4.11 PUBLIC UTILITIES AND SERVICE SYSTEMS

4.11.1 Existing Conditions

Fire and Emergency Medical Services

The desalination plant is located within the City of Carlsbad which is serviced by the City of Carlsbad Fire Department, which provides fire and emergency medical services. The nearest fire station to the plant site is Fire Station 1, located at 1275 Carlsbad Village Drive, approximately 2.5 miles from the desalination plant site. Additional stations operated by the City of Carlsbad include the following:

- Fire Station 2 - 1906 Arenal Road
- Fire Station 3 - 3701 Catalina Drive
- Fire Station 4 - 6885 Batiquitos Drive
- Fire Station 5 - 2540 Orion Way
- Fire Station 6 - 3131 Levante Street

Police

The City of Carlsbad maintains one police station at 2560 Orion Way. The City of Carlsbad Police Department received 73,667 calls for service in 2004 (Diamond, January 14, 2005 , personal communication). Further, in 2004, there were 270 reported violent crimes and 2,173 recorded property crimes. The Carlsbad Police Department response times were under performance standards for all three priority types. The average response time for priority 1 crimes (violent, in progress and some non- violent, in progress) was 5.1 minutes compared to the 6.0 standard. The average response time for priority 2 crimes (non-violent, in progress) was 11.4 minutes based on a 15 minute performance standard. Priority 3 crimes (reporting after the fact) showed a response time of 23.5 minutes from a 30 minute standard (Diamond, 2005).

Parks and Recreation

The City of Carlsbad operates and maintains 17 parks. The City, along with the California Department of Fish and Game manages the Batiquitos, Buena Vista and Agua Hedionda Lagoons as nature preserves and recreational amenities. Cannon Park is located at the corner of Cannon Road and Carlsbad Boulevard, immediately adjacent to the Encina Power Station and the proposed desalination plant site.

Cabrillo, as owner of the Encina Power Station, owns and manages several areas around the plant for public access and recreation. Since 1954, several concessions were made between SDG&E (former owner of the Encina Power Station) and the City to allow public access to beach areas around the plant. These concessions include: access and use of the beach directly in front of the plant, and public access to and use of Cannon Park. In addition, Cabrillo maintains ownership of the Middle and Inner Agua Hedionda Lagoons and SDG&E owns a trail on the lagoon north shore. These areas are under a lease to the City for $1.00 a year for purposes of recreation.

The Pacific Ocean immediately west of the proposed Encina Power Station (EPS) is a regional recreational resource. The beach is used for picnicking, sun bathing swimming, fishing, surfing and other water sports.

Wastewater

The City of Carlsbad owns and maintains sewage pipelines, pump stations and other facilities used to convey wastewater for treatment. Within the City, the wastewater system is comprised of major trunk lines, smaller collector lines, and lift stations. Wastewater treatment services are provided by the Encina Wastewater Authority (EWA). The EWA serves 125 square miles and has a service area of about 300,000 people. Currently a majority of the developed land within the City of Carlsbad utilizes this service while a very small percent utilizes septic systems. Eventually all land uses will be connected to the EWA's Encina Water Pollution Control Facility. This facility provides primary and secondary treatment for the City.

The Encina Water Pollution Control Facility is currently designed to handle an average daily flow of 36 mgd. Current average flow is around 28 mgd. Carlsbad's current capacity right at the Encina facility is approximately 9.24 mgd and its current average flow into the facility is 7 mgd**.** EWA has developed engineering plans for plant improvements anticipated to meet the needs of the service area (including the City of Carlsbad) to the year 2025. This expansion project, referred to as "Phase V" will result in an increase in capacity to 40.5 mgd of liquid processing and 43.3 mgd of solids processing.

The proposed desalination plant would connect to the Encina Facility via the Vista/Carlsbad Interceptor, the sewer trunk line which runs parallel with the railroad just east of the project. This sewer line carries waste from portions of Vista and Carlsbad. Carlsbad's capacity right of the Interceptor is 6.4 mgd, with a 2002 average flow of 4.65 mgd**.**

Water

The City of Carlsbad is currently 100% reliant on imported water delivered through the San Diego County Water Authority. Current water supplies in San Diego County are comprised primarily of imported water purchased from the Metropolitan Water District of Southern California (MWD). The San Diego County Water Authority (CWA) purchases imported water from MWD and from the Imperial Irrigation District through a water transfer agreement, and wholesales the imported water, along with locally developed water supplies, to its member agencies which in turn deliver the water to individual homes and businesses throughout the county. Local water supplies comprise approximately 10-25% of the water used in San Diego County, including surface water that is collected and stored in local reservoirs, and groundwater. The Carlsbad Municipal Water District (CMWD) distributes this water to approximately 85% of the City of Carlsbad. The Olivenhain Municipal Water District and Vallecitos Water District provide service to the remaining city area.

Solid Waste Disposal

Solid waste disposal is provided by Waste Management, Inc., which operates under a franchise agreement with the City of Carlsbad. City of Carlsbad residents disposed of 128,853 tons of refuse in 2003. Waste is collected and delivered to the Palomar Waste Transfer Station located on Orion Avenue. Ultimate disposal locations are determined based on capacity and pricing.

Energy

The project site is located within the electrical service delivery area of the San Diego Gas and Electric Company (SDG&E). SDG&E owns and operates electrical transmission facilities that distribute power to the San Diego region, and comprises a component of the California power grid (grid). The grid is a network of long-distance, high-voltage transmission lines and substations that carry electricity to local utilities, such as SDG&E, for distribution to their customers. The California Independent System Operator (ISO) is a not-for-profit public benefit corporation that is responsible for ensuring reliability of electrical supply and distribution throughout the grid, which covers approximately 75 percent of the state, and includes over 25,526 circuit miles of transmission facilities, with an annual volume of approximately 200 billion kilowatt hours, serving approximately 30 million California residents.

The Encina Power Station is an electrical generating facility that is part of the grid. All of the generating units associated with the facility have been designated as “Reliability Must Run” (RMR) by the ISO. The RMR Generation designation represents the minimum generation (number of units or MWh output) required by the ISO to be available to maintain system

reliability. At full production output, the Encina power plant has the capability to directly or indirectly serve roughly half of the power demand for San Diego County.

Local Facilities and Improvement Plan/Local Facilities Management Plans

As part of its Growth Management Program, the City of Carlsbad adopted the 1986 *Citywide Facilities and Improvement Plan* in order to implement the City's General Plan and Zoning Ordinance. This plan ensures that development does not occur unless adequate public facilities and services exist or will be provided concurrent with new development. A Local Facility Management Plan (LFMP) has been for adopted for all but one of the 25 Facility Zones within the City. The proposed project is located within Zone 3, for which the City adopted a LFMP in 1987. Consistent with the Citywide Plan, each plan contains performance standards (i.e., thresholds) for public facilities and services. This provides the City with quantitative guidance as to whether or not a project will be in conformance with adequate public facility and service provision thresholds. Therefore, projects within the City of Carlsbad are subject to thresholds for circulation, city administrative facilities, fire, schools, libraries, park and recreation resources, open space, wastewater treatment capacity, sewer collection system, drainage/storm water system and water distribution. It should be noted that the LFMP thresholds for city administrative facilities, fire, schools, libraries, and park and recreation resources are not applicable to the proposed project because they are population based, and the project would not directly generate additional population. Those LFMP thresholds that are applicable to the project are identified and described below:

- ***Wastewater Treatment Capacity:*** Sewer treatment plant capacity is adequate for at least a five year period.
- ***Sewer Collection:*** Trunk-line capacity to meet demand as determined by the appropriate sewer district must be provided concurrent with development.
- ***Drainage Facilities:*** Drainage facilities must be provided as required by the City concurrent with development.
- ***Water Distribution:*** Line capacity to meet demand as determined by the appropriate water district must be provided concurrent with development. A minimum 10-day average storage capacity must be provided prior to any development.
- ***Open Space:*** Fifteen percent of the total land area in the zone exclusive of environmentally constrained non-developable land must be set aside for permanent open space and must be available concurrent with development.
- ***Circulation:*** No road segment or intersection in the zone nor any road segment or intersection out of the zone which is impacted by development in the zone shall be projected to exceed a service level C during off-peak hours nor service level D during

peak hours. Impacted means where 20% or more of the traffic generated by the local facility management zone will use the road segment or intersection.

4.11.2 Significance Criteria

Appendix G of the CEQA guidelines lists the following as criteria for determining whether a significant impact to public facilities or services would occur:

Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered government facilities, a need for new or physically altered government facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services:

- Fire protection?
- Police protection?
- Schools?
- Parks?
- Other public facilities?

In order to adequately address impacts to utilities and services, the project would be considered to have a significant effect if it would:

- ***Fire and emergency Medical Services:*** Be designed such that emergency access does not allow for acceptable response times, or cause an increase in demand that would require additional staffing or equipment.
- ***Police Services:*** Be designed such that emergency access does not allow for acceptable response times, or cause an increase in demand that would require additional staffing or equipment.
- ***Wastewater:*** exceed the local discharge limits and applicable pretreatment ordinance of the local wastewater treatment plant, or require or result in the construction of new wastewater facilities or expansion of existing facilities that could cause significant environmental effects. The project would also result in significant impacts if the City of Carlsbad determines that it does not have sufficient capacity to meet the project's demands in consideration of existing commitments
- ***Water:*** not have sufficient water supplies to serve the project.
- ***Solid Waste:*** not have sufficient permitted capacity in the landfill serving the project to serve the project's needs.

- ***Energy:*** 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.

4.11.3 Impacts

Fire and Emergency Medical Services

The proposed project will be required to comply with all of the standards and design requirements of the Carlsbad Fire Department, which include adequate emergency access, installation of fire sprinklers and maintenance of fire suppression equipment. The Carlsbad Fire Department currently has the facilities and personnel to accommodate the project, and it is not anticipated that any adverse impacts to service delivery would result from implementation of the project, and impacts are less than significant.

Police

The desalination facility would require the protection and monitoring of the Carlsbad Police Department. The Encina Power Station already receives protection from the police department; this new facility would simply be an extension of the monitoring/patrolling that currently occurs at or around the facility. The Desalination plant will also operate 24 hours per day – security and/or employees will always be on the premises to monitor activity. Therefore, because of the minimal demand for police protection, no additional services, equipment or personnel are anticipated to service the project, and impacts are less than significant.

Parks and Recreation

The proposed desalination project would be located next to Cannon Park. Construction of the desalination facility would not interfere with park activities. Additionally, the project would not generate substantial additional population, and therefore would not create substantial demand for recreational facilities or services.

Potential community enhancements are also being addressed with the City through a direct agreement between the City and Cabrillo, as a part of the overall Precise Development Plan (PDP). Enhancements would include easements for use, leases, or the dedication of land to the City of Carlsbad for general public benefit. These features are included as a part of the PDP:

- ***Fishing Beach -*** This 2.89 acre site is located on the east side of Carlsbad Boulevard just south of the lagoon jetty along the western shore of the Outer Lagoon. The purpose

of the dedication will be for recreational and coastal access use, with a reservation for staging activities associated with periodic dredging conducted by Cabrillo. An additional stretch of land extending south of this site to the north end of the PDP area (in the approximate location of the discharge pond and aquaculture facility buildings) is proposed for public parking.

- ***Bluff Area*** **–** This site is located on the west side of Carlsbad Boulevard, north of Tierra Del Oro Street. The site is approximately 13 acres in size, and is proposed to be dedicated for recreational and coastal access uses.

- ***Hubbs Site*** **–** This includes the land located on the north side of the lagoon just west of the railroad tracks, next to Hubbs Seaworld Research Institute. The site is approximately 2 acres in size and is proposed to be used as a site for expansion of fish hatchery and aquatic research uses.

- ***South Power Plant public parking area*** **–** This site is along the east side of Carlsbad Boulevard and near the south entrance to the power plant. The site is proposed to be used for public parking

These enhancements would have the effect of improving recreational opportunities within the project area. No significant impacts to recreational facilities or services are anticipated.

Wastewater

Regulatory Framework

The San Diego Regional Water Quality Control Board (RWQCB) administers all provisions relating to the regulation of wastewater treatment and disposal in the San Diego Region. California's Porter-Cologne Act requires the RWQCB to administer laws relating to wastewater regulation, including setting and enforcing both federal and state discharge standards, and administering water quality testing programs and permits for publicly owned treatment works (POTWs). The water quality statutes and regulations enforced by the RWQCB include, but are not limited to the federal Clean Water Act, Porter-Cologne Act and the California Ocean Plan.

The RWQCB is responsible for ensuring that all industrial discharger are in compliance with the applicable industrial waste discharge regulations. To comply with the RWQCB regulatory requirements, the Carlsbad Seawater Desalination Facility will obtain an Industrial Discharge Permit and comply with the local discharge limits and applicable pretreatment ordinance of the local wastewater treatment plant.

Wastewater Quality

The proposed project would lower the total dissolved solids (TDS) concentration in the water supply serving Carlsbad and potentially some of the other communities served by the Encina Water Pollution Control Facility (EWPCF). This would result in a reduction in the TDS of the wastewater treated at the EWPCF. Additionally, the project would generate municipal and industrial waste streams which would be discharged to the EWPCF for treatment and disposal.

The municipal waste discharges are associated with the employees' and site visitors' use of the restrooms and lunch room at the plant. The maximum flow of municipal wastewater generated by the project would be less than 1,000 gallons per day and would have a less than significant impact on the local and regional wastewater collection and treatment system. The industrial waste steams generated by the project include granular media filter or micro-filtration membrane filter backwash water and spent membrane cleaning solutions. The total suspended solids content of these waste streams would not exceed 500 pounds per day. The average and maximum flow from these facilities are shown in *Tables 4.11-1 and 4.11-2*. The Applicant would be required to obtain an Industrial Waste Permit from EWA prior to discharging the industrial waste streams to EWPCF. These discharges have the potential to increase the total dissolved solids (TDS) content of the influent to the EWPCF. The increased TDS may have an adverse impact on water recycling facilities operating in the Encina sewer service area. This section provides an evaluation of the net effect of the proposed project on EWPCF operations and water recycling programs.

For purposes of a worst case analysis, this evaluation conservatively assumes that City of Carlsbad is the only member of the EWA that is contributing lower TDS wastewater to the EWPCF and that all of the potential waste streams from the project are treated at the EWPCF.

The average TDS concentration in the imported water serving Carlsbad and the surrounding communities today is 550 mg/L. The average TDS of the influent to the EWPCF without the project is approximately 1,000 mg/L. The proposed project would produce a water supply with a TDS concentration of 350 mg/L, resulting in a 36 percent reduction in the TDS of the water supply served by Carlsbad. Water used in the service area represents 22 percent of the influent to the EWPCF. After the project becomes operational, the average TDS of the 28 mgd influent to the EWPCF would be reduced from 1000 mg/L to 956 mg/L. Thus, without considering the effects of the various waste streams, the higher quality water received by CMWD from the proposed project would result in a 4.4 percent reduction of the TDS of the influent to the EWPCF.

TABLE 4.11-1
Granular Media Backwash and Reverse Osmosis Cleaning Solution

Process	Flow (gpd)/(gpm)		Maximum Instantaneous Flow (gpm)		TDS (mg/L)		EWPCF TDS (mg/L)	
	Ave	Max			Ave	Max	Ave	Max
Granular Media Filters	16,000	16,000	11	11	33,500	33,500	974	974
RO Cleaning Solution	6,100	72,000	4	50	20,000	20,000	958	1,005
Combined Flow	22,100	88,000	15	61			979	1023

TABLE 4.11-2
Membrane Backwash, Chemically Enhanced Backwash and Reverse Osmosis Cleaning Solution

Process	Flow (gpd)		Maximum Instantaneous Flow (gpm)		TDS (mg/L)		EWPCF TDS (mg/L)	
	Ave	Max	Ave	Max	Ave	Max	Ave	Max
Membrane Filter Backwash	16,000	16,000	11	11	33,500	33,500	974	974
CEB	110,000	110,000	76	76	20,000	20,000	1,030	1030
RO Cleaning Solution	6,100	72,000	4	50	20,000	20,000	958	1,005
Combined Flow	132,100	198,000	92	137			1,053	1,097

The backwash water from the pretreatment filters (granular media or micro-filtration membranes) in combination with the other waste streams discharged to EWPCF would have a total suspended solids content of less than 500 pounds per day. The total volume of the filter backwash water would be less than 16,000 gallons per day.

Cleaning of the membrane pretreatment filters requires the use of a Chemically Enhanced Backwash (CEB) process. The wastewater from this process would contain a combination of

chlorine and acid, and would be discharged to the sewer system for ultimate treatment at the EWPCF. The total volume of spent CEB solution would be 0.110 mgd.

A more elaborate chemical cleaning process for both the pretreatment membrane filters and the reverse osmosis product water filters would be conducted less frequently. Chemicals typically used for cleaning in various combinations include:

- Citric Acid - (2% solution)
- Sodium Hydroxide B (0.1% solution)
- Sodium Tripolyphosphate B (2 % solution)
- Sodium Dodecylbenzene B (0.25% solution)
- Sulfuric acid B (0.1% solution).

The wastewater from this process would also be discharged to the sanitary sewer system for treatment at the EWPCF. The total volume of spent cleaning solution discharged to the sewer would be approximately 91,000 gallons per month on average, which may increase to a maximum of 182,000 gallons per months depending on the number of units being treated within a given time frame. The spent cleaning solution would be stored on site and released to the sewer system at an average rate of 6,100 gallons per day and a maximum rate of 72,000 gpd.

The intermittent cleaning of the RO membranes will result in a waste stream from the facility with an average TDS concentration of 20,000 mg/L. The municipal wastewater currently treated at the EWPCF typically has TDS concentration of approximately 1,000 mg/L, but as previously discussed, in the absence of the various waste streams, the influent TDS would be reduced to 956 mg/L once the project becomes operational. *Table 4.11-1* provides average daily flow in gallons per day (gpd) and maximum instantaneous flow in gallons per minute (GPM) for the industrial waste streams for the combined flow of the granular media filter backwash and reverse osmosis cleaning solution and the average and maximum TDS concentration of the EWPCF effluent that is the source water to local water recycling facilities owned by Carlsbad Municipal Water District and Leucadia Wastewater District.

If the membrane pretreatment system is selected (instead of granular media filtration), then the spent chemically enhanced backwash (CEB) water would also be discharged to the EWPCF. The spent CEB would have a salinity of 20,000 mg/L with a flow of 110,000 gpd. ~~As shown in~~ *Table 4.11-2*, provides average and maximum instantaneous flow for the industrial waste streams for the combined flow of the granular media filter backwash and reverse osmosis cleaning solution and the average and maximum TDS concentration of the EWPCF effluent that is the source water to local water recycling facilities owned by Carlsbad Municipal Water District and Leucadia Wastewater District.

Thus, if the membrane pretreatment is not selected, the increase in TDS conditions shown in *Table 4.11-1* would prevail, which result in a less than significant impact on the water recycling projects operating in the EWPCF service area. Should membrane pretreatment be selected, then the TDS conditions shown in *Table 4.11-2* would prevail and the project would result in a permanent increase in TDS levels for the water recycling facilities in the Encina sewer service area. However, the impacts to the water recycling facilities would be less than significant with respect to TDS limits after mitigation.

Wastewater Collection and Treatment and LFMP Thresholds

The proposed project will comply with local discharge limits and pretreatment ordinance of the EWPCF. The project will not require or result in the construction of new wastewater facilities or expansion of existing facilities that could cause significant environmental effects. The City of Carlsbad has determined that it does have sufficient capacity to meet the project's demands in consideration of existing commitments.

The project's combined wastewater flow of a maximum 200,000 gpd and an instantaneous flow maximum below 150 gpm will not exceed the City's capacity rights in the Vista/Carlsbad Sewer Interceptor or the EWPCF. To ensure capacity rights are not exceeded, a mitigation measure quantifies maximum acceptable daily and instantaneous flows at 200,000 gpd and 300 gpm. Furthermore, the LFMP threshold for wastewater treatment capacity requires such capacity to be adequate for at least a five-year period. As previously mentioned, the City currently has EWPCF capacity rights of approximately 9.24 mgd and an average flow of 7.04 mgd**.** According to the City of Carlsbad 2003 Sewer Master Plan Update, 2010 projected flows into the EWPCF are slightly under 8.4 mgd and about 9 mgd in 2015.

Water

Regulatory Framework

The California Department of Health Services (DHS) administers all provisions relating to the regulation of drinking water to protect public health. California's Safe Drinking Water Act requires DHS to administer laws relating to drinking water regulation, including setting and enforcing both federal and state drinking water standards, and administering water quality testing programs and permits for public water system operations. The standards established by DHS are found in Title 22 of the California Code of Regulations.

DHS is responsible for ensuring that all public water systems are operated in compliance with drinking water regulations. Current drinking water regulations include both primary and

secondary standards. Compliance with primary standards is mandatory, because these standards are based on potential health effects on water users. The primary standards define maximum concentration levels (MCLs) that cannot be exceeded by any public water system.

Under Title 22 of the California Code of Regulations, DHS will regulate the operation of the Carlsbad Seawater Desalination Facility and will oversee the quality of the product water produced. DHS will be responsible for ensuring that the product water will meet all federal and state standards for drinking water that have been established by USEPA and DHS.

To comply with the DHS regulatory requirements, the Carlsbad Seawater Desalination Facility will obtain a Drinking Water Permit to wholesale desalinated water. Poseidon Resources will apply for a domestic water supply permit pursuant to the Regulations Relating to Domestic Water Systems.

Water Quality

The Carlsbad Desalination Facility will have multiple treatment processes including pretreatment facilities, cartridge filters, reverse osmosis membranes, and product water conditioning and disinfection facilities.

Intake seawater will be filtered through pretreatment facilities which will be designed to remove over 99.9 percent of all suspended solids and will also remove or inactivate over 95 percent of the bacteria and other pathogens (such as Cryptosporidium, Giardia, and viruses), if they are present in the source seawater. The raw seawater will be chlorinated upstream of the pretreatment facilities as needed, to reduce the number of bacteria in the feed seawater to the filters. Prior to reverse osmosis the pretreated water will be processed through finer 5-micron cartridge filters which will provide another barrier for pathogens and fine particles. The pre-filtered water will then be processed through the reverse osmosis membranes, which are an ultimate final barrier for removal of all suspended particles (solids and pathogens) and most dissolved solids in the seawater. The openings of the RO membranes have size of 0.001 microns, which are smaller than the size of most viruses and all bacteria. This ultimate barrier will provide a rejection of over 99.5% of the salts in the seawater and over 99.99% of the remaining microorganisms (bacteria, viruses, protozoa, etc.), that have not been already removed upstream of the RO system. To provide an additional level of safety and water quality protection, after RO treatment, and prior to conveyance to the water supply system for distribution, the desalinated water will be disinfected using chlorine.

The product water quality of the Carlsbad Seawater Desalination Facility can be influenced by a number of factors such as source water fluctuations, technology performance, and integration of

the desalinated water with potable water from other sources (Metropolitan Water District of Southern California). The following discusses the potential for each factor to impact water quality and the features of the project that are proposed to meet drinking water standards.

Source Water

The source water for the Carlsbad Desalination Facility might potentially be impacted by natural changes in ocean water salinity, temperature, turbidity, and pathogen concentration, and harmful algal blooms. Typically, ocean water salinity and temperature changes are triggered by natural seasonal events, while the intake ocean water turbidity and pathogen concentration changes are mainly driven by rain events.

The desalination facility intake water quality in terms of turbidity (which is a surrogate indicator for potential elevated pathogen content) and salinity will be measured automatically and monitored continuously at the desalination facility intake facilities. In event of excessive increase in intake seawater turbidity and/or decrease in salinity, this instrumentation will trigger alarms that will notify desalination facility staff. If the intake pathogen count reaches a preset maximum level, this instrumentation will automatically trigger chlorination of the source seawater, thereby reducing source water pathogens before the water reaches the RO treatment facilities. To provide an additional level of safety/protection of the desalinated water quality will be disinfected prior to deliver to the water supply system. In addition to the automation provisions, turbidity and salinity will also be measured manually by the desalination staff at least once a day and the intake seawater will be analyzed for pathogen content at least once per week.

In addition to the intake water quality monitoring instrumentation, the desalination facility pretreatment filtration facilities will be equipped with filter effluent turbidimeters and particle counters. This equipment will continuously monitor pretreatment filter performance and trigger adjustments of desalination facility operations to accommodate intake water quality changes.

Protection of Product Water Quality From Harmful Algal Blooms: Red tides occur along the California coast during the summer months. Red tides are caused by the rapid reproduction of dinoflagellates, the vast majority of which are nontoxic, which results in discoloration of the ocean water ranging from yellow to deep red. One species of dinoflagellate, *Alexandrium catenella,* which hardly ever produces visible blooms, produces saxitoxin. *Alexandrium* has been detected in San Diego coastal waters at low levels (DHS, 2001, 2002, and 2003). Filter feeding shellfish consume vast quantities of these organisms and concentrate the biotoxin in their tissues. If humans consume shellfish containing this toxin, they can suffer from paralytic shellfish poisoning (PSP), which can result in death. Another toxin producer along the California coast is the diatom, *Pseudo-nitzschia spp*., which produces domoic acid, a powerful

neurotoxin. It typically does not result in a visible bloom of algae. The DHS phytoplankton monitoring program has detected *Pseudo-nitzschia* at low levels in San Diego coastal waters. Another dinoflagellate, *Dinophysis spp.*, associated with one other toxin (okadaic acid) has been found in low numbers along the California Coast (Personal Communication, Gregg Langlois, California Department of Health Services). Okadaic acid causes gastrointestinal problems but it is not fatal (Woods Hole Oceanographic Institute website). Although these harmful algae can result in adverse effects on humans when their toxins are concentrated in shellfish and the shellfish are ingested by humans, the concentrations of algal toxins found in seawater are far below the levels that are toxic to humans.

However, as a precautionary measure, the Carlsbad desalination facility will have a number of provisions/barriers for inactivation/removal of red-tide related algal toxins through the treatment processes, including:

- Chlorination of Intake Seawater
- Enhanced Coagulation of Intake Seawater (using ferric sulfate or ferric chloride)
- Pretreatment Filtration Algae Barrier
- Pretreatment Filter Covers to minimize sunlight exposure
- Cartridge Filter Algae Barrier
- Reverse Osmosis Membranes
- Final Disinfection with chlorine
- Emergency Facility Shutdown (the desalination facility operation can be discontinued within 10 minutes after notification in the case of red-tide/algal blooms of catastrophic proportions or advisory by pertinent local and state heath agencies)

It should be noted that seawater desalination facilities applying reverse osmosis membranes similar to these proposed for the Carlsbad Desalination Facility have been successfully used for more than 15 years in other parts of the world (Spain, Cyprus, Israel, the Middle East and the Caribbean). In all of these locations red-tide/algal blooms have occurred occasionally in the past, and there are no documented cases of red-tide health or safety problems associated with the operation of RO seawater desalination facilities.

Protection of Source Water Quality From Power Plant's Routine and Non-Routine Events: The Carlsbad Desalination Facility will have six different provisions for protection/notification to account for non-routine operations at the power facility:

- Automatic control interlock between power plant's pumps and Carlsbad Desalination Facility's intake pumps: Should power plant pumps' operation be discontinued, an

alarm at the desalination facility will sound and will automatically shutdown the desalination intake pumps.

- Continuous Plant Intake Pump Flow Measurement Devices: Seawater intake pumps will be equipped with flowmeters, and if the intake flow is discontinued for any reason, including non-routine power facility operations, this will trigger automatic desalination facility intake pump shutdown.

- Continuous Plant Intake Water Temperature Measurement Devices: The intake pump station will be equipped with instrumentation for continuous measurement of the intake temperature. Any fluctuations of the intake temperature outside preset normal limits will trigger alarm and intake pump shutdown.

- Continuous Intake Water Salinity/Conductivity Measurement Devices: The intake pump station will be equipped with instrumentation for continuous measurement of the intake seawater salinity. Any fluctuations of the intake salinity outside preset normal operational limits will trigger alarm and intake pump shutdown.

- Continuous Intake Water Oil Spill/Leak Detection Monitoring Devices: The intake pump station will be equipped with instrumentation for oil spill/leak detection. Detection of oil in the intake water even in extremely low concentrations will automatically trigger alarm and intake pump shutdown.

- Routine Communication with Power Plant's Staff: The desalination plant staff will be required to contact power plant personnel at least once per shift and inquire about unusual planned or unplanned events at the EPS. If non-routine operations are planned at the EPS, the desalination plant staff will be informed and will modify desalination facility operations accordingly.

Product Water Integration and Compatibility

Blending the desalinated product water with imported water sources is not expected to change the water quality of the blend in terms of its corrosion effect on the water distribution system. Product water from the desalination plant will be chemically conditioned at the treatment facility prior to delivery to the distribution system to mitigate its corrosivity. Lime in combination with carbon dioxide addition will be used for post-treatment stabilization of the RO water as a source for pH and alkalinity adjustment and hardness addition, pursuant to the water quality controls and monitoring requirements set forth in the Water Purchase Agreement between the City of Carlsbad and the project applicant.

Blended Water Chlorine Residual: The desalinated product water will be disinfected prior to delivery to the distribution system. Chlorine, in the form of sodium hypochlorite, will be added as a disinfectant to meet DHS water quality standards for potable water disinfection. Controlling biological growth in the transmission pipelines and in the receiving reservoirs in the distribution system will be accomplished by adding ammonia to the chlorinated water to form chloramines. Potable water from Metropolitan Water District also contains chloramines as the final residual disinfectant. Both treated water sources will have compatible chlorine residuals, including chlorine byproducts. The desalinated water will be chloraminated by sequential application of sodium hypochlorite and ammonia to achieve a chloramine residual concentration at the point of delivery to the distribution system is in a range of 2 to 2.5 mg/L. Therefore, no impacts related to product water quality resulting from disinfection are anticipated to result.

Protection of Blended Water Taste and Odor: The projected quality of the Carlsbad Desalination Facility's product water after reverse osmosis treatment and post-chemical addition is comparable with the water it would blend with in the distribution system. In terms of odor, the desalination facility product water will meet the respective DHS water quality limits. In terms of regulated volatile organics, and other compounds that may impact product water taste and odor, product water from the Carlsbad Desalination Facility will comply with all drinking water standards and does not differ substantially from the water quality of the other sources of product water in the distribution system. Therefore, no adverse aesthetic effects on water quality are anticipated to result from water blending.

Delivery of water from the project will in certain cases involve reversal of water flow in existing water delivery facilities, since the location of the source water supply will change. To protect water users from potential taste and odor problems associated with the startup of facility operations, just prior to startup, a sequential flushing program will be coordinated with the involved water agencies and the City staff to minimize any sediment disturbance that might occur due to flow reversals in the system. A flushing program will minimize any aesthetic issues that might be created through flow reversals. Therefore, no adverse aesthetic effects on water quality are anticipated to result from flow reversal.

Distribution System Effects: In general, existing water supply is delivered to local water distribution systems via gravity flow that is achieved either by continuous gravity flow within a delivery line, or pumping to a reservoir at a higher location than the service area, and ultimate gravity flow to the delivery points. Distribution of 50 mgd of water from the proposed project will require continuous pumping to maintain adequate pressure to reach distribution points. As such, power failure at the pump locations may result in hydraulic impacts on the regional water distribution system that are caused by suction that is created within pipes when water flow is

suddenly stopped (referred to a "surge"). The effects from surge can damage water delivery facilities.

A modeling study has been performed for the proposed project to determine the potential for surge to occur in the proposed water delivery system. The study identifies the potential effects and provides design features that minimize effects to acceptable levels. The surge control facilities generally consist of air chambers and valves located at the pumping facilities that will force water from pressurized surge control tanks into the water lines upon loss of power at a sufficient quantity and rate to prevent suction from developing in the water line. Therefore, it is not anticipated that adverse effects upon existing water delivery facilities will result from potential surge.

Solid Waste Disposal

The primary sources of solid waste from the project would consist of sludge generated as a result of the intake water pretreatment filtration and disposal of other wastes such as filter cartridges. Sludge disposal would involve dewatering onsite to a sludge concentration of 20% or higher and disposal in a sanitary landfill. A daily average of 6.5 wet tons of sludge would be transported for landfill disposal and disposed as a municipal waste under a contract with a private contractor specialized in waste disposal. Spent filter cartridges would comprise approximately 23 tons (3800 cartridges x 2 lbs/cartridge x 6 times or replacement /yr)/2,000 lbs/ton) of waste per year. Spent RO membrane elements would comprise approximately 20 tons (19,000 membrane elements x 15 lbs/membrane x 0.143 replacement /yr)/2,000 lbs/ton) of waste per year. The generation of this additional waste is not anticipated to affect landfill capacity or require expansion of facilities, due to the relatively small quantities. Therefore, impacts to solid waste facilities are not considered to be significant.

Energy

Equipment associated with operation of the desalination plant includes the desalination plant intake water pump station, pretreatment facilities, reverse osmosis system, product water pump station, membrane cleaning system, chemical feed equipment, solids handling equipment, service facilities (*i.e.*, HVAC, lighting), and the Oceanside pump station. All of this equipment will utilize electric power. Based on an evaluation of power usage for these sources, an average of 29.76 mega-watt hours (MWh) of electrical power would be required to operate the desalination plant facilities on a daily basis, and during maximum production of desalinated water, a maximum of 35.5 MWh of electrical power would be used (Poseidon Resources 2004). Additionally, the offsite pump station would require 0.55 MWh of electricity, resulting in a total maximum project demand of approximately 36.05 MWh. The desalination plant will not contain

any electrical power generation facilities, and will purchase this electrical power from the local electric utility, or a power generator, broker or seller.

Power purchases for the desalination plant may occur directly from the Encina Power Station (EPS), or from the regional power grid. As such, predicting whether future direct power sales by EPS would have any specific effect on current or historic levels of operation at EPS would require speculation beyond the scope of this EIR. As noted in the Energy Options White Paper issued by the California Desalination Task Force (California Department of Water Resources (DWR), 2003), "A desalination facility may be located near an existing coastal power plant….(h)owever, the net impact of the desalination plant's load would be felt throughout the electricity supply system."

From time to time, EPS may sell power to a variety of different purchasers based on agreements of varying length. Operations depend upon various factors including, but not limited to, power sale contract terms and conditions, the market price for electricity and ancillary services, local needs of the electrical transmission grid operator (ISO), the availability of generating equipment, the costs of operating the different generating equipment, including the cost of fuel, and the operating characteristics and capabilities associated with each generating unit. Therefore, as noted in the DWR whitepaper, impacts need to be considered on the scale of operations within the grid.

On February 22, 2005, the California Energy Commission, the California Public Utilities Commission, and the California Independent System Operator released a study entitled "California's Electric Situation: Summer 2005" (CEC Study). This report indicates that in 2005 Southern California faces a 10% chance (corresponding to the likelihood of an abnormally hot summer) that generation capacity will not be sufficient to meet satisfy operating reserves during peak demand hours. Insufficient operating reserves can lead to brownouts or blackouts. The likelihood that generation capacity will be inadequate during peak demand hours over the near term would increase if any existing power plants had unexpected outages, if less hydro-electric power than expected were available, or if key transmission lines were forced to close due to fires. The California Energy Commission has determined that the highest peaks in energy demand occur only a few times a year, for a total of 50-100 hours (2003 Integrated Energy Policy Report, CEC).

Although the California Energy Commission, the California Public Utilities Commission, and the California Independent System Operator have identified a possible electricity shortage in Southern California, the same agencies have developed a set of initiatives to ensure that there is no medium to long term deficit. Specifically, the CEC study proposes a series of actions to be undertaken immediately that would minimize the likelihood of electrical shortages in the summer

of 2005, including: augmenting demand response programs, interruptible programs, and energy efficiency programs; encouraging the accelerated construction of permitted power plants, and new peaking generation; identifying and expediting transmission upgrades that are feasible for 2005; and encouraging conservation efforts. In addition, the CEC Report includes an action plan for 2006 and beyond to ensure that peak demand needs are met, including: a series of energy conservation initiatives (including green building initiatives); demand reduction strategies (including dynamic pricing, and voluntary load reduction for certain large users of electricity during peak demand); increased development of renewable energy sources; and encouragement of new generation and transmission facilities.

The Governor has made a priority of implementing the CEC Report's recommendations and other strategies to ensure adequate supply of electrical energy during peak demand. Specifically, on February 22, 2005, the Resources Agency unveiled a 10-point plan designed to ensure an adequate, stable supply of electricity at reasonable prices. The plan specifically calls for all electricity suppliers to operate with minimum 15 percent reserve margins by 2006. In addition, the plan emphasizes developing a competitive wholesale procurement system to increase transparency in electricity sales and encourage long-term contracts, encouraging investment in new transmission capacity, increasing renewable energy supplies, promoting energy efficiency, taking advantage of dynamic pricing and advanced metering (strategies that would encourage customers to conserve during peak hours to avoid higher rates), and increasing research and development into emerging technologies. The Governor is working closely with the California Energy Commission, the California Public Utilities Commission, and the California Independent System Operator to bring addition electrical generation capacity online. As a specific example of expected increased generation capacity, power plants totaling approximately 1,000 MW of capacity are approved for Otay Mesa and Escondido, and are expected to be online by 2008.

Given the comprehensive and cooperative nature of the planning effort to improve electrical power supply during peak demand, as well as the Governor's stated goal to ensure that running reserves are adequate by 2006 and the plan to implement that goal, the energy supply will be adequate by the end of 2006. In other words, power supply in Southern California will be adequate after 2006, even at times of peak demand, and even if the weather is unusually warm.

Construction on the desalination plant will not begin until late 2006, at the earliest, with operation and the corresponding electrical demand to begin until late 2008, at the earliest. Given that adequate peak generation capacity, even for unusually warm weather, is anticipated to be online by 2006, and comprehensive planning is underway to ensure that adequate capacity remains in the long term, the desalination plant will not have a significant impact on electrical demand.

The grid currently supplies an annual volume of approximately 200 million MWh of electricity throughout California (www.caiso.com, accessed October 31, 2004). The cumulative effect of energy consumption of existing and planned seawater desalination facilities is approximately 22,500 MWh per year and 1million MWh per year, respectively; these represent less than one percent of the total energy available on the grid (DWR, 2003b).

As noted by the DWR Desalination Task Force, another consideration in evaluating impacts of desalination on the electricity system is the demand the plants would put on the system during peak hours. Statewide peak demand is roughly 52,000 MWh and is expected to grow by approximately 2% annually (DWR, 2003c). The report estimates that the cumulative effect of proposed desalination plants in California would place 100 MWh to 125 MWh of peak demand on the system. The project's contribution to this estimated cumulative demand would be approximately 36.~~55~~ 05 MWh under maximum operating conditions. The report concludes that the projected demand does not significantly affect the state's system. In addition, it is anticipated that operation of the proposed project will have the flexibility to adjust water production rates to reduce energy consumption during peak hours. This is due to the fact that peak hour energy costs are substantially higher than off-peak costs, and therefore, there is an economic incentive for the project applicant to reduce power consumption during peak hours.

The desalination plant would have the ability to shut-down one or more RO trains to reduce power demand during peak demand periods and power emergencies. The reduced plant output would be replaced with water delivered from existing storage reservoirs or with imported water supplies from the SDCWA. Existing storage capacity in close proximity of the desalination facility can hold over 200 million gallons, or four days output from the desalination plant. All of the water utilities receiving water from the desalination plant would continue to maintain a back up supply through their existing connections to the SDCWA. Whenever possible, the desalination plant would operate with the standby RO train in service during the off-peak hours to replenish the water drawn from storage.

It should also be noted that local production of water will result in a net reduction in energy demand that is currently associated with imported water supplies. As further discussed in *Section 9.0, Growth-inducing Impacts*, water produced from the desalination plant would provide a local supply component to the overall regional water supply portfolio that would reduce future need for imported water. The energy use associated with seawater desalination is one-third more than the energy used to pump water from Northern to Southern California. (DWR, 2003b). Water delivered from the California State Water Project currently requires approximately 3.200 MWh of electricity per acre foot of water, versus 4.655 (on average) to 5.123 (at maximum load) MWh of electricity per acre foot of water for the production of desalinated water from the proposed project. The net increase in energy consumption would be approximately one-third of

the reported maximum of 36.~~55~~ 05 MWh, which would be less than 14 MWh, or 0.03 percent of current statewide peak demand.

It is not anticipated that the increase in energy demand and consumption would require expansion of or improvements to existing facilities within the ISO controlled electricity grid that could result in significant environmental effects. Therefore, impacts to energy resources and facilities are considered to be less than significant.

Local Facilities and Improvements Plan/Local Facilities Management Plans

The Local Facilities and Improvements Plan/Local Facilities Management Plans (LFMP) were adopted to ensure that growth occurred in concert with public facilities and service systems. The City's fire, schools, libraries and parks and recreation performance standards were developed assuming population growth occurs through the construction of additional dwelling units. The desalination facility will not result in the provision of additional residential units or substantial employment opportunities that could be directly tied to additional growth. Therefore, the project would not conflict with these policy documents' standards or thresholds for city administrative facilities, fire, schools, libraries and park and recreation facilities. Additionally, while the school performance standard is population based, the project will still pay school fees charged according to the square footage of the desalination plant.

Thresholds regarding sewer, wastewater treatment, drainage and water conveyance would be applicable to this project as it would require the use of these services and public facilities. Each of these performance standards state that adequate capacity in local public facilities must be demonstrated and/or provided concurrent with development. The project's impacts on the capacity (and/or planned capacity) of the sewer and wastewater treatment services are discussed above in each relevant subsection. With regards to drainage and water conveyance facilities, the LFMP for Zone 3 (the facilities zone in which the desalination plant is proposed) states that existing Zone-wide facilities are adequate and requires as mitigation the developer to construct necessary drainage improvements and pay appropriate water district fees. No significant impacts relative to service capacity have been identified, and impacts would be less than significant.

Furthermore, the LFMP performance standards for open space and circulation are also applicable to the project. As stated in the Zone 3 LFMP, the open space threshold for Zone 3 has already been met. Regarding circulation, the relevant threshold requires a project's traffic impacts to not cause any road segment or intersection to exceed service level C during off-peak hours and service level D during peak hours. Project traffic impacts are short-term and will occur primarily during construction of the plant and off-site pipelines rather than plant operation. These impacts are reduced to a level of insignificance by mitigation measures that require the applicant

throughout construction to comply with traffic control plans and demonstrate required levels of service will be maintained. Project traffic impacts and mitigation are discussed fully in *Chapter 4.10, Transportation and Traffic.*

4.11.4 Mitigation Measures

4.11-1 The combined waste discharge from the desalination facility to the EWPCF shall not exceed an instantaneous maximum of 300 gpm and a daily maximum of 200,000 gpd. The combined total suspended solids discharged to the EWPCF shall not exceed 500 pounds per day. Should the project operations cause the monthly average TDS of the effluent at the local water recycling facilities to exceed 1,000 mg/L, or contribute to the monthly average TDS at the local water recycling facilities exceeding 1,000 mg/L, the Applicant shall take steps to reduce the TDS increase or reimburse the operators of local water recycling plants for its proportional share of the cost to reduce the increase in TDS resulting from project operations. In addition, the applicant shall provide the City a minimum 2 years worth of data that establishes a baseline water quality and TDS levels of the effluent at the local water recycling facilities prior to commencement of project operations. Upon commencement of operations, the applicant shall establish a monitoring program which regularly reports the TDS contribution of the desalination plant. The City shall determine monitoring program parameters, including the frequency of monitoring and duration of the program.

4.11.5 Level of Significance After Mitigation/Residual Impact

No significant impacts to public utilities and services would remain after implementation of the identified mitigation measure.