pipeline. The outfall would terminate at a diffuser located offshore that would discharge the concentrate to Monterey Bay.
Desalinated Water Conveyance and Storage Facilities		
Clearwells (Water Storage Tanks) and Clearwell Pump Station	• 6.4-mgd, 120-horsepower pump • Two 85-foot-diameter, 750,000-gallon aboveground storage tanks (providing a total combined storage volume of 1.5 million gallons)	The clearwell pump station would pump water from the post-treatment process to the clearwells. The clearwells would serve as holding tanks from which water would be pumped to either the CalAm water system or the existing Castroville Seawater Intrusion Project (CSIP) pond.
Desalinated Water Pump Station	• 6.4-mgd, 800-horsepower pump to pump water through the Desalinated Water Pipeline to the CalAm water system • 1.4-mgd, 20-horsepower pump to pump water through the Salinas Valley Return Pipeline to the CSIP pond	This facility would pump desalinated product water from the MPWSP Desalination Plant to the CalAm water system and existing CSIP pond.
Salinas Valley Return Pipeline	• 1.2-mile-long, 12-inch-diameter pipeline	This pipeline would convey desalinated product water from the MPWSP Desalination Plant to the CSIP pond for subsequent delivery to agricultural users in the Salinas Valley.
Desalinated Water Pipeline	• 3.25-mile-long, 36-inch-diameter pipeline	This pipeline would convey desalinated product water from the clearwells at the MPWSP Desalination Plant to the Transmission Main at Reservation Road.
Transmission Main	• 6-mile-long, 36-inch-diameter force main	This pipeline would convey desalinated product water between the Desalinated Water Pipeline at Reservation Road to the Monterey Pipeline and Transfer Pipeline at the intersection of Del Monte Boulevard/La Salle Avenue.
Transfer Pipeline	• 2.4-mile-long, 36-inch-diameter pipeline (could be operated in both directions)	This pipeline would convey desalinated product water or water that is extracted from the ASR injection/extraction wells (including GWR product water) to the Terminal Reservoir for storage; water extracted from ASR directly to the CalAm distribution system; and water stored in Terminal Reservoir to the CalAm distribution system.
Monterey Pipeline	• 5.4-mile-long, 36-inch-diameter pipeline (could be operated in both directions)	This pipeline would convey CalAm water supplies (including desalinated product water, ASR product water, and GWR product water) between Seaside and the Monterey Peninsula.

TABLE Y-1

MPWSP WITH 6.4 MGD DESALINATION PLANT (ALSO KNOWN AS CALAM FACILITIES OF THE MPWSP VARIANT)

(Source: ESA, March 21, 2015)

Facility	Description	Purpose
Interconnection Improvements for State Route 68 Satellite Systems a) Ryan Ranch–Bishop Interconnection b) Main System–Hidden Hills Interconnection	a) 1.1-mile-long, 8-inch-diameter pipeline b) 1,200-foot-long, 6-inch-diameter pipeline	These interconnection pipelines and associated improvements would allow MPWSP supplies to be conveyed to the Ryan Ranch, Bishop, and Hidden Hills water systems.
Terminal Reservoir	• Two 3-million-gallon storage tanks	These tanks would store desalinated product water and ASR product water.
Valley Greens Pump Station	• 3-mgd, 100-horsepower pump station	This 600-square-foot facility would provide the additional water pressure needed to pump water through the existing Segunda Pipeline into Segunda Reservoir.
ASR System		
Six ASR Injection/Extraction Wells (four existing wells and two proposed): a) ASR-1, ASR-2, ASR-3, and ASR-4 Wells (existing) b) ASR-5 and ASR-6 Wells (proposed)	• Two proposed 1,000-foot-deep injection/extraction wells (ASR-5 and ASR-6 Wells) with a combined injection capacity of 2.2 mgd and extraction capacity of 4.3 mgd • Four existing injection/extraction wells (Phase I and II wells)	The existing and proposed ASR injection/extraction wells would be used to inject Carmel River supplies and desalinated product water into the Seaside Groundwater Basin for storage. During periods of peak demand, the wells would be used to extract water that is stored in the Seaside Groundwater Basin (including Carmel River supplies, desalinated product water, and GWR product water) for subsequent delivery to customers.
ASR Pump Station	• 8.4-mgd, 300-horsepower pump station	This pump station would be used to pump water to and from the ASR injection/extraction wells through existing and proposed pipelines.
ASR Conveyance Pipelines	• Two parallel 0.9-mile-long, 30-inch-diameter pipelines	One of these pipelines would be used to convey water from existing conveyance facilities at the corner of Coe Avenue and General Jim Moore Boulevard to the new ASR-5 and ASR-6 Wells for injection; the other pipeline would be used to convey extracted ASR supplies to the same existing facilities.
ASR Pump-to-Waste System	• 0.9-mile-long, 16-inch-diameter pipeline • 4,800-square-foot, 12-foot-deep settling basin	The ASR Pump-to-Waste System would flush sediment and other suspended solids out of the two proposed ASR injection/extraction wells and convey it to a new settling basin (the proposed ASR Settling Basin) at the same site, or to the existing settling basin for the ASR-1 and ASR-2 Wells located approximately 2 miles to the south. The ASR Pump-to-Waste Pipeline would connect to existing pump-to-waste pipelines located at the intersection of General Jim Moore Boulevard and Coe Avenue.

TABLE Y-2

PROPOSED GWR PROJECT WITHOUT CALAM DISTRIBUTION SYSTEM: MONTEREY AND TRANSFER PIPELINES

(ALSO KNOWN AS GWR FACILITIES OF THE MPWSP VARIANT)

Facility	Description	Purpose
New Source Water Diversion and Storage Facilities		
Diversion facilities for Unused Treated Wastewater from MRWPCA Regional Treatment Plant	New diversion structure on the existing secondary effluent pipeline to capture unused secondary-treated effluent. This facility is described as part of the Treatment Facilities at the Regional Treatment Plant	To capture unused secondary-treated effluent and divert it to the proposed AWT Facility.
Salinas Pump Station Diversion and Salinas Treatment Facility Storage and Recovery Improvements	Salinas Pump Station Diversion: – Underground junction structure constructed over the existing 48-inch sanitary sewer line, to mix sanitary, agricultural wash waster and stormwater flows. This structure would also receive agricultural wash water and stormwater return flow from the Salinas Treatment Facility's Pond 3. – Modifications to the existing agricultural wash water underground diversion structure and the addition of 42-inch diameter 150-foot long underground pipeline and metering structure. – Underground stormwater diversion structure and underground pipeline between this structure and the existing 33-inch agricultural wash water line. – Underground stormwater diversion structure and underground pipeline to divert to divert stormwater flow to the Salinas Pump Station through an existing 30-inch abandoned pipeline. – Meters, valves, electrical and control systems, and fencing around the diversion structures Salinas Treatment Facility Storage and Recovery Improvements: – Return pump station including valve, mater vault, and two variable frequency drive pumps – 18-inch return pipeline connecting the pump station to the Salinas Diversion site – Pipeline connecting Pond 3 to the new return pump station – Pump station near the lower end of Pond 3 – Pipeline to convey treated wastewater from the aeration basin to the pipeline that returns waster from Pond 3 or directly to the return pump station.	Water would be diverted to the existing Salinas Pump Station using a new diversion structure and new short pipelines connecting the existing agricultural wash water pipeline to the existing municipal wastewater system. The agricultural wash water would then mix with the municipal wastewater and be conveyed through the existing 36-inch diameter Salinas interceptor to the Regional Wastewater Treatment Plant. City of Salinas urban runoff and stormwater would be diverted to the Regional Wastewater Treatment Plant rather than discharged to the Salinas River.
Reclamation Ditch Diversion at Davis Road	• Diversion structure consisting of a intake structure connecting to a wet well (manhole) via a gravity pipeline • Two submersible pumps installed within the wet well, controlled by variable frequency drives • Valve and meter vaults • Weatherproof cabinet enclosing electrical controls and drives • Two short force main approximate 50 foot long, discharging to an existing manhole on the City of Salinas 54-inch sewer main • Modification to existing sanitary manhole and a short pipeline from the existing manhole to the pump station	To divert and convey source waters from the Reclamation Ditch to the Regional Treatment Plant
Tembladero Slough Diversion at Castroville	• Intake structure connecting to a new lift station wet well (manhole) via a gravity pipeline • Modifications to the existing Castroville Pump Station • Two submersible pumps installed within the wet well, controlled by variable frequency drives • Weatherproof cabinet enclosing electrical controls and drives • Short force main approximate 100 foot long discharging to the existing wet well at the MRWPCA Castroville Pump Station • Underground valve vault, isolation valves and flow meter	To divert and convey source waters from the Tembladero Slough to the Regional Treatment Plant.
Blanco Drain Diversion Pump Station and Pipeline	• Intake structure connecting to a wet well (manhole) via a gravity pipeline • Two submersible pumps installed within the wet well, controlled by variable frequency drives • Weatherproof cabinet enclosing electrical controls and drives • The pump station would discharge through a18-inch force main and a 30-inch gravity main, running from the pump station to the headworks for the Regional Wastewater Treatment Plant • Underground valve vault, isolation valves and flow meter • Surge tank	To divert and convey source water from the Blanco Drain watershed to the Regional Treatment Plant.
Lake El Estero Diversion	Lake El Estero Source Water Diversion System Option 1: – Pumping system consisting of a new column pump installed in the wet well of the existing lake management pump station – Upgrades to the existing electric panel – 30-foot long, 12-inch diameter discharge pipeline Lake El Estero Source Water Diversion System Option 2: – Gravity system consisting headwall and screen intake pipe – 40-foot long, 12-inch diameter discharge pipeline – Isolation valve (controlled and motorized)	Lake El Estero Source Water Diversion System would connect existing facilities and convey the new source water flows to the Regional Treatment Plant.
New Treatment Facilities and Modifications at the MRWPCA Regional Wastewater Treatment Plant		
Inlet Raw Water Diversion Structure and Pump Station	• Diversion structure installed on an existing secondary effluent pipeline at the Regional Treatment Plan • Influent pump station (subgrade wetwell and pumps)	The diversion structure would divert and convey secondary effluent source water to the proposed Advanced Water Treatment Facility. The influent pump station would accept and equalize the Regional Wastewater Treatment Plant secondary effluent flow.
Raw Water Pretreatment	Chloramination – Sodium hypochlorite storage – Chemical feed pumps – Inline injection and mixing system Ozonation – Liquid oxygen storage and vaporizers or onsite oxygen generator – Nitrogen boost system – Ozone generator and power supply unit – Cooling water system – Side-stream injection system – Ozone contactor – Ozone destruct units Biologically active filtration (if required) – Gravity-feed filter basins with approximately 12 feet if granular media, and an underdrain/media support system – Ancillary systems Alkalinity addition system for pH control, backwash water basin, backwash pumps, air compressor and a supply system for an air scour system, air compressor and a supply system for process air, and a wash water basin to facilitate filter backwashing	Before membrane filtration, the secondary effluent would be pretreated using these pre-screening methods in up to three separate subsystems. Chloramines would be used to reduce biofouling of the membrane systems. Ozone treatment would provide a chemical/pathogen destruction barrier and reduce the membrane fouling. Biologically active filtration (if required) would be used downstream of ozone treatment to reduce the concentration of residual organic matter present in the ozone effluent and to reduce the solids loading on the membrane filtration process.

TABLE Y-2

PROPOSED GWR PROJECT WITHOUT CALAM DISTRIBUTION SYSTEM: MONTEREY AND TRANSFER PIPELINES

(ALSO KNOWN AS GWR FACILITIES OF THE MPWSP VARIANT)

Facility	Description	Purpose
Microfiltration/Ultrafiltration Membrane Treatment System	Membrane filtration system – Hollow fiber membrane modules – Valve manifolds to direct the flow of feed, filtrate, cleaning solutions, backwash supply, backwash waste, and compressed air to the corresponding module connecting piping. – Feed pumps	The membrane filtration system would remove suspended and colloidal solids, including bacteria and protozoa through hollow fiber membrane modules.
Reverse Osmosis Membrane Treatment System	Individual process trains housing the process membranes in pressure vessels along with connecting piping and valve manifolds for feed, permeate, concentrate, cleaning and flush supplies.	The reverse osmosis process that employs semi-permeable membranes is proposed to remove dissolved salts, inorganic and organic constituents, and pathogens from the membrane filtration treated water.
Advanced Oxidation Process System	• Chemical feed to add hydrogen peroxide and reactors housing arrays of ultraviolet lamps along with ballasts to power the ultraviolet system.	The advanced oxidation system would provide a final polishing step for pathogen disinfection and would provide an additional chemical destruction barrier for the reverse osmosis permeate.
Post-Treatment System	• Post-treatment stabilization system	Post-treatment stabilization of the product water would prevent corrosion of pipe materials in the product water conveyance system. Stabilization would also be used to reduce the potential for product water to leach minerals and other chemicals from the soils within the Seaside Groundwater Basin upon injection.
Advanced Water Treatment Pump Station	• Pump station constructed on a new concrete pad • Split-faced block building approximately 30 feet by 70 feet and up to 25 feet tall. - Pump motors - Discharge piping - Electrical power equipment - HVAC - Instrumentation and control equipment • Electrical supply transformer • Pressurized surge tank • Standby pumping units for pump stations	The Advanced Water Treatment Pump Station would pump the product water into the product water conveyance pipeline.
Brine Mixing Facility	• Two cast-in-place concrete vaults on the existing outfall • A cast-in-place concrete mixing structure with a 60-inch static mixer in a fiberglass mixing pipe and air release valve • Pipelines and valves • Flow meters • Sampling port • Two sluice gates • Air release valve • Lab and control building	The Brine Mixing Facility would thoroughly mixed osmosis reject or concentrate water (or brine) to prevent stratification of MRWPCA's ocean outfall that may lead to complicated corrosion potential to the outfall pipe and to optimize the mixing with sea water in the bay. this is also the connection point between the Desalination Brine Discharge Pipelines and the PCA's outfall
Power Supply	• Utility service • Transformers • Switchgear	The Advanced Water Treatment Facility power would be supplied through a new PG&E utility connection.
Salinas Valley Reclamation Plant Modifications	• Sluice gates • A new pipeline between the existing inlet and outlet structures with the storage pond • Chlorination basin upgrades	Modifications would enable the plant to produce more continuous flows in the winter when demand by the CSIP users decreases to as low as 0.5 mgd.
GWR Product Water Conveyance Facilities		
RUWAP Alignment (Option 1) or Coastal Alignment (Option 2)	• 24-inch-diameter pipeline • In-line isolation valves on the pipeline approximately every 2,000 feet	Conveys the advanced treated product water from the proposed Advanced Water Treatment Facility to the Seaside Groundwater Basin for injection. The Product Water Conveyance system would be designed to convey a total of up to 3,700 afy of product water to the proposed new injection wells.
Booster Pump Station	• 2,100-sqaure foot, up to 25 foot tall booster pump station building • Split-faced block building – Pump motors – Discharge piping – Electrical power equipment – HVAC – Instrumentation and control equipment • Electrical supply transformer • Pressurized surge tank • Standby pumping units for pump stations	The Booster Pump Station would provide adequate pressure to convey the Advanced Water Treatment product water to the proposed new GWR Injection Well Facilities for injection.
GWR Injection Well Facilities		
Injection Well Clusters	• Four deep injection wells (DIW-1, DIW-2, DIW-3 and DIW-4) with a combined injection capacity of 4.6 mgd. And four vadose zone well (VZW-1, VZW-2, VZW-3, and VZW-4) with a combined injection capacity of 2.88 mgd. Each well cluster would include one of each type of well and the following: – Back flushing pump and motors – Above and below grade injection and back-flush wash pipelines – Values and flow meters – Small building (approximately 16 feet by 24 feet) for electrical and control equipment • Wells would be constructed in close proximity to each other to share electrical, motor control, pumps, and site building pad infrastructure.	The proposed injection wells would be used to inject product water into the Seaside Groundwater Basin.
Backflush Facilities	• 2,000 gpm back-flush well pump, flow meter, electrical cabinet and 400 hp motor attached to the injection well • Pipeline to convey the back-flushed water to the percolation basin • 240,000 gallon, 50-foot-wide, 180-foot-long, and 3-foot-deep percolation basin	The back-flush facilities would flush or cleans out organic material or bacterial growth, which would otherwise result in the lost pumping capacity of the injection wells. Back-flushed water would be conveyed to the percolation basin for storage.
Monitoring Wells	• Six Paso Robles Aquifer monitoring wells • Six Santa Margarita Aquifer monitoring wells	Monitoring wells would be used to monitor project performance and compliance with State Board Division of Drinking Water regulations. The monitoring wells would also be used to satisfy regulatory requirements for monitoring of subsurface travel time, tracer testing, and other requirements for a groundwater replenishment project.
Electrical Power Supply and Instrumentation for GWR Injection Wells	• Electrical equipment • Electrical control building (for backflush pumps) housing SCADA, electrical controls, pump drive, and adjacent transformer • 400 square foot electrical control building housing the motor control center • External electrical control cabinets • Wiring • Connections of electrical power and instrumentation and control facilities	Injection wells would require a permanent power supply to the site.