5.9 Utilities and Service Systems

5.9.1 Introduction

This section describes the existing utilities and service systems setting of the project area, and evaluates whether the development of the proposed desalination plant and related facilities would result in adverse effects to utilities and service systems. Specifically, the evaluation focuses on whether the proposed project would exceed wastewater treatment requirements; result in or require the construction of new water, wastewater, or electrical generation and/or transmission facilities; be served by a landfill with sufficient capacity; and comply with federal, state, and local statutes and regulations related to solid waste.

The description of the existing setting and evaluation of impacts is based on project-specific design and operational details as described in **Section 4, Project Description**. Additional information in this section related to environmental setting, regulatory framework, and the analysis of impacts and mitigation measures is derived from Section 5.9, Public Services and Utilities, of the *Integrated Water Plan Program Environmental Impact Report* (IWP Program EIR) (City, 2005a), as well as from other references, as cited throughout this section[1].

Public and agency comments related to utilities and service systems were received during the public scoping period in response to the Notice of Preparation, and are summarized below.

- Evaluate direct and indirect impacts to water usage and estimate water demand.
- Evaluate potential impacts of brine discharge on outfall infrastructure (e.g., corrosion, scour).
- Evaluate impacts on the wastewater treatment plant.
- Estimate solid waste generation and analyze impacts of disposal and treatment methods.
- Evaluate the energy use of the proposed project and the capacity of the existing system to serve the proposed project.

To the extent that issues identified in public comments involve potentially significant effects on the environment according to the California Environmental Quality Act (CEQA), and/or are raised by responsible and trustee agencies, they are identified and addressed in this EIR. For a complete list of public comments received during the public scoping period, refer to **Appendix**

[1] Referenced documents in this EIR are available for review at the City of Santa Cruz Water Department offices at 212 Locust Street, Suite D, Santa Cruz, California 95060, Monday through Thursday 8:00 a.m. to Noon and 1:00 p.m. to 5:00 p.m., except holidays. Likewise, these documents are available for review at the Soquel Creek Water District offices at 5180 Soquel Drive, Soquel, CA 95073, Monday through Friday 8:00 a.m. to Noon and 1:00 p.m. to 5:00 p.m., except holidays.

A, Scoping Report City of Santa Cruz and Soquel Creek Water District (scwd²) Regional Seawater Desalination Project.

5.9.2 Environmental Setting

Water Supply

The proposed desalination project would result in the use of potable water from the City of Santa Cruz (City) distribution system for purposes such as preparing chemical solutions for daily maintenance washes, therefore a description of the City's system and associated water supply reliability is provided below, based on **Section 3, Project Background**. A similar discussion about the Soquel Creek Water District (District) distribution system is not provided, as the proposed project would not rely on District water for any similar on-site uses.

The City supplies water to the City of Santa Cruz, the City of Capitola (Capitola), and portions of unincorporated Santa Cruz County (County). Sixty-five percent of the City's customers are residential, 26 percent are business and industrial, and approximately 10 percent are municipal and irrigation, which includes golf course irrigation and irrigation of coastal commercial agricultural land. City water is also provided for fire protection needs throughout the service area.

The City's primary sources of water supply are surface water diversions from the North Coast of the County and the San Lorenzo River. During the summer and fall, the City also obtains a small amount of supplies from groundwater at its Live Oak well field. A large quantity of surface water is stored in Loch Lomond Reservoir for use year-round, but is used primarily during typically non-wet (summer and fall seasons) and drought conditions.

The City's water system draws almost exclusively on local surface water sources, whose yield varies from year to year depending on the amount of rainfall received and runoff generated during the winter season. In normal and wet years, when rainfall and runoff are abundant, the water system is capable of meeting the community's current total annual water requirements. In single dry years, the system relies more heavily on water stored in Loch Lomond to satisfy demand, which draws down the reservoir level lower than usual and depletes available storage. In multi-year or critical drought conditions, the combination of very low surface flows in the coast and river sources and depleted storage in Loch Lomond reservoir reduces available supply to a level that cannot support average dry season demands. Compounding the situation is the need to retain a certain amount of water in the reservoir in case another dry year follows.

The water shortage is further compounded by the need to maintain more in-stream flows to support anadromous fisheries and aquatic habitat in the streams from which the City currently diverts water. The City's surface water sources provide habitat for special-status species, including but not limited to coho salmon and steelhead trout. Both of these fish species are listed under State and/or Federal Endangered Species Acts as either "threatened" or "endangered." The City has been working with the National Oceanic and Atmospheric Administration, National

Marine Fisheries Service on a Habitat Conservation Plan, and will also be working with the California Department of Fish and Wildlife on similar planning.

Given the presence of supply shortages during historical, existing, and future drought conditions, the City has been pursuing a supplemental water supply for the past 25 years. The City's adopted *Integrated Water Plan* contemplates conservation, curtailment, and the construction of a 2.5 million gallons per day (mgd) seawater desalination plant and related facilities (with the ability to expand the plant to 4.5 mgd to meet future needs through 2030). A cooperative operational scenario that involved partnering with the District was also selected. This supplemental supply project constitutes the proposed project being evaluated in this EIR. See **Section 3** for additional information about the City's water supply and demand conditions.

Wastewater

The City operates a wastewater collection, treatment, and disposal system that provides services to approximately 130,000 people in the cities of Santa Cruz and Capitola and portions of unincorporated Santa Cruz County. The service areas beyond the City of Santa Cruz include: (1) the Santa Cruz County Sanitation District, which includes the Live Oak, Capitola, Soquel, and Aptos areas; and (2) Community Service Areas 10 and 57, which include a portion of the Graham Hill Road corridor. Municipal wastewater generated within the City limits is delivered to the Wastewater Treatment Facility (WWTF) via 160 miles of wastewater mains and 21 pumping stations (City, 2011e). Additionally, the County Sanitation District collects wastewater through a system of approximately 200 miles of wastewater mains and 34 pumping stations for treatment at the City's WWTF (City, 2011e).

The WWTF is adjacent to Neary Lagoon, just inland from the City's Main Beach. The WWTF is designed to provide secondary treatment and to treat an average dry-weather flow of 17 mgd, and a peak wet-weather flow of 81 mgd. Currently, the average daily dry weather flow at the Santa Cruz WWTF is about 9.9 mgd, with a peak wet-weather flow on the order of 65 mgd (City, 2011e). Of the permitted capacity (17 mgd), the County Sanitation District has treatment capacity rights of 8 mgd. Of the total average daily flow, the City contributes approximately 5.3 mgd and the County Sanitation District contributes about 4.5 mgd (City, 2011e). The total remaining treatment plant capacity is therefore about 7.2 mgd, of which 3.7 mgd constitutes the remaining capacity for the City.

Treated effluent is discharged to the Pacific Ocean via a 10,000+ foot outfall/diffuser system that terminates approximately 1 mile offshore at a depth of 110 feet. Santa Cruz operates the WWTF under a current National Pollution Discharge Elimination System (NPDES) permit (Order No. R3-2010-0043, NPDES No. CA 0048194). See **Section 5.1, Hydrology and Water Quality** for additional discussion about the WWTF's NPDES permit.

In addition to sewered wastewater collection from the City and County areas, the City of Scotts Valley discharges approximately 1.0 mgd of treated municipal wastewater through the City of Santa Cruz's ocean outfall. Scotts Valley treats its wastewater separately at its own treatment

facility under a separate NPDES permit (CA 0048828, Order No. 97-12), but makes joint use of the Santa Cruz ocean outfall facility. The Santa Cruz WWTF also has a dedicated septage-receiving facility that receives approximately 7.0 million gallons of septage per year (or approximately 19 thousand gallons per day) from unsewered areas of the County. Average daily discharge from the outfall from all sources combined is about 11.5 to 12.5 mgd during the dry season (City, 2011e).

Solid Waste

Solid waste collection, recycling, and disposal are provided by the City to residents, businesses, and other uses in the City. The Resource Recovery and Collection Division of the City Public Works Department is responsible for solid waste disposal and recycling operations at the City's Resource Recovery Facility (RRF), on Dimeo Lane, about 3 miles north of the City limits. The RRF includes a sanitary landfill, recycling center, greenwaste drop-off area, and household hazardous waste drop-off facility. The City's Landfill is defined as a Class III landfill and accepts construction/demolition, dead animals, green materials, industrial, inert, metals, mixed municipal, sludge (biosolids), tires, and wood waste. It does not accept any hazardous wastes under any conditions, or "liquid" wastes (containing less than 50 percent solids by weight) unless certain criteria are met. It is permitted to accept a maximum of 535 tons per day (tpd) of solid waste. The site has a total remaining airspace capacity of approximately 6 million cubic yards as of 2010. The closure date of the landfill is anticipated to be approximately 2052 (CalRecycle, 2012a). The RRF only accepts municipal solid waste and serves as a sorting facility to remove any recyclable or composting materials. The recycling center accepts a variety of recyclable materials.

The City has met the state-mandated waste diversion goals of 25 percent of their 1990 waste-streams from landfill disposal by 1995 and 50 percent by 2000. This has been accomplished through public education and the implementation of expanded curbside recycling programs. The programs include the collection of most forms of clean paper (e.g., office, junk mail, newspaper, magazines, paper board, and card board), containers (e.g., glass, metal, aluminum, and some plastics), and yard wastes. The programs also include the diversion and reuse of construction and demolition debris, such as concrete, asphalt, and wood, as well as wastewater treatment plant sludge. In the year 2000, the City established a Zero-Waste goal with the ultimate intention of eliminating the City's need for a landfill. As of 2009, the City had achieved a diversion rate of 63 to 65 percent, which exceeds the state requirements (City, 2012a).

The County is responsible for solid waste disposal and recycling operations for the unincorporated County and City of Capitola. For the unincorporated county, recycling and disposal is available at Buena Vista Land fill and Ben Lomond Transfer Station. The Buena Vista Landfill is at 1231 Buena Vista Drive in Watsonville. The Ben Lomond Transfer Station is at 9835 Newell Creek Road in Ben Lomond.

The Buena Vista Landfill is a Class III landfill permitted to accept a maximum of 838 tpd of solid waste. The site had a permitted capacity of approximately 7.5 million cubic yards and a remaining capacity of 3.3 million cubic yards as of 2000. The closure date of the Landfill is anticipated to be approximately 2031 (CalRecycle, 2013a). Materials accepted at the Buena Vista Landfill are Class III non-hazardous residential, commercial and industrial waste, dewatered sewage sludge, and low-level petroleum contaminated soils. The Buena Vista Landfill accepts an average of 350 tpd.

The Ben Lomond Transfer Station is permitted to accept a maximum of 300 tpd of solid waste (CalRecycle, 2013b). Materials accepted at the Ben Lomond Transfer Station are Class III non-hazardous residential, commercial and industrial waste. The Ben Lomond Transfer Station accepts 100 tons of refuse daily, which is trucked to the Monterey Peninsula Landfill and Recycling Facility in northern Monterey County for burial.

Solid waste collected in Capitola is also transferred to the Monterey Peninsula Landfill Recycling Facility, which is operated by the Monterey Regional Waste Management District. It is a regional disposal facility that serves an 853-square-mile area. The landfill has a remaining waste capacity of approximately 74 million cubic yards and has an anticipated life capacity of 95 years. The closure date of the landfill is anticipated to be approximately 2107 (CalRecycle, 2012b).

Electrical & Natural Gas Utilities

Pacific Gas and Electric Company (PG&E) provides electrical and natural gas service to the project area. PG&E is one of the largest combination natural gas and electric utilities in the United States, providing service to approximately 15 million people throughout a 70,000-square-mile service area (PG&E, 2012). The service area extends through northern and central California, from Eureka in the north to Bakersfield in the south, and from the Pacific Ocean in the west to the Sierra Nevada in the east. The service area includes 141,215 circuit miles of electric distribution lines, 18,616 circuit miles of interconnected transmission lines, 42,141 miles of natural gas distribution pipelines and 6,438 miles of transportation pipelines. PG&E and other utilities in the state are regulated by the California Public Utilities Commission (PG&E, 2012).

PG&E produces and purchases electricity from both renewable and non-renewable resources. In 2011, approximately 25 percent of electricity provided to PG&E retail customers came from natural gas, 22 percent from nuclear generation, 18 percent from large hydroelectric facilities, and 19 percent from eligible renewable sources such as wind, geothermal, biomass and small hydro. The remaining portion came from other and unspecified power (electricity not traceable to specific generation sources) (PGE, 2013). In 2010, PG&E customers consumed about 84,500 million kilowatt hours of electricity (CEC, 2008).

Most of the natural gas consumed in California is extracted from on- and off-shore sites from the Southwest (42 percent), the Rocky Mountains (23 percent), and Canada (22 percent), with the remainder produced in California (12 percent) (CEC, 2013a). Natural gas from out-of-state

production basins is delivered into California via the interstate natural gas pipeline system. PG&E's gas is delivered via high-pressure pipelines to its load centers with compressors used to maintain transmission pressure. The gas is then received at either an underground storage facility or redistributed through another series of pipelines. In 2006, California consumed 6,032 million cubic feet per day of natural gas. Of this, the majority (43 percent) was used for California's electricity generation market. Other end users of natural gas include the residential (22 percent), industrial (23 percent), and commercial (10 percent) sectors. Transportation, storage and transmission losses account for the remaining natural gas consumption (CEC, 2013b). In 2010, PG&E customers consumed about 4,600 millions of therms of natural gas (CEC, 2008).

The City's water system uses approximately 4,200 megawatt-hours per year (MWh/yr) of electrical energy based on both its use of surface and groundwater sources. The District's water system uses approximately 2,600 MWh/yr of electrical energy based on its use of groundwater sources (see **Appendix O, Summary of Energy and GHG Reduction Approach**).

Primary electrical services (21 kilovolt) and secondary electrical services (4,160 volt) are located near the plant sites in electrical lines in Natural Bridges Drive and Swift Street. Gas services near the plant sites are supplied from a 6-inch gas main in Natural Bridges Drive and a 4-inch gas main in Delaware Avenue. An existing 12-inch gas main traverses Plant Sites A-1 and A-3.

5.9.3 Regulatory Framework

The proposed project would be subject to applicable regulations pertaining to wastewater, solid waste and energy. Regulations pertaining to utilities and service systems in the project area that are relevant to the analysis of project impacts are detailed below. See also **Section 5.4, Land Use, Planning, and Recreation** for evaluation of potential conflicts with relevant land use plans, policies, and regulations of agencies that have jurisdiction over the proposed project.

Wastewater Regulations

The Federal Clean Water Act regulates the discharge of pollutants to waters of the United States from any point source. The discharge of treated wastewater is included in the Clean Water Act NPDES program. The California State Water Resources Control Board (State Board) and the nine Regional Water Quality Control Boards (RWQCB) have the authority in California to protect and enhance water quality, including administration of the NPDES permit program for discharges, storm water, and construction site runoff. The RWQCB regulates operations and discharges from sewage systems through the NPDES permit.

Federal, state, and local regulations are enforced by the City through permitting, monitoring, and inspections of Significant Industrial Users (SIU), under the City's Sewer System Ordinance. The City's Sewer System Ordinance, Chapter 16.08 of the City of Santa Cruz Municipal Code, regulates discharges to sanitary sewer and requires that all wastewater be discharged to public sewers, with the exception of graywater as allowed by Municipal Code Chapter 16.08. A sewer

connection permit is required for all new connections to the City's sewer system under the above regulations.

SIUs are defined in accordance with the Code of Federal Regulations 40 CFR 403.3(t) and are described in Municipal Code Chapter 16.08 as follows:

1. A categorical industry discharger subject to pretreatment standards, or

2. A non-categorical industrial discharger that has any one or more of the following characteristics:

    - An average discharge flow of twenty five thousand gallons per day (gpd) or more of process wastewater ("process wastewater" excludes sanitary, noncontact cooling water, and boiler blow-down wastewater). If seasonal, the average shall be based upon the seasonal discharge.
    - A waste stream discharge that makes up five percent or more of the average dry weather hydraulic or organic (e.g., BOD, TSS,) capacity of the wastewater treatment system.
    - Has a reasonable potential (as determined by the director), either individually to violate wastewater limitations of this chapter or in combination with other industrial discharges, to adversely affect the wastewater treatment system (by upsetting, interfering with the system, or causing pass-through of pollutants, sludge contamination, or endangerment of city workers). Liquid waste haulers are included in this definition.

The proposed project would be considered a non-categorical industrial discharger, as it would have an average discharge flow of more than 25,000 gpd of "process wastewater". Therefore, a wastewater discharge permit is anticipated under Municipal Code Chapter 16.08.160.

Solid Waste Regulations

To minimize the amount of solid waste that must be disposed of by transformation and land disposal, the State Legislature passed Assembly Bill (AB) 939, the California Integrated Waste Management Act of 1989, effective January 1990. The legislation required each local jurisdiction in the state to set diversion requirements of 25 percent by 1995 and 50 percent by 2000; established a comprehensive statewide system of permitting, inspections, enforcement, and maintenance for solid waste facilities; and authorized local jurisdictions to impose fees based on the types or amounts of solid waste generated. In 2007, Senate Bill (SB) 1016, Wiggins, Chapter 343, Statutes of 2008, introduced a new per capita disposal and goal measurement system that moves the emphasis from an estimated diversion measurement number to using an actual disposal measurement number as a per capita disposal rate factor. Therefore, the new disposal-based indicator (pounds per person per year) uses only two factors: a jurisdiction's population (or in some cases employment) and its disposal as reported by disposal facilities.

The City's established annual per capita disposal rate set by the California Department of Resources Recycling and Recovery (CalRecycle) is 6.8 pounds per day. The City's current per capita disposal rate is 4.4 pounds per day.

Energy Regulations

Title 24, Part 6, of the California Code of Regulations (CCR) is the California Building Code, which governs all aspects of building construction. Included in Part 6 of the Code are standards mandating energy efficiency measures in new construction. Since its establishment in 1977, the building efficiency standards (along with standards for energy efficiency in appliances) have contributed to a reduction in electricity and natural gas usage and costs in California. The standards are updated every three years to incorporate new energy efficiency technologies. The latest update to the Title 24 standards became effective on January 1, 2008. The standards regulate energy consumed in buildings for heating, cooling, ventilation, water heating, and lighting. Title 24 is implemented through the local planning and permit process. Specifically, the City Municipal Code Section 18.04.040 adopts Title 24 CCR into the Building Code.

City Municipal Code Section 24.15 provides the City's Green Building Regulations. Related to energy, the intent of these regulations is to reduce the energy consumption needs of structures, by making use of efficient construction methods and materials. In general, all new building in the City must comply with these regulations. In order to obtain a building permit for any new building, addition or substantial remodel of a certain size, each project must include elements from the program checklist.

5.9.4 Impacts and Mitigation Measures

This section contains the evaluation of potential environmental impacts associated with the proposed project related to utilities and service systems. The section identifies the standards of significance used in evaluating the potential environmental effects, the methods used in conducting the analysis, and a detailed evaluation of impacts for the proposed project and any potential future expansion.

Standards of Significance

Based on CEQA Guidelines, Section 15065; Appendix G of the CEQA Guidelines; applicable agency plans, policies, and/or guidelines; and agency and professional standards; the proposed project would cause a significant impact related to utilities and service systems if it would:

9a. Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board.

9b. Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects.

9c. Be located in an area with insufficient water supplies available to serve the project from existing entitlements and resources and therefore would require new or expanded entitlements.

9d. Result in a determination by the wastewater treatment provider which serves or may serve the project that it has inadequate capacity to serve the project's projected demand in addition to the provider's existing commitments.

9e. Be served by a landfill with insufficient permitted capacity to accommodate the project's solid waste disposal needs.

9f. Not comply with federal, state, and local statutes and regulations related to solid waste.

9g. Require or result in the construction of new electrical generation and/or transmission facilities, or expansion of existing facilities, the construction of which could cause significant environmental effects.

9h. Conflict with existing energy standards.

Analysis Methodology

The above standards of significance are assessed in this section as the basis for determining the significance of impacts related to utilities and service systems. If necessary, mitigation measures are proposed to reduce significant impacts to less than significant.

Impacts and Mitigation

This section provides a detailed evaluation of utilities and service system impacts associated with the proposed project. The analyses addresses impacts to potable water supplies (standards 9b and 9c), impacts related to wastewater (standard 9a, 9b, and 9d), impacts related to solid waste (standards 9e and 9f), and impacts related to energy (standards 9g and 9h).

Impacts related to storm drainage facilities during construction and operation are addressed in **Section 5.1.** Impacts related to other services (e.g., schools, parks, police, and fire) were addressed in the Notice of Preparation for the proposed project and were determined not to have the potential to result in significant environmental impacts and therefore are not further evaluated in this EIR (see **Appendix A** for additional information).

The impacts to utilities and service systems are summarized in **Table 5.9-1, Summary of Potential Utilities and Service Systems Impacts**, and are categorized as either "not applicable" or "no impact," "less than significant impact," "less than significant impact with mitigation," or "significant and unavoidable impact." The detailed analysis of utilities and service system impacts and mitigation measures follows this table.

Table 5.9-1. Summary of Potential Utilities and Service Systems Impacts

Impacts	LEVEL OF SIGNIFICANCE													
	Seawater Intake Site Alternatives								Plant Site Alternatives			Other Components	Project Overall	Possible Future Expansion
	SI-4	SI-5	SI-7	SI-9	SI-14	SI-16	SI-17	SI-18	A-1	A-2	A-3			
5.9-1: Water Supply	--	--	--	--	--	--	--	--	LTS	LTS	LTS	--	LTS	LTS
5.9-2: Wastewater	--	--	--	--	--	--	--	--	LTSM	LTSM	LTSM	LTS	LTSM	LTSM
5.9-3: Solid Waste	--	--	--	--	--	--	--	--	LTS	LTS	LTS	--	LTS	LTS
5.9-4: Energy	--	--	--	--	--	--	--	--	--	--	--	--	LTS	LTS

Notes:
SU = Significant and Unavoidable Impact
LTSM = Less Than Significant Impact With Mitigation
LTS = Less Than Significant Impact
NI = No Impact
-- = Impact not applicable, or not applicable to individual project components

WATER SUPPLY

Impact 5.9-1: The operation of the proposed project would result in an increased supply of potable water and would not require new or expanded water supplies or distribution facilities, over and above those proposed as part of the project.

Significance: Less than significant

Mitigation Measures: None required

Proposed Project

The proposed project would use potable water for desalination plant operations, including maintenance washes, chemical cleaning solutions, equipment wash down, and staff and visitor uses. The other elements of the proposed project would not require potable water. The potable water used by the desalination plant would be provided by the City's potable water distribution system via a new service connection that would be located just downstream of the proposed desalination plant's product water line connection to the City's distribution system. Even though the potable water uses would be served by the City's potable water distribution system, the desalination plant would be the primary supply source in the distribution system that would serve the plant, given the location of the service connection. The desalination plant would not provide potable water directly to the site; however, as substantial on-site water storage would be required in order to provide such services.

The anticipated potable water use at the proposed 2.5 mgd plant is estimated to average approximately 16,200 gpd, with a maximum daily use of 25,420 gpd (see **Table 5.9-2, Summary of Estimated Potable Water Use**). Annual usage would range from approximately 6 to 9 million gallons per year (mgy), depending on the number of days during the year that the plant would operate at maximum capacity. Of the total daily usage, 16,000 gpd would be used to prepare chemical solutions (sodium hypochlorite and/or sodium hydroxide) for daily maintenance washes for the microfiltration/ultrafiltration (MF/UF) system. The California Department of Public Health (CDPH) advises water suppliers to dispose of the spent maintenance wash solutions instead of recycling the neutralized streams back into drinking water plants for treatment. The City and District may pursue provisions in the CDPH operating permit to allow for recycling of the maintenance wash streams. If this were allowed, it could reduce potable water use shown in **Table 5.9-2** by 16,000 gpd. Under such conditions, the anticipated potable water use at the proposed 2.5 mgd plant would average approximately 200 gpd, with a maximum daily use of 9,420 gpd. Estimated annual usage would range from less than 0.1 to 3.5 mgy if recycling of the maintenance wash streams is allowed.

Table 5.9-2. Summary of Estimated Potable Water Use

Discharge Description	Frequency	Average Day (gpd)[1]	Maximum Day (gpd)[2]
MF/UF Maintenance Washes[3]	Daily	16,000	16,000
MF/UF Chemical Cleaning Solutions[3]	1 day in 90	0	16,000 (not included)
SWRO Chemical Cleaning Solutions[3]	1 day in 90	0	8,000
Staff Potable Water Use[4]	Daily	120	140
Plant Tours and Visitors' Water Use[5]	1 per day	80	80
Equipment Wash Down[6]	1 day in 30	0	1,200
Total Potable Water Use[7]			
Total Potable Water Use		16,200	25,420
Total Potable Water Use (If maintenance wash streams can be recycled)		200	9,420

Source: Information for table provided by CDM Smith, 2013.

1. Average daily operations assume the plant is producing 1.6 mgd of treated product water, as described in Section 4, Project Description.
2. Maximum daily operations assume that the plant is operating at its design capacity of 2.5 mgd, as described in Section 4.
3. MF/UF maintenance washes and MF/UF chemical cleanings would occur on separate days and therefore the water use associated with chemical cleanings is not added in the total water use; MF/UF maintenance washes and SWRO chemical cleanings could occur on the same day and therefore the water use from both activities is include in the total water use.
4. Staff potable water use assumes plant is staffed 24 hours per day, 7 days per week as follows:
   - Average of six (6) shifts per day; 8 hours per person per shift
   - Average of 20 gpd per person per 8-hour shift
   - Average of 120 gpd (6 shifts/day at 20 gpd); maximum of 140 gpd (7 shifts/day at 20 gpd)
   - Administration building would include area of approximately 4,000 square feet with kitchen/break room, conference room, two (2) separate restrooms with shower facilities.
5. Tours and visitors: maximum of 40 visitors per day; average of one (1) tour per day; average duration of 2 hours per tour (80 gpd).
6. Equipment wash down occurs once per month; wash down consists of 10 gpm for 2-hour duration (1,200 gpd).
7. Potable water use estimates do not include fire flows or water for landscaping.

Acronyms:
gpd = gallons per day
MF/UF = microfiltration/ultrafiltration
SWRO = seawater reverse osmosis
gpm = gallons per minute
mgd = million gallons per day

The amount of potable water use from the proposed project would not require new or expanded water supplies or treatment facilities, as the increment of increase would be available during normal and wet years and would be offset by the new supply provided by the proposed project during single and multiple dry years. The proposed desalination plant does constitute a new water treatment facility; however, the potential that the construction and operation of the plant could cause significant environmental effects is addressed in this EIR.

The City-District intertie system constitutes new distribution system improvements in both the City and District water service area. These improvements are part of the project being evaluated and therefore the potential that the construction of these improvements could cause significant environmental effects is also addressed in this EIR.

Water service for the plant sites could be provided by an existing 10-inch water main in Natural Bridges Drive or by an existing 12-inch water main in Delaware Avenue, depending on the plant site alternative selected. The size of these facilities would be adequate to serve the water demand from the proposed project. Therefore, additional new or expanded distribution facilities would not be required to serve the proposed project. The impact of the proposed project related to water supply would be less than significant, as it would not require new or expanded water supply, treatment, or distribution facilities.

Potential Future Expansion

If expansion of the project was pursued in the future, the additional amount of potable water use associated with the expansion would also not require new or expanded water supplies or treatment facilities, as the increment of increase would be available during normal and wet years and would be offset by the new supply provided by the proposed project during single and multiple dry years. Therefore, the water supply impact would be less than significant.

Mitigation Measures

None required.

WASTEWATER	
Impact 5.9-2:	The proposed desalination plant could potentially impact the wastewater distribution system through the settlement of solids, but would not be expected to exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board or otherwise impact the wastewater treatment facility.
Significance before Mitigation:	Potentially significant
Mitigation Measures:	See Mitigation Measure 5.9-2
Significance after Mitigation:	Less than significant

Proposed Project

The proposed project would generate wastewater from the proposed desalination plant that could potentially be discharged to the City sanitary sewer system for treatment at the City's WWTF. The project would also generate brine that would be directly discharged into the WWTF outfall pipeline. These flows are evaluated below to determine whether the proposed project could potentially impact wastewater treatment and distribution capacity, or exceed wastewater treatment requirements. See **Section 5.1** for an evaluation of the effects of the combined brine/WWTF effluent discharge on marine water quality.

Wastewater

Wastewater from the proposed desalination plant would be comprised of the following components, as summarized in **Table 5.9-3, Summary of Estimated Sanitary Sewer Discharges**: (1) used washwater from the MF/UF system; (2) thickened solids from the dissolved air flotation (DAF) pretreatment units; (3) monitoring instrument waste, (4) chemical cleaning solutions from clean-in-place procedures of the MF/UF filters and seawater reverse osmosis (SWRO) membrane units; (5) used equipment washdown water; and (6) domestic wastewater. The other elements of the proposed project would not be substantial sources of wastewater. The proposed desalination plant would generate nominal amounts of domestic wastewater associated with the staff and visitors of the desalination plant. There are two options for handling solids from all of the other sources of solids that are associated with the plant processing activities. This impact addresses the first option of directing solids from these processing sources to the sanitary sewer system, which is the recommended approach for residuals handling identified in **Section 4** and **Appendix L, scwd² Seawater Desalination Plant – Phase 1 Preliminary Design: Volume 1 – Report & Volume 2 - Drawings**. Impact 5.9-3 addresses the second option of directing the solids from these processing sources to a landfill.

Table 5.9-3. Summary of Estimated Sanitary Sewer Discharges

Discharge Description	Frequency	Plant Capacity 2.5 mgd	
		Average Day[1] (gpd)	Maximum Day[2] (gpd)
DISCHARGE COMPONENTS			
MF/UF Maintenance Washes[3,4]	Daily	16,000	16,000
Thickened Solids (2% solids)	Daily	2,040	17,700
Thickened Solids (0.3% solids)	Daily	13,600	118,000
Monitoring Instrument/Reagent Waste	Daily	2,880	4,320
Staff Potable Water Use	Daily	120	140
Equipment Washdown	1 day in 30	0	1,200
Plant Tours and Visitors' Water Use	1 per day	80	80
MF/UF Cleaning Solutions Waste[3]	1 day in 90	0	4,000 (not included)
SWRO Cleaning Solutions Waste[3]	1 day in 90	0	8,000
TOTAL SEWER DISCHARGES – SANITARY SEWER OPTION			
Total Sewer Discharge (2% solids)[5]		21,100	47,400
Total Sewer Discharge (0.3% solids)[5]		32,700	148,000
TOTAL SEWER DISCHARGES – LANDFILL DISPOSAL OPTION			
Total Sewer Discharge (dewatered solids trucked offsite)[5,6]		19,100	29,700

Source: Information for table provided by CDM Smith, 2012.
Notes:
1. Average operations assume that the plant is producing 1.6 mgd of product water.
2. Maximum operations assume that the plant is operating at its design capacity of 2.5 mgd during winter storm events, when the solids in the raw seawater are at their highest anticipated concentration.
3. MF/UF maintenance washes (4 washes; 1 per unit; 4,000 gallons per wash) and MF/UF chemical cleanings would occur on separate days and therefore the cleaning waste is not added in the total discharges. MF/UF maintenance washes and SWRO chemical cleanings could occur on the same day and therefore both discharges are included in the discharge totals.
4. The CDPH advises water suppliers to dispose of spent maintenance wash solutions instead of recycling the neutralized streams back into drinking water plants for treatment. The City and District may pursue provisions in the CDPH operating permit to allow for recycling of the maintenance wash streams. If this were allowed, it could reduce the average daily discharge to the sanitary sewer by 16,000 gpd. Recycling the neutralized MF/UF maintenance streams would not present increased health risks, and would have little or no effect on treatment.
5. All numbers are rounded to the nearest 100 or 1,000 (three significant figures).
6. If thickened solids are directed to the landfill, all filtrate from the dewatering process would be recycled at the plant; and other discharges would be directed to the sewer system.

Acronyms:
CDPH = California Department of Public Health
gpd = gallons per day
MF/UF = microfiltration/ultrafiltration
mgd = million gallons per day
SWRO = seawater reverse osmosis

Solids from the DAF pretreatment units and from the MF/UF maintenance wash water would consist of naturally occurring organic and inorganic matter in the raw seawater, and iron precipitated from coagulation with ferric chloride used in the pretreatment system. The recommended residuals-handling system described in **Section 4** would separate the liquids and

solids from the plant processing systems, and recycle this reclaimed water to the desalination plant influent for treatment. The remaining thickened solids containing 0.3 to 2.0 percent solids, would typically be released daily to the sanitary sewer, but can also be stored in the clarifiers for 1 to 4 weeks depending on raw seawater quality and associated volume of solids.

Assuming an average plant production of 1.6 mgd of product water, approximately 2,000 gallons of liquid per day containing 2.0 percent solids would be released from the plant to the sewer. The maximum anticipated discharge of thickened solids could be 17,700 gpd when the plant is operating at the design production capacity of 2.5 mgd during winter storm events, when the solids in the raw seawater are at their highest anticipated concentration. The discharge volume of thickened solids would increase to approximately 13,600 gpd for average production and approximately 118,000 gpd for maximum production, with a solids concentration at 0.3 percent.

SWRO membranes tend to foul over time and require periodic cleaning. A clean-in-place system would be provided for periodic cleaning of the SWRO membranes and the MF/UF filters. Daily maintenance washes of the MF/UF filters would be conducted with potable water from the adjacent potable water distribution system. Additionally, chemical cleaning solutions would be used during the clean-in-place procedures conducted periodically at the MF/UF filters (approximately once every 3 months) and SWRO membrane units (once every 3 to 6 months). Chemicals would include combinations of chlorinated and low- and high- pH solutions. The used cleaning solutions would be pumped to a neutralization tank, where the contents would be de-chlorinated and neutralized before being sent to the sanitary sewer for disposal.

Table 5.9-3 provides estimated discharges from all sources under average and maximum operations. In total, the desalination plant would generate approximately 21,100 gpd at 2.0 percent solids or 32,700 gpd at 0.3 percent solids, on an average day when the plant is producing 1.6 mgd of product water. On a maximum day when the plant is operating at 2.5 mgd during winter storm events, the plant could generate up to 47,400 gpd at 2.0 percent solids or 148,000 gpd at 0.3 percent solids. These estimates are overly conservative, as some of the discharges would occur only periodically. Additionally, as indicated above, the CDPH advises water suppliers to dispose of the spent maintenance wash solutions instead of recycling the neutralized streams back into drinking water plants for treatment. The City and District may pursue provisions in the CDPH operating permit to allow for recycling of the maintenance wash streams. If this were allowed, it could reduce the average daily and maximum discharge to the sanitary sewer by 16,000 gpd; however, the analysis contained herein assumes recycling of these maintenance wash streams would not be allowed.

Appendix X, Preliminary Assessment for Disposal of Waste Flows from the Proposed scwd² Seawater Desalination Plant to the City of Santa Cruz Sanitary Sewer System, was prepared to assess the potential impacts of the proposed desalination plant with respect to the disposal of waste flows to the City's wastewater collection and treatment system. Based on this analysis, the City's existing wastewater collection systems appears to be adequately sized to convey the estimated waste flows from the proposed plant to the existing WWTF. However, the City's

existing wastewater collection system from Delaware Avenue to Chace Street includes several pipe segments with slopes less than 0.3 percent. These low slopes produce in-pipe velocities less than 2.0 feet per second, the generally accepted minimum recommended velocity to keep solids in suspension. The extent of settling or maintenance required for the collection system in the area of the proposed project is not fully understood at this time. The additional solids could potentially exacerbate settling of solids in the collection system, which could result in the need for more frequent maintenance in these pipeline segments. Mitigation Measure 5.9-2 will provide for the development of design criteria to control solids deposition, and the establishment of monitoring and maintenance procedures to ensure that the settling of solids in the collection system does not create problems in the distribution (e.g., lost capacity, system blockage). With the implementation of this mitigation measure, potential impacts of the proposed project on the wastewater distribution system would be reduced to less than significant.

The City's WWTF has been rated with a capacity of approximately 17 million gpd and has a total remaining treatment plant capacity of 7.2 mgd, of which 3.7 mgd constitutes the remaining capacity for the City (City, 2011e). Therefore, the addition of a maximum of 148,000 gpd (0.2 mgd) of wastewater would not result in any treatment plant capacity deficiencies. Treatment plant capacity would also not be exceeded when considering the additional flows that would be generated under the adopted *City of Santa Cruz General Plan 2030*, estimated at approximately 0.55 mgd and 1.35 mgd with UCSC growth (City, 2012a).

Under the anticipated range of conditions, salinity at the City's existing WWTF would increase from its current average of approximately 1,000 milligrams per liter (mg/L) to a range of approximately 1,010 to 2,230 mg/L with the addition of solids from the proposed plant. **Appendix L** indicates that salinity would not begin to adversely affect wastewater treatment processes until the salinity exceeds approximately 10,000 mg/L. Based on this assessment, waste flows from the proposed desalination plant would not significantly impact treatment at the City's WWTF. Therefore, the project would not require or result in the construction of new wastewater treatment facilities, expansion of existing treatment facilities, or improvement of these facilities. The impact of the proposed project related to wastewater treatment facilities would be less than significant.

Additionally, the proposed project would require a sewer connection permit and a wastewater discharge permit from the City. The permit conditions would identify: (1) the type of user classification (e.g., industrial); (2) the city and federal limits of wastewater constituents and characteristics; (3) limits on the rate and time of discharge or requirements for flow regulation or equalization; (4) requirements for the installation of inspection and sampling facilities and monitoring programs; (5) requirements for maintaining and submitting technical reports and plant records relating to wastewater discharges; (6) daily average and daily maximum discharge rates; (7) compliance schedules; and (8) other conditions deemed necessary for compliance. Compliance with these permit conditions would ensure that wastewater from the proposed project would not exceed wastewater treatment and discharge requirements of the WWTF's NPDES permit.

Brine Discharge

During the desalination treatment process brine would be generated, which would be approximately twice as salty as the ocean source water. A new 30-inch pipeline would convey the brine directly from the desalination plant to the City's existing WWTF effluent outfall pipeline where it would be combined with the WWTF effluent. The brine would not be processed through the WWTF.

As indicated in **Section 4**, the addition of brine to the WWTF outfall would expose the sluice gates in the tunnel gate box at the Junction Structure at Mitchell's Cove to high salinity water and increased corrosion potential. To address corrosion potential, the sluice gates would either have to be coated with corrosion-resistant material or replaced. Coating or replacement of the sluice gates would be implemented as part of the project and the effects of such improvements are evaluated in this EIR. Additionally, the amount of brine that would be discharged would not exceed the capacity of the outfall, because there is existing remaining capacity at the WWTF, as described above in **Section 5.9.2, Environmental Setting**. Therefore, the addition of brine to the WWTF effluent outfall pipeline would not require expansion of the outfall structure. The impact would be less than significant.

Potential Future Expansion

If expansion of the project was pursued in the future, additional wastewater flows would be discharged to the sewer system. **Appendix L** indicates that the existing wastewater distribution system has adequate capacity to accommodate the additional wastewater flows associated with a 4.5-mgd plant. However, solids deposition in certain distribution lines would likely continue to be a potential concern. With respect to the proposed project, the implementation of Mitigation Measure 5.9-2 would reduce the potentially significant impacts of solids deposition in the distribution system to less than significant.

The additional wastewater flows would not result in any treatment plant capacity deficiencies, as for the proposed project. Increased brine flows to the WWTF outfall would also occur, but would not cause any additional corrosion in the outfall, as the sluice gates would have already been replaced or coated.

Mitigation Measures

Mitigation Measure 5.9-2

This mitigation measure would apply only to the desalination plant if the sewer disposal option for solids handling is pursued. The City and District shall establish design criteria related to percent solids by weight, timing of disposal, and other relevant factors, to control solids deposition in the wastewater collection system. The City and District shall establish monitoring and maintenance procedures to ensure that the settling of solids in the collection system does not create operational problems in the wastewater pipelines between the desalination plant and the

WWTF (e.g., lost capacity, system blockage). The design criteria and monitoring and maintenance procedures will be developed in conjunction with City Public Works Department. The monitoring and maintenance procedures will apply only to the portion of the collection system located between the point of discharge from the proposed project to the collection system and the City's WWTF.

SOLID WASTE	
Impact 5.9-3:	Operation of the proposed project would generate solid waste, but would not impact landfill capacity or conflict with state mandated solid waste diversion rates.
Significance:	Less than significant
Mitigation Measures:	None required

Proposed Project

The proposed desalination plant would generate solid waste from the solids produced from the DAF pretreatment units and from the MF/UF maintenance washwater, as described in Impact 5.9-2 above. The other elements of the proposed project would not be substantial sources of solid waste. There are two options for handling solids that are generated from the desalination plant processing activities. This impact addresses the second option of directing the solids from these processing sources to a landfill or land application. Impact 5.9-2 addresses the first option of directing solids from these processing sources to the sanitary sewer system.

The sanitary sewer disposal of solids from processing sources is the preferred solids handling approach**,** as indicated in **Section 4** and **Appendix L.** However, **Appendix D, scwd² Final Seawater Reverse Osmosis Desalination Pilot Test Program Report and Appendices** indicates that dewatered solids could also be sent to a landfill. If the landfill disposal option is pursued, the solids would likely be disposed of at the City's landfill at Dimeo Lane. The solids could also be used for a land application, such as is done with the dewatered solids from the City's WWTF, which are currently trucked to the Central Valley.

Landfill disposal or a land application would require a solids dewatering facility, which would be located in a building at the plant site (see **Section 4**). The dewatering system would take the thickened solids from the treatment process and produce a cake (approximately 25 to 50 percent dry solids) that could be delivered to the landfill by truck. Assuming an average production of 1.6 mgd and dry weather conditions, approximately 340 pounds per day of dry solids by weight could be generated by the plant. When the plant is operating at the design production capacity of 2.5 mgd during winter storm conditions, approximately 2,950 pounds per day of dry solids by weight could be generated by the plant. The actual weight would depend on the percent of dry solids in the dewatered cake, which would range from approximately 25 to 50 percent dry solids,

as noted above. **Table 5.9-4, Estimated Weight of Solids for Landfill Disposal**, provides the estimated weight of daily and annual solids that could be disposed of at a landfill, based on this range.

Table 5.9-4. Estimated Weight of Solids for Landfill Disposal

Operating Conditions	Days Assumed	Dry Solids Weight (pounds/day)	Percent Dry Solids (%) by Weight	Landfill Disposal	
				Daily Weight (pounds/day)	Annual Weight (pounds/year)
Average (1.6 mgd and dry weather conditions)	335	340	25%	1,360	455,600
			35%	971	325,429
			50%	680	227,800
Maximum (2.5 mgd and winter storm conditions)	30	2,950	25%	11,800	354,000
			35%	8,429	252,857
			50%	5,900	177,000
TOTAL ANNUAL[1]			25%	--	809,600
			35%	--	578,286
			50%	--	404,800

Source: Information for table provided by CDM Smith and City of Santa Cruz, 2012.

Notes:

1. The total annual pounds per year is based on the addition of the pounds per year under average operating conditions (assumed to be 335 days per year) and pounds per year under maximum operating conditions (assumed to be 30 days per year).

Acronyms: mgd = million gallons per day

As shown in the table, 11,800 pounds per day (5.9 tpd) of dewatered sludge disposal is the maximum amount of sludge that could be produced at the maximum operating capacity of 2.5 mgd. The City's RRF is permitted to accept a maximum of 535 tpd of waste. The estimated worst-case dewatered sludge from the proposed project would be approximately 1 percent of the daily permitted volume. Depending on the percentage of dry solids, the actual disposal volumes of residuals from the desalination process could be as low as 5,900 pounds per day, which would represent less than 1 percent of the permitted daily waste volume of the City's RRF.

The City's Waste Discharge Requirements Order No. R3-2006-0018 prohibits disposal of water treatment sludge with greater than 50 percent moisture content unless certain criteria are met. Disposal of dewatered sludge would be subject to a paint filter liquids test (United States Environmental Protection Agency Method 9095B) that would ensure that no free liquids are disposed at the landfill. The paint filter liquids test is performed to determine if the waste samples contain free liquids.

The solids would contain naturally occurring organic and inorganic matter from the raw seawater, iron precipitated from coagulation with ferric chloride used in the pretreatment system, and low concentrations of other chemicals used in the treatment process. As indicated in **Section 5.11, Hazards and Hazardous Materials**, although the dewatered solids would not likely be

categorized as hazardous, testing for non-hazardous waste disposal criteria would be required prior to disposal of solids from the proposed project to a landfill, in accordance with the requirements of Resource Conservation and Recovery Act and Title 22 CCR.

The implementation of the above regulations and associated testing in accordance with such regulations would ensure that dewatered solids from the proposed project would be disposed of properly. It is anticipated that the solids would meet applicable regulations for disposal at the City's landfill on Dimeo Lane. Other types of wastes, such as filter cartridges and membranes used in the SWRO process, would also be generated, but the spent SWRO membranes would be returned to the manufacturer for recycling. The administrative activities at the plant would generate nominal amounts of typical office wastes.

The proposed project would produce approximately 405 tons per year (809,600 pounds per year) of solid waste under worst-case conditions, which is approximately 0.9 percent of the solid waste that was sent to the City's RRF in 2011 (CalRecycle, 2012c). The generation of waste at the facility would not be anticipated to affect landfill capacity or require expansion of landfill facilities, due to the relatively small quantities that would be generated on an annual basis. Because this landfill has remaining capacity through 2052, it has sufficient permitted capacity to accommodate the project's solid waste. Therefore, the proposed project would not be anticipated to affect landfill capacity or require expansion of solid waste disposal facilities. The impact would be less than significant.

It should be noted that directing solids from the proposed project to the sanitary sewer system, as described in Impact 5.9-2, would result in the need to dewater and dispose of additional solids over and above those currently processed by the WWTF. The quantities would likely be similar to those described in this impact for solids dewatered at the proposed desalination plant. It would be expected that dewatered solids from the City's WWTF would continue to be trucked to the Central Valley for land application, with the addition of dewatered solids associated with the proposed project. The implementation of the above regulations and associated testing in accordance with such regulations would ensure that dewatered solids from the proposed project at the WWTF would be disposed of properly. The impact would be less than significant.

Potential Future Expansion

If expansion of the project is pursued in the future, additional solid waste related impacts would not be expected, as any additional dewatered solids would also have to meet regulatory requirements to ensure proper disposal and remaining landfill capacity exists to serve an expanded project. Impacts related to solid waste would be less than significant.

Mitigation Measures

None required.

ENERGY IMPACTS

Impact 5.9-4:	The operation of the proposed desalination plant would result in an increased use of energy and natural gas, but would not require new or expanded energy or natural gas supplies or distribution facilities, or conflict with applicable energy standards.
Significance:	Less than significant
Mitigation Measures:	None required

Proposed Project

The proposed project would consist of a seawater intake and conveyance system including an intake pump station, a seawater desalination plant and associated process equipment and pumps, potable water distribution system improvements including three pump station upgrades, and potential energy projects. The project would be designed with high-efficiency processes including energy recovery devices, variable speed pumps, high efficiency motors, and enhanced reverse osmosis membrane materials, as previously described in **Section 4** and listed as environmental design features below. With these design features incorporated, the project would require 15 kilowatt-hours of power per thousand gallons of water produced, which is considered a conservatively high estimate and within the accepted range for high-efficiency desalination design. This power factor, which addresses the operation of all components of the project, is used in calculating the net increase in energy use that would result with the proposed project (see **Appendix O**).

Based on the power figure above, the proposed project would require 13,680 MWh/yr of electricity during normal/average rainfall conditions and require 13,695 MWh/yr of electricity during drought conditions, based on operations at full capacity. However, the addition of desalinated product water to the water supply portfolios of both agencies results in changing operations of traditional sources (e.g., reduced groundwater pumping) that, in turn, reduce energy use of those traditional sources. Therefore, the net increase in electrical energy use with the proposed project would be 12,764 MWh/yr during normal/average rainfall conditions and 12,477 MWh/yr during drought conditions. The installation and operation of solar photovoltaic (PV) panels at the desalination plant, micro-hydro turbines at the Graham Hill Water Treatment Facility, and possibly other projects that could be pursued by the City and District as part of the net carbon neutral objective, would further reduce the net energy requirements of the proposed project. See **Section 4**, **Appendix O**, and environmental design features below for additional information.

Standby power for the main process equipment is not proposed. Because the desalination plant provides a supplemental water supply, it is anticipated that periodic, short-term interruptions in

plant operations caused by power outages would be acceptable given the existing primary water supplies and existing treated water storage in the distribution systems of both the City and District service areas. To protect personnel and facilities, a 250-kilowatt emergency diesel generator would be provided for operation of critical life safety systems and equipment shutdown systems in the event of an interruption in power supply from PG&E.

As described in **Section 4**, according to the **Appendix L** and discussions with PG&E, primary electrical service (21 kilovolt) and secondary electrical service (4160 volt and lower) would be provided to the proposed desalination plant from existing electrical lines located in Natural Bridges Drive or Swift Street. The proposed project would install a service pad or small building at the plant site or in the roadway right-of-way that would house transformers. The transformers would convert the 21 kilovolt primary service to medium voltage (4160 volt) to power the SWRO high pressure feed pumps and to low voltage (480 volt or less) to power all the other plant loads. The proposed design approach is similar to the recent electrical upgrade/expansion project at the City's Graham Hill Water Treatment Plant. However, PG&E would determine the actual configuration for the new electrical service to the plant during final design. It is not anticipated that the increase in energy demand and consumption would require the expansion or improvements to existing facilities in the California Independent System Operator controlled electricity grid that could result in significant environmental effects. Impacts related to energy resources and facilities would be less than significant, as expansion of existing electrical energy facilities would not be required as a result of the proposed project.

The proposed project's natural gas source would be provided by PG&E. Gas service could be supplied to Plant Site A-1 from a 6-inch gas main in Natural Bridges Drive. Gas service could be supplied to Plant Sites A-2 and A-3 from a 4-inch gas main in Delaware Avenue. An existing 12-inch gas main traverses Plant Sites A-1 and A-3, which would need to be relocated to the north to accommodate project facilities on these sites. Impacts related to natural gas resources and facilities would be less than significant, as new or expanded natural gas resources and facilities would not be required as a result of the proposed project.

The proposed project would comply with Title 24 CCR through compliance with the City's Building Code; therefore energy efficiency standards would be implemented in all new construction that would occur with the proposed project. Additionally, the proposed project would comply with the City's Green Building requirements for Non-Residential (Commercial) Actions. This program closely follows the approach established by the United States Green Building Council's Leadership in Environmental and Energy Design (LEED) program. The impact related to energy standards would be less than significant, as the proposed project would not conflict with such standards.

Potential Future Expansion

If expansion of the project was pursued in the future, additional energy and natural gas related impacts would not be expected to occur. Additionally, as compliance with energy standards

would continue to be required, conflicts with such standards would not be expected. The impact would be less than significant.

Environmental Design Features

The environmental design features (**Table 4-12**) of the proposed project related to energy minimization include the following:

- High-efficiency energy recovery devices will allow for reuse of energy at the plant.
- High-efficiency pumps and motors will reduce energy requirements.
- SWRO membrane configuration will provide for adequate water quality while minimizing system energy requirements.
- Compliance with the City's Green Building Program will allow the project to meet established sustainability goals.
- The operation of the proposed project will be net carbon neutral, which means that it will be designed and operated so that there will be no net increase in greenhouse gas (GHG) emissions, as compared to the existing environmental setting. Net carbon neutral operations will be achieved through the incorporation of high-efficiency design features, and the pursuit of one of two options for offsetting the net increase in GHG emissions. These options are anticipated to also reduce energy through the implementation of various energy reduction projects (e.g., solar PV, micro-hydro turbines).
- To accommodate potential future regulatory and carbon reduction technology changes, the City and District will prepare, approve, and implement an Energy Minimization and Greenhouse Gas Reduction Plan (Energy Plan) upon successful completion of EIR certification and prior to project construction. The Energy Plan will address the content and organizational specifications outlined in **Appendix O**. In addition to meeting the net carbon neutral GHG reduction objective, the Energy Plan will reduce system-wide energy use of the City and District water supply systems.

Mitigation Measures

None required.