# 5.3 HYDROLOGY, DRAINAGE AND STORM WATER RUNOFF

*Information in this section was compiled from a site survey conducted by RBF Consulting on June 22, 2001; the Water Quality Control Plan for the Santa Ana River Basin (8) and amendments (1995) by the Santa Ana Regional Water Quality Control Board; the Federal Emergency Management Agency Flood Insurance Rate Map (revised February 18, 2004); the County of Orange General Plan (July 2, 2003); City of Irvine General Plan (1999); the United States Geological Survey (USGS) National Map Viewer (http://nmviewogc.cr.usgs.gov/viewer.htm); and the Drainage Area Management Plan (2003) prepared by the County of Orange, Cities of Orange County, and the Orange County Flood Control District.*

## *EXISTING CONDITIONS*

### REGIONAL DRAINAGE CONDITIONS

The proposed project site is situated within the Santa Ana River Basin, which has a total drainage area of approximately 1,700 square miles. In general terms, the Santa Ana River Basin is a group of connected inland basins and open coastal basins drained by surface streams flowing generally southwestward to the Pacific Ocean.[1] The Santa Ana River empties into the Pacific Ocean approximately 1.5 miles downcoast (southeast) of the subject site. The flow of the Santa Ana River is intermittent and only substantial during storms. Long-term annual precipitation near the coast averages about 18.1 inches, of which 90% occurs between November and April. The Pacific Ocean lies approximately 2,000 feet south of the project site. The coast near the proposed project site is fronted by a broad, sandy beach and is backed by lowlands. The sea floor directly offshore is relatively smooth, with isobaths following the coastline. Offshore sediments range from fine to medium sand near-shore to sandy silt at a distance of about one mile from shore. The beach sands are normally transported southeastward by littoral currents, which are generated by incoming waves and modified by seafloor topography.

### PROPOSED DESALINATION FACILITY SITE

#### On-Site Drainage

The proposed desalination facility and associated product water storage tank are completely surrounded by containment berms of approximately 10 to 15 feet in height as a precaution against accidental fuel oil spillage. These berms prevent on-site stormwater from leaving project site boundaries. Stormwater collects within the storage tank area and either evaporates or percolates into the ground. In times of heavy rainfall, stormwater is either released through the manual valve of a drain line or is first tested for pollutants, and, if found to satisfactorily meet regulatory criteria, is pumped into the adjacent Huntington Beach Channel operated by the Orange County Flood Control District (OCFCD), ultimately emptying into the Pacific Ocean.[2]

#### Surrounding Drainage Conditions

The general topography of the project site vicinity slopes gently to the southwest, towards the Pacific Ocean. Runoff upstream and downstream of the subject site generally follows this slope,

[1] Water Control Management Plan, Santa Ana River Basin (8), Santa Ana Regional Water Quality Control Board, 1995.

[2] Han Tan, AES Huntington Beach, June 22, 2001.

emptying into one of the three primary drainage facilities in the region, which consist of the Huntington Beach Channel, the Talbert Channel, and the Santa Ana River. All three drainage facilities are owned and operated by the OCFCD. All surface runoff within the vicinity of the project site eventually flows into the Pacific Ocean. A segment of the Huntington Beach Channel has recently been improved by the OCFCD to effectively double flow capacity (the Channel previously lacked 100-year flood protection capabilities). Metal sheet pile walls were placed on either side to expand the Channel's basewidth from approximately 30 to 85 feet. The project site obtained 100-year regional flood protection upon completion of these channel improvements.[3]

An approximately 131-acre wetland area is located southeast of the proposed project site, along a 1.5 mile stretch of Pacific Coast Highway. The wetlands are divided into two major components. To the southeast, the 17-acre Talbert Marsh opens to the ocean through a 100-foot wide entrance adjacent to the mouth of the Santa Ana River, approximately 1.3 miles downcoast (southeast) of the subject site. The Talbert Marsh is a recovering wetland area reintroduced to tidal influence in 1989. The second component of the wetland area is separated from the Talbert Marsh by Brookhurst Street, and includes 89 privately-owned acres directly southeast of the project site. This wetland area does not have tidal access, and water sources are limited to rainfall, urban runoff, and groundwater seepage. Due to extremely high salinities in the soils and seasonal ponds and poor quality of the brackish water marsh, restoration of the wetland area is proposed to occur in the planning stage.

### Water Quality (Groundwater)

The lower part of the Holocene age sediments beneath the proposed project site consists of layered lenses of coarse sand and gravel known as the Talbert aquifer. A relatively impermeable cap of interbedded silts and clay up to about 15 feet thick overlies the Talbert aquifer. Given the proximity of the site to the Pacific Ocean, and its interconnection with the nearby Huntington Beach Channel, depth to groundwater within the site vicinity is between five to seven feet. The actual elevation of the groundwater table fluctuates with the ocean tides and water level in the adjacent neighboring flood control channel. Due to this interconnection, groundwater quality is considered brackish.

### Water Quality (Surface Water)

As mentioned above, stormwater at the site is allowed to either evaporate, percolate into the ground, drained via a manual valve, or is pumped in to the OCFCD flood channel adjacent to the project site. No beneficial uses for surface water exist on site. Existing site runoff for the project vicinity contains moderate amounts of pollutants typical of urban areas, including oil and grease from automobiles, as well as incidental fertilizer and pesticides from routine maintenance of existing vegetation.

## OFF-SITE PIPELINE ALIGNMENT AND UNDERGROUND PUMP STATIONS

### Proposed Pipeline Alignment

The proposed off-site product water delivery pipelines would be between approximately 30,000 and 40,000 linear feet, adjacent to a wide variety of land uses. The proposed pipelines would be located primarily within existing roads or easements that are generally flat and would be located entirely underground. The areas are generally drained by curb/gutter storm drain systems (for portions of the alignment within streets), on-site stormwater drainage systems (for portions within easements and other areas) and infiltration.

[3] Telephone conversation with Albric Ghokasian, Orange County Flood Control District, November 23, 2004.

### OC-44 Booster Pump Station

The proposed OC-44 pump station site is located in an area where two existing pump stations occur. The existing site is unpaved and slopes gently to the northeast (although in general, the area slopes to the north). The site is situated at an approximate elevation of 250 feet above mean sea level and is located approximately 0.5-mile north of the San Joaquin Reservoir . No storm drain system exists on-site, and the site is drained via surface flow to the northeast.

### Coastal Junction Booster Pump Station

The Coastal Junction pump station site is proposed for location in a church parking lot within the City of Irvine. The site exists as a flat, paved area, at an approximate elevation of 50 feet above mean sea level. The site vicinity generally slopes gently to the west. The site vicinity can be characterized as developed/urbanized. The San Diego Creek, a major drainage facility for the region, is situated adjacent to the church parking lot to the north. The existing site is served by an on-site storm water drainage system.

## *LAWS, ORDINANCES, REGULATIONS AND STANDARDS*

The proposed project must satisfy the requirements of several federal and state regulatory agencies, most notably, the following:

- The Orange County Third Term NPDES Municipal Storm Water Permit (administered by the Santa Ana Regional Water Quality Control Board [SARWQCB]);
- California's Nonpoint Source (NPS) Pollution Control Program (administered by the State Water Resources Control Board [SWRCB]); and
- The National Pollutant Discharge Elimination System (NPDES) General Permit for Storm Water Discharges Associated with Construction Activity (administered by the SWRCB, and discussed further in Section 5.9, *CONSTRUCTION RELATED IMPACTS*).

### FEDERAL PROGRAMS

The Environmental Protection Agency (EPA) is the primary federal agency responsible for management of water quality in the United States. The Clean Water Act (CWA) is the federal law that governs water quality control activities initiated by the EPA and others. Section 303 of the CWA requires the adoption of water quality standards for all surface water in the United States. Under Section 303(d), states are required to develop lists of water bodies that do not meet water quality objectives after required levels of treatment by point source dischargers. Total Maximum Daily Loads (TMDLs) for all pollutants for which these water bodies are listed must be developed in order to bring them into compliance with water quality objectives.

In 1972, provisions of the CWA, were amended so that discharge of pollutants to waters of the United States from any point source is effectively prohibited, unless the discharge is in compliance with a NPDES permit. The 1987 amendments to the CWA added Section 402(p), which established a framework for regulating municipal, industrial, and construction stormwater discharges under the NPDES program. On November 16, 1990, USEPA published final regulations that established application requirements for stormwater permits for municipal separate storm sewer systems ($MS_4$s) serving a population of over 100,000 (Phase 1 communities) and certain industrial facilities, including construction sites greater than five acres. On December 8, 1999, USEPA published the final regulations for communities under 100,000 (Phase II $MS_4$s) and operators of construction sites between one and five acres.

## STATE PROGRAMS

The State Porter-Cologne Act (Water Code 13000, et seq.) is the principal legislation for controlling stormwater pollutants in California. The act requires development of Basin Plans for drainage basins within California. Each plan serves as a blueprint for protecting water quality within the various watersheds. These basin plans are used in turn to identify more specific controls for discharges (e.g., wastewater treatment plant effluent, urban runoff, and agriculture drainage). Under Porter-Cologne, specific controls are implemented through permits called Waste Discharge Requirements issued by the nine Regional Water Quality Control Boards. For discharges to surface waters, the Waste Discharge Requirements also serve as NPDES permits.

NPS pollution, also known as polluted runoff, is the leading cause of water quality impairments in California. Section 319 of the CWA requires that each state prepare and submit a report that "identifies those navigable waters within the State which, without additional action to control nonpoint sources of pollution, cannot reasonably be expected to attain or maintain applicable water quality standards."

In order to comply with this directive, the California State Water Resources Control Board (SWRCB) adopted California's NPS Control Program (NPS Program) in 1988. The NPS Program was updated in January of 2000 to the Plan for California's Nonpoint Source Pollution Control Program (Program Plan). The chief way in which the Plan fulfills the requirement of CWA Section 319 is through the implementation of management measures (MMs). MMs serve as general goals for the control and prevention of nonpoint source pollution.

The project site is included within the Water Quality Control Plan for the Santa Ana River Basin (also known as the Santa Ana River Basin Plan). This Basin Plan identifies specific controls for discharges as well as implementation standards to achieve such controls. The proposed project would be subject to all applicable rules and regulations contained within the Water Quality Control Plan for the Santa Ana River Basin.

## LOCAL PROGRAMS

Since 1990, the City of Huntington Beach has cooperated with other Orange County cities (the "permittees") in complying with the NPDES permits issued by the SARWQCB. The result of this cooperation has been the development of numerous common stormwater programs that have been integrated in the area-wide Drainage Area Management Plan (DAMP).

As a result of the NPDES permits issued in early 2002 (Third Term Permits), the DAMP underwent significant changes and restructuring as part of the formation of the 2003 DAMP. The 2003 DAMP contains model program guidance that was developed through a collaborative effort among all permittees, as well as interested agencies, organizations, and the public. The 2003 DAMP requires that each permittee, including the City, prepare a Local Implementation Plan (LIP) as an Appendix to the 2003 DAMP. The City's LIP describes the activities that the City has previously undertaken and is currently undertaking to meet the requirements of the Third Term Permits and to make meaningful improvements in urban water quality. The LIP is intended to serve as the basis for City compliance during the five-year period of the Third Term Permit.

The 2003 DAMP requires the implementation of site design, source control and treatment control BMPs. The enforcement mechanism for the DAMP are the Waste Discharge Requirements for Discharges of Urban Runoff from the Municipal Separate Storm Sewer Systems (MS4) Draining the Watersheds of Orange County, the Incorporated Cities of Orange County, and the Orange County Flood Control District within the Santa Ana Region. The permit is also generally known as the SARWQCB Municipal NPDES Permit No. CAS618030.

# *IMPACTS*

### *Significance Criteria*

Under the CEQA Guidelines a project may be considered to have a significant environmental effect if it will:

- Violate any water quality standards or waste discharge requirements.
- Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted).
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner, which would result in substantial erosion or siltation on- or off-site.
- Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner, which would result in flooding on- or off-site.
- Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff.
- Otherwise substantially degrade water quality.
- Place within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.
- Place within a 100-year flood hazard area structures, which would impede or redirect flood flows.
- Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as a result of the failure of a levee or dam.
- Inundation by seiche, tsunami, or mudflow.

Impacts in regards to long-term hydrology, drainage, and storm water quality are discussed below. As the proposed off-site pipeline alignment and underground pump station would be subsurface, there are no anticipated long-term impacts in regards to hydrology, drainage, and/or water quality. A discussion of short-term construction-related impacts in regards to hydrology and water quality is included in Section 5.9, *CONSTRUCTION RELATED IMPACTS.*

### LONG-TERM WATER QUALITY IMPACTS

#### Proposed Desalination Facility Site

Fertilizers and Pesticides

It is anticipated that the proposed desalination project would incorporate both native and non-native landscaping on-site. Non-native vegetation may require periodic fertilization and pest control. The use of fertilizers and pesticides would comply with City standards as well as the guidelines set forth in the Orange County Management Guidelines for such activities. Based on the size of the landscaped areas, the small amounts of fertilizers and pesticides needed, and the fact that the site landscape would be maintained per local and County standards, it is unlikely that use of these chemicals would be of environmental concern to the groundwater, adjacent ocean waters, or

surrounding uses. Therefore, this is not considered a significant impact. However, a Water Quality Management Plan (WQMP) would be prepared for the proposed project, which would identify applicable Best Management Practices (BMPs) and control measures as identified within the Countywide National Pollution Discharge Elimination System (NPDES) Drainage Area Management Plan (DAMP).

Flooding

The proposed project is currently designated with a Federal Emergency Management Agency (FEMA) flood zone designation of "X." However, the City's Local Coastal Program designates the project site as being situated within an area prone to "Flooding with Wave Action". In addition, the open space/wetland area to the southeast of the subject site routinely stores runoff, resulting in high water levels during storm events, which could potentially impact the site. Appropriate hydrology and hydraulic analysis would be performed to determine if the site has adequate drainage.

Storm Water Drainage

The proposed grading activities and development of the proposed project site are anticipated to increase the amount of impervious area, thereby increasing surface runoff. In addition, existing containment berms (which contain storm water on-site) along the western and southern boundaries of the subject site would be removed (berms to the north of the subject site and along the eastern border of the site would remain in place). An on-site local storm water drainage system would be implemented as part of the desalination facility site and product water storage tank. The desalination site would be divided into two areas (north and south), with catch basins and a storm water pump station located in each area. Storm water flows would first be directed to catch basins by gravity, and would then be directed to a storm water pump via gravity lines. The water would then be pumped to the 48-inch by-product concentrated seawater discharge line that ultimately connects to the AES Huntington Beach Generating Station (HBGS) outfall line. Aboveground product water tank implementation would include an on-site storm water system, which would direct storm water to the desalination facility's storm water system. In addition, containment berms surrounding the western and northern side of the West tank site would be left in place, further containing storm water on-site. As alternative options, the desalination facility's on-site storm water system could discharge storm water to the HBGS on-site storm water system or the City of Huntington Beach local storm water system, both of which ultimately convey storm water to the Pacific Ocean via the HBGS outfall. No storm water would be discharged into the adjacent Huntington Beach Channel. A Water Quality Management Plan (WQMP) would be completed for the proposed project as required by the Regional Water Quality Control Board (RWQCB).

If necessary, storm water would be treated prior to off-site discharge in order to minimize impacts from urban pollutants. One of two sedimentation methods would be utilized for treatment, including:

- **Waste Filter Backwash Clarifiers:** The proposed desalination project facility would utilize clarifiers for the purpose of settling the waste stream generated during the backwash of the pretreatment filters. During rainy events, storm water would be combined with the waste filter backwash water and settled in the filter backwash clarifiers. This clarified water would then be combined with the desalination facility's concentrated seawater discharge and sent to the Pacific Ocean via the HBGS outfall. The waste filter backwash clarifiers would be oversized to accommodate the treatment of storm water.
- **Sedimentation in Separate Clarifiers:** As an alternative to combining on-site storm water with the waste filter backwash, storm water directed to on-site storm drains could be treated in separate sedimentation clarifiers for storm water treatment only.

Subsequent to clarification, this water would be discharged via the HBGS outfall with the desalination facility's concentrated seawater discharge and HBGS cooling water.

The most viable storm water treatment alternative would be selected during the design phase of the project, in close coordination with the City of Huntington Beach, RWQCB, and HBGS staff. The storm water facilities would be designed to comply with all applicable requirements of the City of Huntington Beach and the RWQCB.

In addition, stormwater runoff would not affect adjacent sensitive land uses. Although the project site is situated directly adjacent to a wetland area (southeast of the site), the subject site would be graded so that all on-site stormwater would flow away from the wetland area towards an on-site local stormwater drainage system. The on-site local stormwater drainage system that would be implemented as part of the proposed project would not have surface runoff discharge onto Pacific Coast Highway. The existing containment berms along the western and southern boundaries of the subject site would remain, providing additional containment of any stormwater to the project site. The proposed project would also incorporate applicable Best Management Practices (BMPs) in order to contain stormwater runoff, which may contain urban pollutants such as petroleum by-products, trash/grease, pathogens, and pollutants that may occur in association with proposed desalination project operation. The project would be in compliance with all standards as administered by the State Water Resources Control Board and County of Orange.

Water Quality Impacts to Nearby Coastal Wetlands from On-Site Spillage

The existing containment berm along the eastern border of the subject site (to be left in place) would prevent direct spillage of product or by-product water onto the portion of wetlands situated to the east. In the event of an accidental spill associated with proposed project operation of either product or by-product water, no significant effects would occur on the adjacent wetland/open space area or the Huntington Beach Channel because water would not pass the physical separation. Soils of wetlands are already flooded by freshwater during the rainy season, forming standing pools. Product water spills would do the same. Soils are already hypersaline, so spills of by-product water would contribute little to the salinity of soils. Spills into the local Huntington Beach Channel are also likely to have minimal impact. The channel already has multiple year-round fresh water inputs, so product water spills would have no impact. By-product water spills would be diluted by these fresh water inputs. However, if the channel is mostly oceanic at the time of a spill, salinities may be overly elevated. Species likely to be found in the channel, such as topsmelt, can tolerate wide variations in salinity. In addition, the desalination facility would incorporate appropriate leak/spill containment measures to minimize the likelihood for hazardous materials being stored, used, and transported on-site from impacting adjacent uses (refer to Section 5.8, *HAZARDS AND HAZARDOUS MATERIALS*, for a detailed discussion). Impacts in this regard are anticipated to be less than significant.

It should be noted that the Huntington Beach Wetlands Conservancy has proposed a Restoration Plan for several wetland areas both adjacent to and downstream of the proposed subject site. As stated above, significant impacts to these wetlands are not anticipated to occur as a result of an accidental spill of product or by-product water from the proposed desalination project.

## ***MITIGATION MEASURES***

### LONG-TERM WATER QUALITY IMPACTS

HWQ-1 Prior to issuance of a precise grading permit, the applicant shall submit and obtain approval from the City of Huntington Beach of a Water Quality Management Plan (WQMP) specifically identifying Best Management Practices (BMPs) that would be used on-site to

control predictable pollutant runoff. This WQMP shall identify, at a minimum, the routine, structural and non-structural measures specified in the Countywide NPDES Drainage Area Management Plan (DAMP) Appendix which details implementation of the BMPs whenever they are applicable to a project, the assignment of long-term maintenance responsibilities to the applicant, and shall reference the location(s) of structural BMPs. The applicable BMPs include:

- Facility materials that require fertilization and pest control shall be maintained in accordance with Orange County Management Guidelines for Use of Fertilizers and Pesticides.

- BMP structures and facilities shall be cleaned and maintained on a scheduled basis by a Facility Operator appointed person.

HWQ-2 Appropriate site specific hydrology and hydraulic analysis would be performed for the project prior to the issuance of grading or building permits, which ever comes first. The analysis shall include mitigation measures, if necessary, in regards to storm water drainage and flooding.

HWQ-3 Prior to the issuance of building permits (not including demolition permits) an appropriate on-site drainage system shall be installed for the project that integrates permanent stormwater quality features.

## ***UNAVOIDABLE SIGNIFICANT IMPACTS***

None have been identified.