4.7 HYDROLOGY AND WATER QUALITY

The purpose of this section is to describe stormwater drainage impacts associated with construction and operation of the proposed Beach-Edinger Corridors Specific Plan (Specific Plan), including effects on surface water and groundwater quantity and quality; flooding and storm drain system capacity; and groundwater recharge. For purposes of this discussion, stormwater is rainwater that is captured into the storm drain system and eventually conveyed to the Pacific Ocean or infiltrates to groundwater. Impacts to the sanitary sewer system, which is the system that collects sewage and conveys it directly to the water reclamation/treatment plants, are addressed in Section 4.14 (Utilities and Service Systems) of this document. In addition, groundwater supplies are also addressed in Section 4.14.

The primary sources of information used in the analysis presented in this section include information from *City of Huntington Beach Water Supply Assessment for the Proposed Beach-Edinger Corridors Specific Plan* (WSA) (PBSJ 2009); the City of Huntington Beach GIS data; the *Water Quality Control Plan, Santa Ana River Basin* (Basin Plan) (SARWQCB 2008a); *City of Huntington Beach Citywide Urban Runoff Management Plan* (CURMP) (HB 2005a); *City of Huntington Beach Urban Water Management Plan* (UWMP) (HB 2005b); *Orange County Water District Groundwater Management Plan* (GMP) (OCWD 2004); the *Orange County Drainage Area Management Plan* (DAMP) (OCFCD 2003); and other references as noted. Full bibliographic entries for all reference materials are provided in Section 4.7.5 (References) at the end of this section.

All comments received in response to the Initial Study/Notice of Preparation (IS/NOP) circulated for the proposed project were taken into consideration during preparation of this Environmental Impact Report, and if relevant, have been addressed in this section or others within this document.

4.7.1 Environmental Setting

The Specific Plan area (project site) extends along Beach Boulevard, from the Coastal Zone boundary in the south to Edinger Avenue in the north, and along Edinger Avenue, from Beach Boulevard westward to Goldenwest Street. The total acreage of the project site is approximately 459 acres.

Beach Boulevard runs due north/south roughly through the center of the City, and Edinger Avenue runs due east/west along the northern boundary of the City. The portion of Edinger Avenue within the project site runs along the southern edge of Golden West College and the Bella Terra shopping mall and intersects with Beach Boulevard immediately south of the Interstate 405 (I-405) interchange. The Coastal Zone boundary abuts the southern edge of the project site, but the project site is not within the Coastal Zone. Figure 3-1 (Project Vicinity and Regional Location Map) illustrates the project site's regional location and vicinity.

Currently, the primary land use within the project site is commercial (including a variety of retail and office uses). Some residential uses are located along portions of Beach Boulevard, south of Adams Avenue, and scattered vacant lands are also present. Commercial uses account for approximately 5,741,598 square feet (sf) of existing development. In addition, there are 303 hotel rooms (approximately

139,369 sf) and 264 hospital beds (381,207 sf) within the project site. The overall square footage approximation does not include estimated square footage of the 493 existing residential units.

Topography at the project site is relatively flat and ranges from about 5 feet above mean sea level (msl) in the southern portion up to about 60 feet above msl in the central portion. In the northern portion of the project site, the elevation is about 25 to 45 feet above msl and about 15 to 25 feet above msl along Edinger Avenue, from east to west (USGS 1981, 1998).

Annual precipitation in the area is about 11.13 inches (Newport Beach) to 12.61 inches (Laguna Beach), with about 91 percent occurring from November through April (WRCC 2009a, 2009b). The lowest monthly average precipitation occurs during July and is about 0.01 to 0.02 inch (WRCC 2009a, 2009b). The monthly average maximum temperature is about 73.5 to 78.1 degrees Fahrenheit and occurs during August (WRCC 2009a, 2009b). The monthly average minimum temperature is about 43 to 46.8 degrees Fahrenheit and occurs during January (WRCC 2009a, 2009b).

Regional Hydrology and Drainage

The City of Huntington Beach (City) is located within the Santa Ana River Basin (SARB), a 2,800-square-mile area located roughly between Los Angeles and San Diego. The SARB is a group of connected inland basins and open coastal basins drained by surface streams flowing generally southwestward to the Pacific Ocean. The SARB can be divided into an upper basin and a lower basin. The project site is located within the lower basin drainage and surface flows are dominated by the flood control dam at El Prado. The Santa Ana River canyon, which separates Chino Hills from the Santa Ana Mountains, is the major drainage of Orange County. The lower Santa Ana River has been channelized and modified so that in most years flow does not reach the Pacific Ocean, but is used to recharge groundwater instead.

There are three major watersheds encompassing the City of Huntington Beach: Talbert/Greenville Banning Channel Watershed, Westminster Watershed, and the Lower Santa Ana River Watershed. For water quality planning purposes, drainage areas within the City have been consolidated into eight planning areas. Three of the water quality planning areas for the Specific Plan are discussed below.

The Orange County Flood Control District (OCFCD) is responsible for the design, construction, operation, and maintenance of regional flood control facilities. The County flood channels are maintained annually, and maintenance includes debris and vegetation removal. The existing storm drainage channels were originally designed to accommodate 25-year flood events[6] or less, which was the standard at the time. However, when the channels were constructed, they were generally built to accommodate only 65 percent of the 25-year flood event. The channels were built with restrictive channel bottoms, which reduce the amount of water the channel can carry and slows the flow rate of runoff water. The County now uses 100-year flood event standards for new storm drain construction and drainage improvements, and portions of the existing channels have been improved to accommodate up to a 100-year flood event.

[6] The 25-year flood event has a 4 percent chance of occurring in any given year. The 100-year flood event has a 1 percent chance of occurring in any given year.

Local Hydrology and Drainage

The City owns, operates, and maintains local storm drainage systems to convey storm runoff and reduce or eliminate flooding under peak storm flow conditions. Several major channels owned and maintained by OCFCD are within the City and receive runoff from areas within the City, as well as from substantial drainage areas in other upstream jurisdictions.

Drainage from within the City is conveyed through streets and gutters to City storm drain systems consisting of underground pipes, pump stations, and open channels, which ultimately route runoff into OCFCD facilities. The City owns and operates fifteen storm drainage channel pump stations that are generally located near principal Orange County drainage channels. Runoff is collected through the City's drainage facilities at each pump station, and then transferred to the nearest OCFCD channel, which ultimately conveys water to the Pacific Ocean. The City's channels, originally designed to accommodate up to 65 percent of the 25-year flood events, were typically constructed at ground level (or at-grade); however, the at-grade channels accelerate flooding potential because the amount of water that may be pumped into an at-grade channel is less than what can be pumped into a below-grade channel.

The Drainage Element of the *Citywide Urban Runoff Management Plan* (HB 2005a) incorporates a city-based Master Plan of Drainage (MPD), which is a comprehensive drainage study that identifies and creates an inventory of existing storm drain facilities; identifies those areas where system elements do not meet the latest goals established by the City; ranks the severity of the difference between existing capacity and the capacity needed to achieve those goals; prepares planning-level cost opinions for system upgrades; and recommends system improvements to initiate corrections as funding becomes available. The City then initiates individual drainage projects within its budgetary, political, and discretionary constraints. Hydrologic and hydraulic modeling has determined that several areas within the City's drainage system are undersized for the current storm flows and conveyance standards and are subject to potential flooding (HB 2005a).

The project site is located within the Westminster and Talbert/Greenville Banning Channel Watersheds of the SARB. The Westminster Watershed covers 74.1 square miles in the southwestern corner of Orange County, while the Talbert/Greenville Banning Channel Watershed covers 21.4 square miles and straddles the mouth of the Santa Ana River. Three main tributaries drain the Westminster Watershed: (1) the Los Alamitos Channel, (2) the Bolsa Chica Channel, and (3) the East Garden Grove–Wintersburg Channel, which drains past the Bolsa Chica Wetlands into Outer Bolsa Bay, Huntington Harbour, Anaheim Bay, and finally into the Pacific Ocean. The Talbert/Greenville Banning Watershed straddles the mouth of the Santa Ana River and has two main tributaries that drain into it. On the western side, the Talbert and Huntington Beach Channels drain through the Talbert Marsh before emptying into the Pacific Ocean. On the eastern side, the Greenville Banning Channel empties into the Santa Ana River. The northern half (approximately) of the project site lies within the East Garden Grove–Wintersburg Channel drainage area of the Westminster Watershed, and the southern half (approximately) is within the Huntington Beach Channel drainage area of the Talbert/Greenville Banning Channel Watershed. The project site is located within the Talbert Channel, Slater Channel, and Wintersburg Channel Planning Areas and their respective hydrology and drainage is discussed below.

Water Quality Planning Areas

The Talbert Channel Planning Area discharges into the Talbert Marsh, a wetland roughly paralleling the inland side of Pacific Coast Highway. The Talbert Marsh receives surface flows from the Huntington Beach Channel and the Talbert Channel. Flow from the adjacent City of Fountain Valley contributes to the Talbert Channel through the Fountain Valley Channel, which is a tributary to the Talbert Channel. This watershed drains an approximately 7.3-mile area and contains eight stormwater pump stations (seven City-operated and one Orange County-operated) that collects runoff and conveys it into the two channels.

The Slater Channel Planning Area has a drainage area of about 3.9 miles and lies wholly within the City; it does not receive flow from other jurisdictions. A large portion of surface runoff within this planning area flows through Talbert and Huntington Lakes or to Sully-Miller Lake, all of which are within Huntington Central Park. Huntington Lake and Sully-Miller Lake typically hold water throughout the year, while Talbert Lake generally does not. The Huntington Central Park lake system is an integral part of the City's drainage infrastructure and acts to retain stormwater runoff. The lakes are also significant from a water quality standpoint because Talbert and Huntington Lakes act as terminal lakes (no surface water exit) under small to moderate storm events, and Sully-Miller Lake has no discharge except through groundwater recharge. During moderate to large storm events, stormwater discharges from Huntington Lake and Talbert Lake into the Slater Channel. At the Slater pump station, the discharges are then pumped from the Slater Channel into the East Garden Grove–Wintersburg Channel.

The Wintersburg Channel Planning Area has a drainage area of approximately 5.3 miles and receives upstream flow from the East Garden Grove West Channel, Ocean View Channel, and Slater Channel. The East Garden Grove–Wintersburg Channel is formed at the confluence of the East Garden Grove West Channel and Ocean View Channel. Further downstream, the Slater Channel enters into East Garden Grove–Wintersburg Channel. The East Garden Grove–Wintersburg Channel drains past the Bolsa Chica wetlands into Outer Bolsa Bay and then into Huntington Harbour, Anaheim Bay, and the Pacific Ocean. Surface waters in the Outer Bolsa Bay, Huntington Harbour, and Anaheim Bay are all under tidal influence.

Because a number of the County flood control channels (e.g., Talbert, Westminster, Ocean View, East Garden Grove, Wintersburg, Sunset, Huntington Beach, Fountain Valley, Santa Ana and Bolsa Chica) that accept runoff from the City also drain a number of other cities in northern Orange County, there is substantially more flow in these channels than just that which originates within Huntington Beach. Using a combination of dry weather monitoring data collected from several channel sites during the development of the CURMP Water Quality Element (HB 2005a), previous analysis by the City of dry weather pump station operating data, and data compiled from other similar jurisdictions, an average dry weather flow factor of approximately 150 gallons per day (gpd) per acre was established for planning purposes (HB 2005a). Based on analysis of dry weather flow monitoring, and comparing tributary areas within and outside of the City, it is estimated that the runoff from Huntington Beach represents about 35 to 40 percent of all dry and wet weather flow discharged to the receiving waters through these watersheds (excluding the Santa Ana River) (HB 2005a).

Project Site Drainage Patterns, Conveyance, and Flooding

On-site drainage is conveyed through City streets, underground storm drains, and local channels to County flood control channels. Soils within the project site are primarily hydrologic groups[7] C and D, indicating high to moderately high runoff potential. Along Edinger Avenue and along Beach Boulevard, from Edinger Avenue to about Heil Avenue, soils are Hydrologic Group C, and from Heil Avenue to about Indianapolis Avenue, soils are Hydrologic Group D. From Indianapolis Avenue to Atlanta Avenue soils are Hydrologic Group C and from Atlanta Avenue southward soils are Hydrologic Group D. (MPD 2005 Figure 4-4)

The MPD modeled General Plan buildout runoff and identified storm drain system capacities/constraints. Table 4.7-1 (Existing Project Site Drainage Characteristics and Capacity Constraints) describes the project site's drainage characteristics and patterns, conveyance system capacity constraints, and flood hazards. The project site is located within 12 MPD watersheds that drain both east and west to several different County channels. Stormwater runoff from the project site is conveyed through local streets and storm drain systems to larger channels. County channels receiving project site runoff include the East Garden Grove West Channel, Oceanview Channel, East Garden Grove–Wintersburg Channel, and the Huntington Beach Channel. Major City channels and storm drain systems receiving stormwater runoff from the project site include the Murdy Channel, C6-SCI Channel, Edwards Street storm drain, Delaware Street storm drain, Adams Avenue storm drain, Newland Street storm drain, and Coldwater Lane storm drain. As depicted in Figure 4.7-1a through Figure 4.7-1c, the majority of the project site directly or indirectly[8] drains to a storm drain system that was modeled as under-capacity[9] for buildout of the General Plan (red or blue dashed lines).

As mentioned previously, the City's storm drain channels were originally designed to convey 65 percent of the 25-year storm event, which was the standard at the time. The existing City standards require capacity to convey 100 percent of the 100-year storm event. Therefore, it can be expected that channels are under-capacity for current standards within the City, even though they are noted as sufficient in the MPD for build-out of the General Plan.

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[7] Hydrologic Group is used to identify soil runoff potential and is classified as A, B, C, or D, based on soil texture, which affects potential infiltration rates. Hydrologic Group A consists of soil textures with the lowest runoff potential and high infiltration rate when saturated, and Hydrologic Group D consists of soil textures with the highest runoff potential and lowest infiltration rates when saturated.

[8] A direct capacity constraint is used to describe a storm drain system capacity constraint that begins at the origin of project site drainage. Indirect constraint is used to describe a constraint somewhere further down gradient from the project site within the storm drain system to which the project site drains. Constraints are identified as requiring upgrades to the existing storm drain system, or installation of a new underground pipe. Storm drain system capacity constraints refer to the inability to convey the required design flows within the streets or underground pipes in accordance with criteria set forth in the MPD.

[9] Under-capacity refers to a system constraint such that the MPD-required conveyance capacity for buildout of the General Plan is not met. This includes criteria for street flow such that street ponding does not exceed specific depths for the design storm events. For instance, arterial streets must maintain one lane free of ponding during the 10-year storm event. Please refer to the MPD for all conveyance capacity criteria.

Areas of the project site are located within Federal Emergency Management Agency (FEMA)-defined Special Flood Hazard Areas (SFHA).[10] Figure 4.7-2 (Flood Zones) depicts the project site flood hazards. The project site is located within a SFHA along Edinger Avenue, from east of Gothard Street to about Parkside Lane, and along Beach Boulevard, from about Holt Avenue to Heil Avenue. The Project site along Beach Boulevard from about Indianapolis Avenue to the southern boundary is located in a 500-year flood event zone. A recent Letter of Map Revision (LOMR) has removed this area from a SFHA, recategorized this area as a 500-year flood event zone, and reduced the Base Flood Elevation to 10 feet above mean sea level (FEMA 2009). Other portions of the project site (primarily along Edinger Avenue and from Heil Avenue to Newman Avenue along Beach Boulevard) are subject to flooding during a 500-year flood event (0.2 percent change of occurring in any given year).

As shown in the Huntington Beach General Plan, the lower portion of the project site, from Indianapolis Avenue southward, is located within a moderate tsunami run-up area (Figure EH-8). The entire project site is located within the inundation zone for failure of the Prado Dam (OC 2005a).

Surface Water Quality

Stormwater discharges from the urbanized areas in Orange County consist mainly of surface runoff from residential, commercial, and industrial developments. In addition, there are stormwater discharges to the County channels from agricultural land uses in the nonurbanized area of Orange County, including farming and animal operations.

Drainage from the City is discharged directly or indirectly[11] into City lakes, coastal bays, wetlands, estuaries, and the Pacific Ocean. While the primary purpose of the storm drain system is to reduce or eliminate flood hazards, the system carries both dry- and wet-weather urban runoff and the pollutants associated with activities from urban land that are transported by runoff. Therefore, the discussion of water quality will be within the context of urban runoff because the project site is located within an urbanized area. Polluted runoff can have harmful effects on drinking water, recreational water, and wildlife.

Urban runoff pollutants include a wide array of environmental, chemical, and biological compounds from both point and nonpoint sources. In the urban environment, stormwater characteristics depend on site characteristics (e.g., land use, perviousness, pollution prevention, types and amounts of Best Management Practices [BMPs]), rain events duration, amount of rainfall, intensity, and time between events, operations and maintenance practices [e.g., street sweeping], soil type and particle sizes, multiple chemical conditions, the amount of vehicular traffic, atmospheric deposition, and other factors. The United States Environmental Protection Agency (US EPA) estimates that short-term runoff from construction sites, without adequate erosion and runoff control measures, can contribute more sediment to receiving waters than that which is deposited by natural processes over a period of several decades (US EPA 2007).

[10] A Special Flood Hazard Area (SFHA) is FEMA–defined as an area subject to flooding during the 100-year flood event (a one percent chance of occurring in any given year) or delineated Floodway.
[11] Indirect discharges occur by conveyance through City streets, local underground storm drains, City channels, and County channels.

Table 4.7-1 Existing Project Site Drainage Characteristics and Capacity Constraints

TAZ[a]	Area (acres)	Estimated Existing		General Plan		Flood Zone[f]	HBWS[g]	Major Channel[h]	Major Drain/ Subchannel[i]	Drainage Pattern up to Major Drain/Subchannel[j]	Improvements Required for Capacity[k]
		Land Use[b]	Impervious[c] (fraction)	Land Use[d]	Impervious[e] (fraction)						
19	2.04	C	0.90	C	0.9	500-year	7	EGG-W	Edwards SD	Edinger (street) to Edinger SD	None to new SD in Edinger and Improved in Edinger
41 (west)	12.54	98% C; 2% V	0.88	C	0.9	500-year	7	EGG-W	Edwards SD	Edinger (street) to Edinger SD	None to new SD in Edinger and Improved in Edinger
41 (east frontage)	1.78	88 % C; 12% V	0.79	C	0.9	500-year	7	EGG-W	None	Goldenwest (street)	None to improved connector to EGG-W
39 (western frontage)	1.84	86% C; 14% V	0.77	C	0.9	500-year	8	EGG-W	MC	Goldenwest (street) to local (street) to Wishingwell (street) to Sunlight SD	New SD in Wishingwell, improved portion of Sunlight SD
39 (east)	15.37	98% C; 2% V	0.88	C	0.9	500-year	8	EGG-W	MC	Edinger (street) to north/south SD	None
37	8.57	53% C; 47% IG	0.48	C	0.9	500-year northwest; Zone A southeast	8	EGG-W	MC	Gothard (street)	None
21	8.69	C	0.90	C	0.9	500-year	8	EGG-W	MC	Edinger SD to north/south SD	Improved Edinger SD
36	6.13	78% C; 22% IG	0.70	C	0.9	Zone A	8	EGG-W	MC	Gothard (street)	None
22	9.63	28% C; 72% V	0.25	C, RL, IG	0.725	500-year	8	EGG-W	MC	Gothard (street) to Edinger SD to N/S SD	None to new SD in Gothard, improved Edinger SD
23	18.24	C	0.90	C	0.9	Zone A most; 10–20% north 500-year	8	EGG-W	MC	Gothard (street) to Edinger SD to N/S SD	New SD in Gothard, improved Edinger SD
35 (northwest)	6.99	C	0.90	C	0.9	Zone A	8	EGG-W	MC	Edinger SD	None
35 (southeast of western portion)	6.99	C	0.90	C	0.9	Zone A	8	EGG-W	MC	Local (street) to Travelway SD	Improved Travelway SD
35 (northwest of eastern portion)	6.07	C	0.90	C	0.9	Zone A	8	EGG-W	MC	Local (street) to Travelway SD	Improved Travelway SD
35 (southeast of eastern portion)	4.42	C	0.90	C	0.9	Zone A	8	EGG-W	MC	Local (street) to Parkside (street) to Travelway SD	New SD in Parkside, improved Travelway SD
33 (north)	4.08	49% C; 51% V	0.44	C	0.9	Partial (about 50%) Zone A; rest 500-year	8	EGG-W	MC	Local (street) to Parkside (street) to Travelway SD	New SD in Parkside, improved Travelway SD
33 (north central)	1.97	79% C; 21% V	0.71	C	0.9	500-year	8	EGG-W	MC	Local (street) to Travelway SD	Improved Travelway SD
33 (south)	2.20	C	0.90	C	0.9	Zone A	8	EGG-W	MC	Travelway SD; Local (street) to Parkside (street) to Travelway SD	Improved Travelway SD; new SD in Parkside, improved Travelway SD
34	4.85	C	0.90	C	0.9	Zone A	8	EGG-W	EGG	Local (street) to Silver SD to Heil SD	None to improved Silver SD
32 (north ⅔)	10.37	C	0.90	C	0.9	500-year	9	EGG-W	EGG	Beach (street) to Stark SD to Malaga SD	None to new SD in Stark, improved Malaga SD
32 (south ⅓)	5.01	C	0.90	C	0.9	Zone A	9	EGG-W	EGG	Local	Improved Local SD
85	4.90	C	0.90	C	0.9	Zone A	8	EGG-W	EGG	Local	Improved Local SD
87	6.66	C	0.90	C	0.9	Zone A	8	EGG-W	OV	Viewpoint (street) to Local SD	None to new SD in Viewpoint, improved Local SD connector
88	3.13	C	0.90	C	0.9	Zone A	10	EGG-W	OV	Local	None to improved connector
89 (northeast)	2.78	C	0.90	C	0.9	500-year	10	EGG-W	OV	Beach (street); direct	Improved connector
89 (southwest)	2.42	C	0.90	C	0.9	500-year	10	EGG-W	OV	Warner (street) to Warner SD	None to improved Warner SD connector
90 (north)	2.91	C	0.90	C	0.9	Zone A	9	EGG-W	EGG	Local	None to improved connector
90 (south)	8.61	C	0.90	C	0.9	Zone A	10	EGG-W	OV	Beach SD	Improved Beach SD (possibly new SD in Beach to improved Beach SD)
91 (north)	4.08	C	0.90	C	0.9	Zone A	10	EGG-W	OV	Beach SD	Improved Beach SD
91 (south)	2.36	C	0.90	C	0.9	500-year	10	EGG-W	OV	Beach (street) to Beach SD	None

Table 4.7-1 Existing Project Site Drainage Characteristics and Capacity Constraints

TAZ[a]	Area (acres)	Estimated Existing		General Plan		Flood Zone[f]	HBWS[g]	Major Channel[h]	Major Drain/ Subchannel[i]	Drainage Pattern up to Major Drain/Subchannel[j]	Improvements Required for Capacity[k]
		Land Use[b]	Impervious[c] (fraction)	Land Use[d]	Impervious[e] (fraction)						
99 (north)	7.03	C	0.90	C	0.9	500-year	10	EGG-W	OV	Local (street) to Sycamore SD to Ash SD to Warner SD	improved Sycamore SD, improved Ash SD, improved Warner SD connector
99 (south)	5.31	C	0.90	C	0.9	500-year	10	EGG-W	OV	Beach SD	None to improved Beach SD (last block)
100 (north)	4.11	C	0.90	C	0.9	500-year	10	EGG-W	OV	Beach (street) to Beach SD	None to improved Beach SD (last block)
100 (south)	4.11	C	0.90	C	0.9	500-year	12	EGG-W	HCP/SC	Beach (street) to Beach SD to Slater SD	None to improved Slater SD; most SDs to HCP require improvements
97	5.00	C	0.90	C,RL,RM	0.772	500-year	10	EGG-W	OV (Local street = C6SCI to OV)	Beach SD; Local street = Local (street) to direct C6SCI	None to improved Beach SD (last block); local street = none
98 (north)	2.46	58% C; 42% V	0.52	C	0.9	500-year	10	EGG-W	OV	Beach (street) to Beach SD	None to improved Beach SD (last block)
98 (south)	2.35	C	0.90	C	0.9	500-year	10	EGG-W	C6SCI to OV	Beach (street) to Slater (street) to Slater SD	None
98 (middle street corner)	0.45	C	0.90	C	0.9	500-year	10	EGG-W	C6SCI to OV	Holland (street) to direct	None
124	4.54	92% C; 8% V	0.83	C	0.9	500-year	12	EGG-W	HCP/SC	Beach SD to Slater SD	Improved portions of Beach SD, improved Slater SD, most SDs to HCP require improvements
126 (northeast ⅔)	5.06	79% C; 21% V	0.71	C	0.9	500-year	11	EGG-W	C6SCI to OV	Local SD to Van Buren SD to Slater SD	none to improved Local SD, improved Van Buren SD
126 (southwest ⅓)	1.50	65% C; 35% V	0.59	C	0.9	500-year	12	EGG-W	HCP/SC	Beach (street) to Beach SD to Slater SD	None to new connector to Beach SD, improved Beach SD (last block), improved Slater SD (most of length)
125 (north ⅔)	3.46	75% C; 25% V	0.68	C	0.9	X	12	EGG-W	HCP/SC	Beach (street); Beach SD to Slater SD	Improved portions of Beach SD to improved Slater SD (most of length)
125 (south ⅓)	1.70	C	0.90	C	0.9	X	11	EGG-W	C6SCI to OV	Talbert SD to pond SD	Intermittent improved Talbert SD, improved pond SD
128 (northwest ⅔)	9.32	C	0.90	C	0.9	X	12	EGG-W	HCP/SC	Beach (street) to Beach SD to Slater SD	None to new connector to Beach SD, improved Beach SD (last block), improved Slater SD (most of length)
128 (southeast ⅓)	4.59	C	0.90	C	0.9	X	11	EGG-W	C6SCI to OV	Direct to pond SD	Improved pond SD
133	13.86	C	0.90	C	0.9	X	11	EGG-W	C6SCI to OV	Beach (street) to Beach SD to Talbert SD	None to improved Beach SD connector to intermittent improved pond SD
134 (northwest)	3.94	96% C; 4% V	0.86	C	0.9	X	17	EGG-W	HCP/Sully Miller	Local (street) to Delaware SD to Ellis SD	None to improved Delaware SD
134 (east and south)	11.47	93% C;3% V	0.84	98% C; 2% ROW	0.9	X	17	EGG-W	HCP/Sully Miller	Beach SD to Franklin SD to Delaware SD to Ellis SD	None/improved Beach SD, intermittent improved Franklin SD, improved Delaware SD
130	18.06	C	0.90	C	0.9	X	11	EGG-W	C6SCI to OV	Local SD to pond SD	None to improved connector, intermittent improved pond SD
132	4.63	C	0.90	C	0.9	X	17	EGG-W	HCP/Sully Miller	Local SD/Beach SD to Franklin SD to Delaware SD to Ellis SD	None/improved Beach SD, intermittent improved Franklin SD, improved Delaware SD
150	12.74	C	0.90	C	0.9	X	17	EGG-W	HCP/Sully Miller	Local SD to Ellis SD	Improved Local SD, improved Ellis SD connector
151 (northeast)	8.80	C	0.90	M	0.9	X	17	EGG-W	HCP/Sully Miller	Local SD to Ellis SD	New Local SD connector, improved Local SD, improved Ellis SD connector
151 (southwest)	14.94	C	0.90	M	0.9	X	20	HC	Delaware SD to Adams SD	Local SD	Improved Local SD
152 (north)	4.40	C	0.90	C	0.9	X	17	EGG-W	HCP/Sully Miller	Local SD to Ellis SD	New Local SD connector, improved Local SD, improved Ellis SD connector
152 (south)	4.00	C	0.90	C	0.9	X	20	HBC	Delaware SD to Adams SD	Local SD	Improved Local SD

Table 4.7-1 Existing Project Site Drainage Characteristics and Capacity Constraints

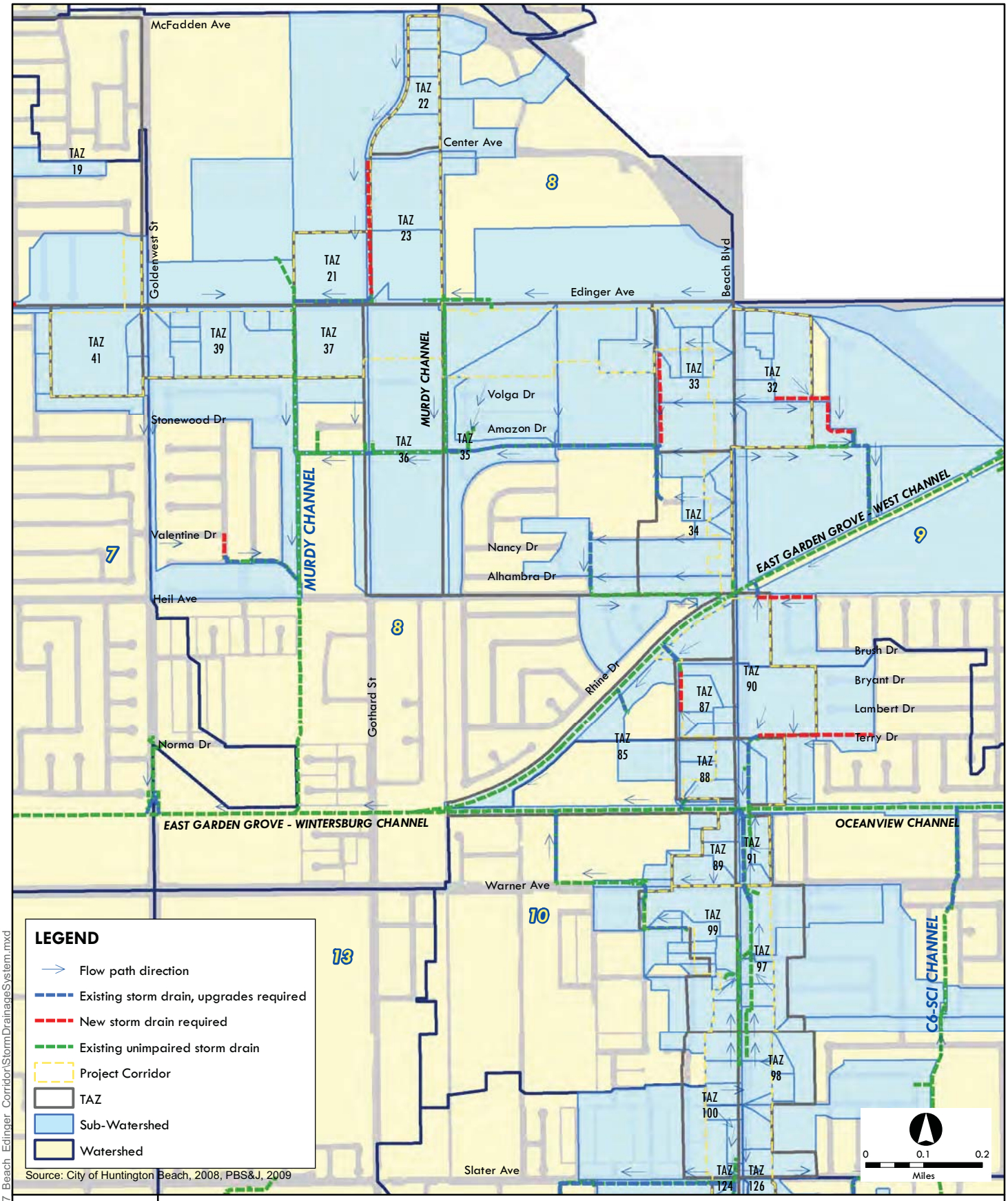
TAZ[a]	Area (acres)	Estimated Existing		General Plan		Flood Zone[f]	HBWS[g]	Major Channel[h]	Major Drain/ Subchannel[i]	Drainage Pattern up to Major Drain/Subchannel[j]	Improvements Required for Capacity[k]
		Land Use[b]	Impervious[c] (fraction)	Land Use[d]	Impervious[e] (fraction)						
153	7.50	65% C; 35% V	0.59	C	0.9	X	22	HBC	Delaware SD to Adams SD	Beach (street) to Beach SD to Clay SD	Improved Clay SD
154 (northwest corner)	5.19	C	0.90	C	0.9	X	17	EGG-W	HCP/Sully Miller	Local SD to Franklin SD to Delaware SD to Ellis SD	Improved Local SD, intermittent improved Delaware SD, partial improved Ellis SD
154 (south)	3.29	C	0.90	C	0.9	X	22	HBC	Newland SD to Coldwater SD	Beach SD to Constantine SD to Lindenwood/Modale SD	Partial improved Linwood/Modale SD
154 (northeast corner)	1.20	C	0.90	C	0.9	X	22	HBC	Newland SD to Coldwater SD	Local (street) to Lindenwood/Modale SD	Partial improved Linwood/Modale SD
155 (near Garfield)	1.42	C	0.90	C	0.9	X	22	HBC	Newland SD to Coldwater SD	Beach (street) to Garfield (street)	None
155 (north of Garfield)	4.25	C	0.90	C	0.9	X	22/23	HBC	Newland SD to Coldwater SD	Beach (street) to Constantine SD to Lindenwood/Modale SD	Intermittent improved Linwood/Modale SD
175 (north of Clay)	12.15	95% C; 5% V	0.86	C	0.9	X	20	HBC	Delaware SD to Adams SD	Beach SD to Clay SD	Improved Clay SD
175 (between Owen and Clay)	1.11	C	0.90	C	0.9	X	20	HBC	Delaware SD to Adams SD	Owen (street) to Florida SD to Clay SD	None to improved Owen SD connector, improved Florida SD, improved Clay SD
175 (south of Owen)	2.92	85% C; 15% V	0.77	C, RL	0.86	X	23	HBC	Adams SD	Beach SD	Improved connectors
174 (between Garfield and Clay)	10.52	60% C; 40% V	0.54	C	0.9	X	20	HBC	Delaware SD to Adams SD	Beach SD to Clay SD	Improved connector, improved Clay SD
174 (Clay to Yorktown —northwest)	4.16	C	0.90	C	0.9	X	23	HBC	Adams SD	Beach (street) to Beach SD	None to intermittent improved Beach SD
174 (Clay to Yorktown —southeast)	6.97	C	0.90	C	0.9	X	23	HBC	Coldwater SD	Worchester SD to Yorktown SD	None
217 (near Utica)	0.27	C	0.90	C	0.9	X	21	HBC	Adams SD	Utica (street) to Local SD to Florida SD	New SD in Utica, improved Utica SD connector, improved Florida SD
217 (except near Utica)	6.53	C	0.90	C	0.9	X	23	HBC	Adams SD	Beach (street) to Beach SD	Improved Beach SD connector
218 (near Utica)	0.47	C	0.90	C	0.9	X	21	HBC	Adams SD	Local (street) to Florida SD	Improved Florida SD
218 (except near Utica)	7.85	93% C; 7% RM	0.87	C, RM	0.9	X	23	HBC	Adams SD	Beach (street) to Beach SD	Improved Beach SD connector
219 (northeast and east)	9.38	65% C; 35% V	0.59	C	0.9	X	23	HBC	Coldwater SD	Direct	None to new SD in ponded area
219 (west)	17.61	C	0.90	C	0.9	X	23	HBC	Adams SD	Beach (street) to Beach SD	None to improved connector
242 (north ¾)	0.52	C	0.90	C	0.9	500-year	23	HBC	Adams SD	Direct	None
242 (south ¼)	2.25	44% C; 66% RMH	0.92	C, RMH	0.85	X	24	HBC	Adams SD	Beach SD to Local SD	Improved connectors, intermittent improved local SDs
239	3.63	18% C; 82% M	0.90	C, M	0.85	500-year	23	HBC	None	Direct	None
241	2.44	C	0.90	C	0.9	X/500-year	24	HBC	None	Beach/Local (street); direct	Improved connector
251	0.74	97% RM-15; 3% RL-7	0.79	RL, RM	0.5	500-year	24	HBC	None	Beach (street) to Beach SD to local SD	Partial improved Beach SD
268	7.34	C	0.90	C	0.9	500-year	24	HBC	None	Local SD to Indianapolis SD	Improved Local SD, improved Indianapolis SD

Table 4.7-1 Existing Project Site Drainage Characteristics and Capacity Constraints

TAZ[a]	Area (acres)	Estimated Existing		General Plan		Flood Zone[f]	HBWS[g]	Major Channel[h]	Major Drain/ Subchannel[i]	Drainage Pattern up to Major Drain/Subchannel[i]	Improvements Required for Capacity[k]
		Land Use[b]	Impervious[c] (fraction)	Land Use[d]	Impervious[e] (fraction)						
Major Drain/Subchannel Improvements Required for Capacity											
									MC[l]		Improved crossing of Gothard
									Edwards SD		None
									C6-SCI		Improved channel Amsterdam to OV
									Delaware SD		Improved of SD (majority of SD)
									Adams SD		Improved connector to HBC
									Newland SD		None
									Coldwater SD		After pond, new connector to improved SD

SOURCE: PBSJ 2009, MPD 2005

a. TAZ = Traffic Analysis Zone; Specific Plan area only. Parenthesis indicates sub-portion of Specific Plan area within the associated TAZ
b. Land use estimated from aerial imagery (MSN 2009) and General Plan land use; C = Commercial; IG = Industrial General; V = Vacant; M = Mixed Use; RMH = Residential Medium High Density; RM = Residential Medium Density; RL = Residential Low Density. C, IG, and M assigned the same amount of impervious area.
c. Impervious percent based on DAMP assigned percent impervious area for general land use categories, for each parcel in the area, and amount of vacant land identified in aerial images
d. Land use based on General Plan designation for each parcel; General Plan land use may slightly differ from DAMP
e. Weighted average DAMP assigned impervious area: Commercial = 0.9; Condominiums = 0.85; 11+ Dwellings/Acre = 0.80; 5-7 Dwellings/Acre = 0.5; 2 Dwellings/Acre = 0.30; School = 0.40; Park = 0.15; Open Brush = 0
f. Flood zone from Figure 4.07-2
g. HBWS = Huntington Beach Watershed per the Master Plan of Drainage
h. Where EGG-W = East Garden Grove–Wintersburg Channel and HBC = Huntington Beach Channel
i. Where EGG = East Garden Grove West Channel, MC = Murdy Channel; OV = Ocean View Channel; C6-SCI = City of Huntington Beach Channel; HCP = Huntington Central Park; SC = Slater Channel; Street Name SD = Major storm drain in the associated street
k. Improvements required per MPD; new = new SD needed; improved = existing SD but undersized and capacity upgrades needed.
l. According to the MPD, there are no current off-site system capacity deficiencies in the Murdy Channel. However, the MPD analysis was based on stormwater detention mitigation measures identified for the adjacent Bella Terra Mall project, which were not implemented. Therefore, without the stormwater detention that was originally tabled for the Bella Terra Mall, it can be assumed that conveyance capacity of the City storm drainage system within the Murdy Channel drainage area is constrained.

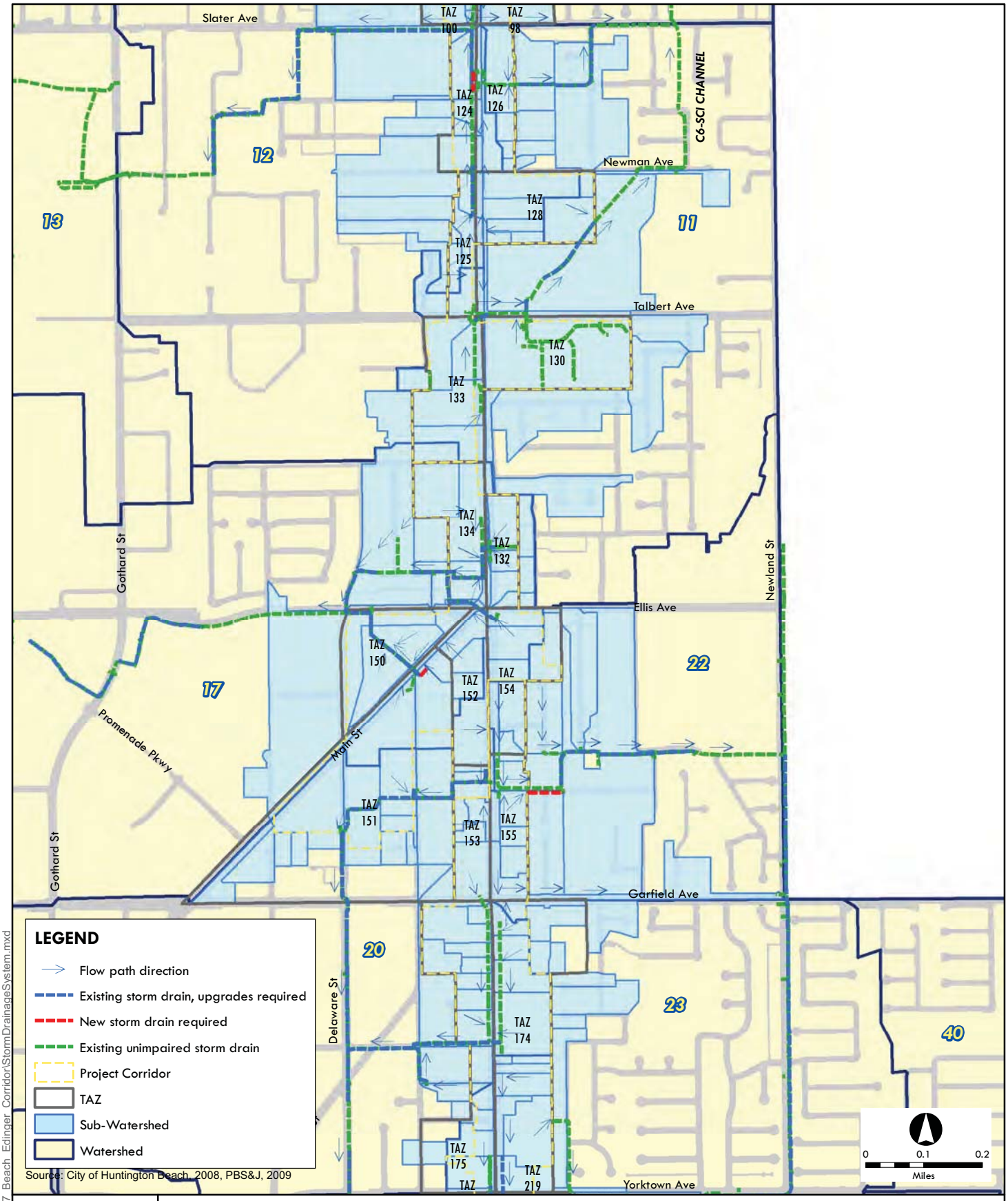


Source: City of Huntington Beach, 2008, PBS&J, 2009

N:\GISProjects\100000407 Beach Edinger Corridor\StormDrainageSystem.mxd

FIGURE 4.7-1a

Existing Project Site Drainage Characteristics and Capacity Constraints (Northern)



Source: City of Huntington Beach, 2008, PBS&J, 2009

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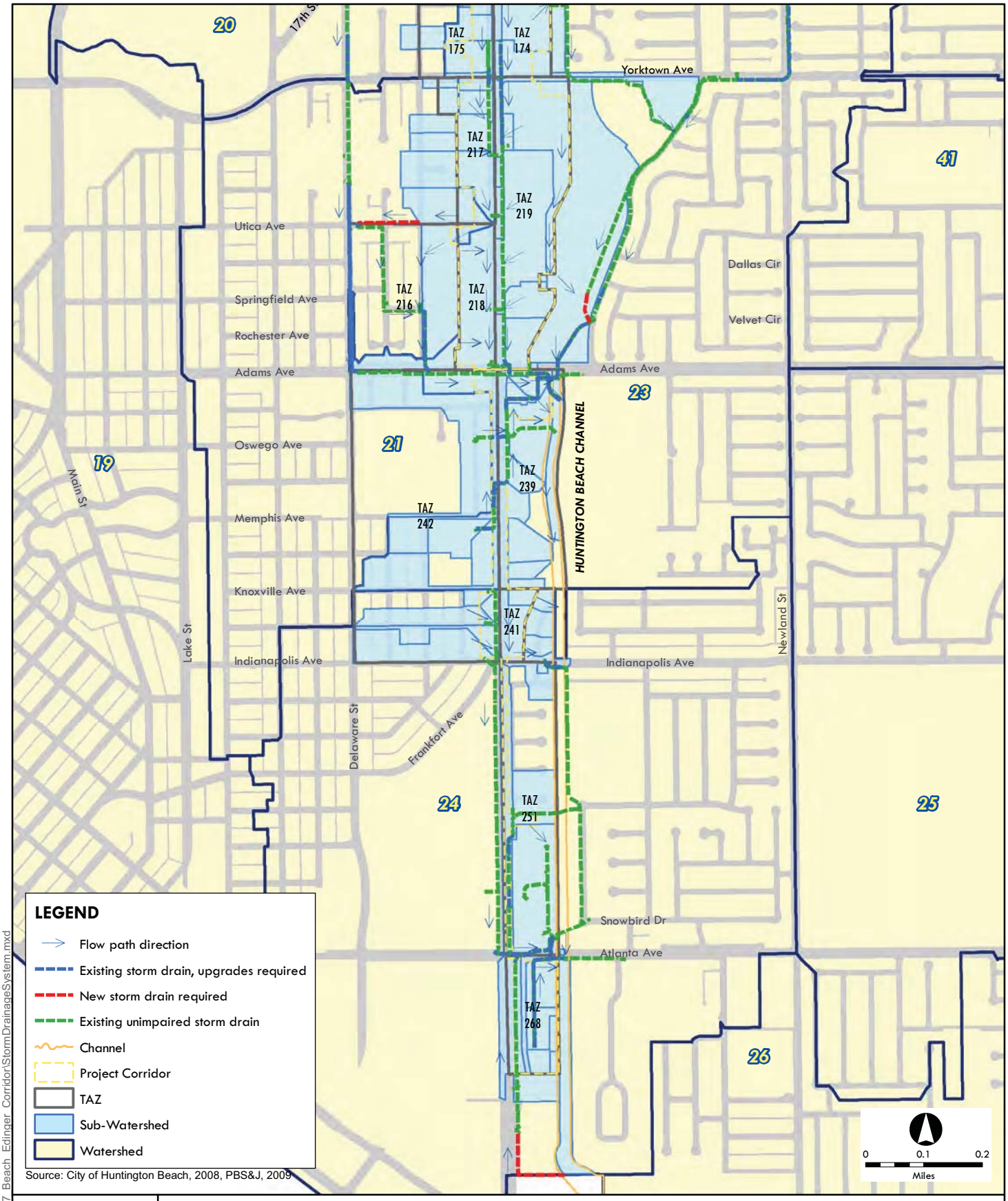
FIGURE 4.7-1b

Existing Project Site Drainage Characteristics and Capacity Constraints (Central)



Source: City of Huntington Beach, 2008, PBS&J, 2009

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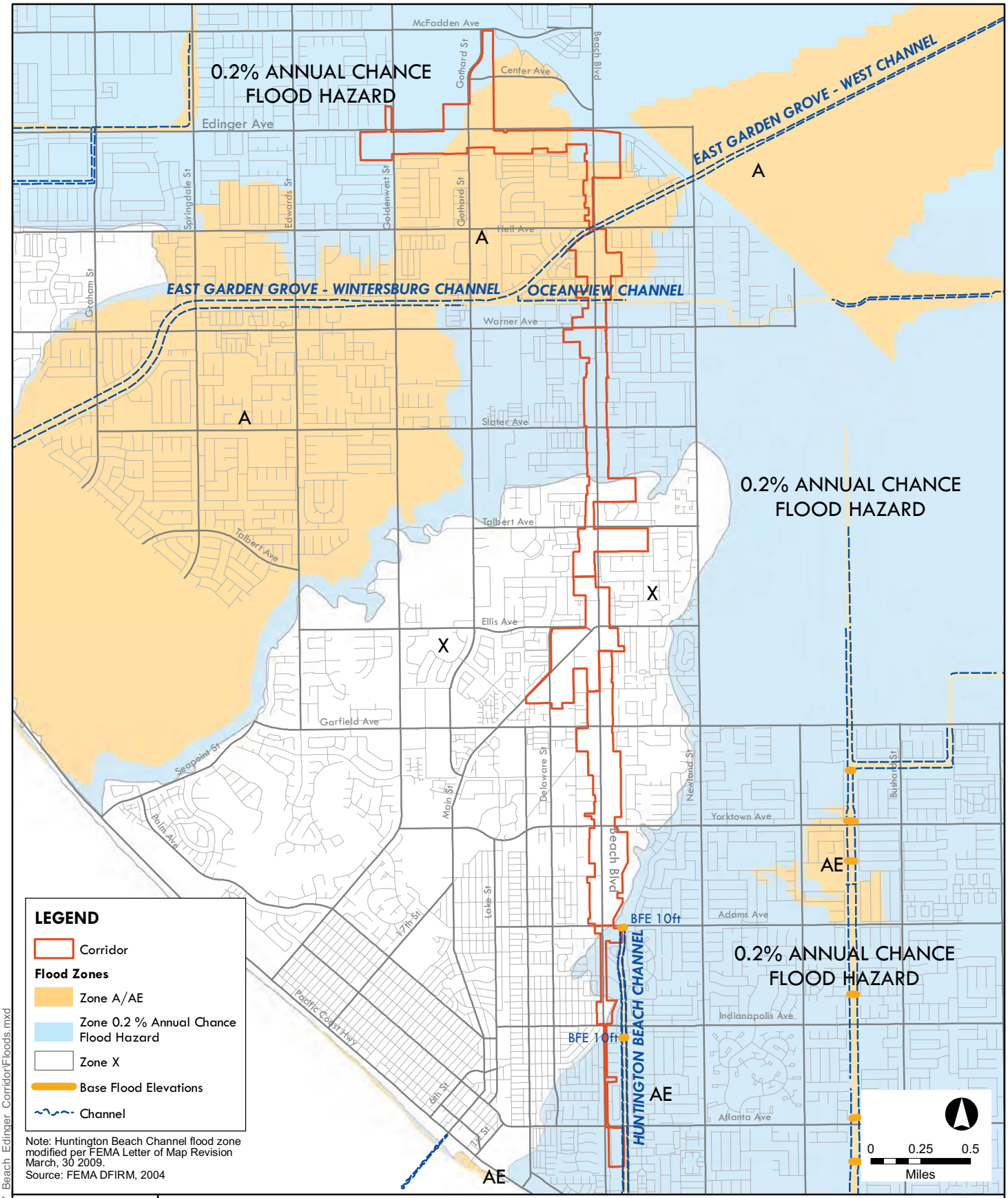
FIGURE 4.7-1c

Existing Project Site Drainage Characteristics and Capacity Constraints (Southern)



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PBS&J

FIGURE 4.7-2

Flood Zones

100000407

Beach-Edinger Corridor Study Program EIR

The quality of urban runoff in the City is typical of most urban areas and includes a variety of common contaminants (HB 2005a). These pollutants consist primarily of suspended sediments, trash, fertilizers and pesticides, animal waste, and contaminants that are commonly associated with automobiles (e.g., petroleum compounds such as oil, grease, and hydrocarbons). In addition, urban stormwater often contains high levels of soluble and particulate heavy metals generated from traffic, industrial facilities, and, occasionally, residential sources.

Runoff Quality

For purposes of discussing water quality issues, water quality has been divided into two categories, which are summarized as follows:

- Dry-weather urban runoff, which occurs when there is no precipitation-generated runoff. Typical sources include landscape irrigation runoff; driveway and sidewalk washing; noncommercial vehicle washing; groundwater seepage; fire flow; potable water line operations and maintenance discharges; and permitted or illegal nonstormwater discharges. Irrigation runoff and washing processes generally contribute to dry weather urban runoff only during the dry season (typically from April through September). This can be a significant source of bacteria and other constituents that can be introduced through day-to-day urban activities as well as illicit discharges, dumping, or spills.
- Wet-weather urban runoff refers collectively to diffuse source discharges that result from precipitation events. Wet weather discharges includes all stormwater runoff. Stormwater discharges are generated by runoff from land surfaces and impervious areas, such as paved streets, parking lots, and building rooftops, during rainfall events, which often contain pollutants in quantities that could adversely affect water quality. Most urban stormwater discharges are diffuse sources and are regulated by the Stormwater National Pollutant Discharge Elimination System (NPDES) Permit or NPDES General Permit for construction activities (see Regulatory Framework of this section).

The CURMP has projected the annual dry weather runoff for the City of Huntington Beach at 2,800 acre-feet (AF) and estimates the average annual wet weather runoff at about 8,000 (AF) (HB 2005b).[12] Based on these estimates, dry weather runoff, which is often considered inconsequential nuisance flows, can contribute as much as one-third of the total annual wet weather runoff, on an annual basis. Therefore, while dry weather flows may be considered inconsequential in terms of flow rates and quantities, it is not inconsequential for water quality.

Wet- and dry-weather runoff typically contains similar pollutants of concern. However, except for the initial stormwater runoff concentrations following a long dry period between rainfall events (first-flush), the concentrations of pollutants found in wet-weather flows are typically lower than those found in dry-weather flows because the larger wet-weather flows dilute the amount of pollutants in runoff waters and because the bulk of the pollutants are washed out at the beginning of the rain event. Storm events may dislodge or carry pollutants over different surfaces than the lower dry weather flows. Table 4.7-2 (Major Types of Pollutants in Runoff) lists typical runoff pollutants.

[12] As noted above, under "Local Hydrology and Drainage" of this section, based on monitoring data, an estimated 150 gpd per acre of dry weather runoff occurs within the City during the dry season.

Table 4.7-2 Major Types of Pollutants in Runoff

Pollutant	*Description*	*Wet or Dry Weather?*
Bacteria	Sources of fecal contamination to surface waters include wastewater treatment plants, on-site septic systems, domestic and wild animal manure, and urban runoff.	Dry, Wet
Pesticides	These compounds can potentially be found in dry and wet weather runoff as a result of normal use (e.g., vehicle fueling, landscaping) and/or illegal dumping and discharge.	Dry, Wet
Petroleum Hydrocarbons	Elevated levels of oil and grease and petroleum hydrocarbons can be found in wet weather runoff, particularly from streets, roads, and other paved surfaces. They can also be found in dry weather runoff as a result of illegal dumping and discharge and driveway/parking lot/street washing.	Dry, Wet
Metals	Metals such as copper, lead, zinc, arsenic, chromium, and cadmium can potentially be found in dry weather runoff, but typically at levels much lower than in wet weather runoff. These metals may be toxic to or bioaccumulate in some aquatic species. Sources of metals in stormwater may include automobiles, paints, preservatives, motor oil, and various urban activities including atmospheric deposition from industrial plants and other operations.	Dry, Wet
Nutrients	Nitrogen and phosphorus are present in dry weather runoff that originate primarily from irrigation nuisance flows, on-site septic system leakage, and deposits of animal waste or other organic debris. During wet-weather conditions, nutrients can be mobilized in runoff from landscaping, leaks from sanitary sewers and septic systems, and runoff of atmospheric deposits, animal waste, and organic debris deposited on impervious surfaces. Nitrogen and phosphorus concentrations can be 2 to 3 times higher in wet weather runoff compared to dry weather runoff. Nutrient loads to surface waters can lead to heavy algae growth, eutrophication, and low dissolved oxygen levels.	Dry, Wet
Trash and Debris	Significant loads of trash, debris, and coarse solids can be found in wet weather urban runoff. Plant material can be a substantial component of coarse solids.	Wet
Suspended Solids	Erosion and sediment transport contribute to suspended solids in runoff waters. Sediment is associated with effects on surface water quality including increased turbidity, effects on aquatic and benthic habitat, and reduction in capacity of impoundments. In addition, a number of other pollutants are often attached to and are carried by sediment particles.	Wet

Generally, in the City, dry weather pollutants of concern include bacteria, pesticides, petroleum hydrocarbons, metals, and nutrients. Wet weather pollutants of concern include bacteria, trash and debris, suspended solids, metals, nutrients, and hydrocarbons/oil and grease. Local land uses have a large effect on runoff water quality.

The project site is located within the Wintersburg Channel, Slater Channel, and Talbert Channel Planning Areas for water quality, as noted above under the subsection "Local Hydrology and Drainage." Land use in the Wintersburg Channel Planning Area is predominantly a mixture of single and multi-family residential, commercial, and industrial areas. Land use in the Slater Channel Planning Area includes a mixture of single and multi-family residential, parks, commercial, and industrial areas. In the Talbert Channel Planning Area, predominant land uses are single- and multi-family residential and commercial business. Dry weather discharges within the Talbert Channel Planning Area are collected at pump stations and diverted to the sanitary sewer system.

Water Quality Standards and Total Maximum Daily Loads

Designated beneficial uses for water resources, along with the water quality objectives to achieve designated beneficial uses, together, comprise the relevant water quality standards. Beneficial uses and

water quality objectives are defined by the Regional Water Quality Control Board (RWQCB) and listed in Water Quality Control Plans for the region. If a water resource is not supporting the designated beneficial use because a water quality objective(s) has been exceeded, the water resource is considered impaired. Impaired water resources listed pursuant to the Clean Water Act (CWA) Section 303(d) require development of a Total Maximum Daily Load (TMDL). The TMDL identifies the maximum amount of the pollutant(s) causing or contributing to impairment that can be discharged to the water resource while maintaining the water resource's ability to support designated beneficial uses. The TMDL also allocates portions of this maximum allowable pollutant load to various dischargers.

Water quality standards for receiving waters[13] of project site runoff are defined in the Water Quality Control Plan Santa Ana Region (#8) (Basin Plan). There are no designated beneficial uses for the system of local and county channels and conveyances within the City of Huntington Beach, nor are there designated beneficial uses listed for the lakes in Huntington Central Park or for the Talbert Marsh. However, the County's East Garden Grove–Wintersburg Channel ultimately discharges to Bolsa Bay, Huntington Harbour, and Anaheim Bay, which have designated beneficial uses.

- Designated beneficial uses for Bolsa Bay (Hydrologic Unit 801.11) include: water and nonwater contact recreation; commercial and sport fishing; preservation of biological habitats of special significance; wildlife habitat; rare, threatened, or endangered species; spawning, reproduction, and/or early development; shellfish harvesting; and marine habitat.
- Designated beneficial uses for Huntington Harbour (Hydrologic Unit 801.11) include: navigation; water and nonwater contact recreation; commercial and sport fishing; wildlife habitat; rare, threatened, or endangered species; spawning, reproduction, and/or early development; and marine habitat. It is also listed as excepted from the municipal and domestic supply beneficial use.
- Anaheim Bay (Hydrologic Unit 801.11) designated beneficial uses include: navigation (Outer Bay); water and nonwater contact recreation; preservation of biological habitats of special significance; wildlife habitat; rare, threatened, or endangered species; spawning, reproduction, and/or early development; and marine habitat. It is also listed as excepted from the municipal and domestic supply beneficial use. There are no site-specific water quality objectives for total dissolved solids, hardness, chloride, total inorganic nitrogen, sulfate, or chemical oxygen demand.

The following receiving waters in the vicinity of the project area have been listed as impaired pursuant to Section 303(d) of the *Clean Water Act* as not attaining the water quality standards established by SARWCB as listed in the Basin Plan:

- Anaheim Bay is listed as impaired (not meeting its designated beneficial uses) by dieldrin, nickel, PCBs, and sediment toxicity from unknown sources (SWRCB 2007).
- Huntington Harbour is listed as impaired by chlordane, copper, lead, nickel, PCBs, and sediment toxicity from unknown sources, and by pathogens from urban runoff/storm sewers (SWRCB 2007).
- Bolsa Chica State Beach is listed as impaired by copper and nickel from unknown sources (SWRCB 2007).

[13] The 'receiving water' is the water resource that receives discharges from the project site/area, whether discharges are directly discharged into the water or indirectly discharged such as via stormwater runoff into the storm drain system.

The East Garden Grove–Wintersburg Channel has been proposed for addition to the 2008 303(d) list of impaired waters by ammonia from unidentified source(s) (SARWQCB 2009). Until this listing has been approved by the RWQCB, SWQCB, and US EPA, TMDL development is not yet required. No TMDLs have yet been developed for the 303(d)-listed impaired water bodies, above, and the proposed completion date for all required TMDLs is 2019 (SWRCB 2007).

No water quality objectives are applicable to any of the direct receiving channels; however, discharge from channels that eventually reach Outer Bolsa Bay, Huntington Harbour, and Anaheim Bay would be subject to the water quality objectives for these receiving waters. If and when a TMDL is adopted for the East Garden Grove–Wintersburg Channel, the TMDL will serve as the applicable regulatory requirement for water quality.

Wet-Weather

As noted above, runoff quality has been divided into two categories for discussing water quality issues: wet-weather and dry-weather runoff. Limited water quality information is available for surface waters to which the project site discharges to (receiving waters). A summary of available information is provided below.

Wet-weather monitoring indicates that acute criteria (1-hour maximum) California Toxics Rule criteria (CTR) (See Regulatory Environment) for copper was regularly exceeded in the East Garden Grove–Wintersburg Channel (45 percent of samples using the freshwater criteria and 100 percent using the salt water criteria) and Huntington Harbour (43 to 80 percent of samples) (HB 2006a). Zinc acute CTR was exceeded only occasionally (0 to 6 percent of samples for East Garden Grove–Wintersburg Channel and 0 to 10 percent of samples for Huntington Harbour) and nickel acute criteria was not exceeded (HB 2006a).

The CTR was established to provide numeric criteria for the narrative[14] toxic substances water quality objectives. A concentration of copper above the acute CTR criteria, for more than one hour, would result in a violation of the water quality objectives for Huntington Harbour. Additionally, as noted above, Huntington Harbour has been listed as impaired by copper. The high number of copper samples that exceeded the CTR acute criteria in the East Garden Grove–Wintersburg Channel is expected to contribute to exceedance of water quality objectives in Huntington Harbour.

Copper chronic criteria (4-day average) CTR criteria was exceeded in 75 to 100 percent of wet weather samples and nickel chronic criteria was exceeded in 0 to 50 percent of wet weather samples from Huntington Bay (HB 2006a). No exceedance of chronic CTR criteria was measured for zinc (HB 2006a). For wet-weather samples, the acute criteria is more applicable for determining exceedance of water quality objectives because wet-weather flows are characterized by episodic rainfall-runoff events, which

[14] Narrative objectives are qualitative objectives, except where numeric limits are explicitly stated. The Basin Plan Water Quality Objective for Toxic Substances is that, "Toxic substances shall not be discharged at levels that will bioaccumulate in aquatic resources to levels which are harmful to human health. The concentrations of toxic substances in the water column, sediments or biota shall not adversely affect beneficial uses." Numeric criteria were established under the CTR to provide a measurable means for evaluating whether or not the water quality objective is met.

are relatively short duration effects; high pollutant loads from stormwater runoff are quickly moved through the system in less than four days.

No data were available for the Huntington Beach Channel or other major conveyances to which the project site drains.

Dry-Weather

Dry-weather monitoring indicates that acute CTR copper criteria were exceeded in 55 to 88 percent of samples in Huntington Harbour (HB 2006a). No acute CTR criteria were exceeded for either nickel or zinc during dry weather (HB 2006a). No summary of dry-weather chronic criteria exceedance was available. For dry-weather samples, the chronic CTR criteria is more appropriate for evaluating exceedance of water quality objectives because flow is more consistent, not episodic, and can be expected to remain at the measured concentration for four or more days. With only acute CTR criteria information, it is not possible to determine if Huntington Harbour does not meet water quality objectives during the dry season.

No data were available for the Huntington Beach Channel or other major conveyances to which the project site drains.

Mass Loading

The Mass loading (total annual amount of measured pollutants transported in channel waters) within the East Garden Grove–Wintersburg Channel was approximately 4 tons of nitrate, 2 tons of phosphate, 35 tons of copper, 110 tons of zinc, and 21 tons of lead (HB 2006b).

No data were available for the Huntington Beach Channel or other major conveyances to which the project site drains.

Natural Treatment System

The Natural Treatment System—East Garden Grove–Wintersburg Channel Project for dry weather treatment using Talbert and Huntington Lakes—is a Santa Ana Regional Water Quality Control Board Approved Supplemental Environmental Project (SEP) (SARWQCB 2008b). This SEP would divert approximately up to 3 million gallons per day of urban runoff from the large, regional East Garden Grove–Wintersburg Channel into Huntington Beach Central Park for natural treatment and restoration of aquatic resources. The SEP would provide multiple benefits, including: the reduction in polluted runoff entering Bolsa Chica Wetlands, Huntington Harbour and Anaheim Bay; the restoration of aquatic resources in Central Park, including Talbert Lake, Huntington Lake, and the Shipley Nature Center; enhancements to groundwater protection by reinforcing the sea-water intrusion barrier; and educational opportunities.

Groundwater

Orange County Groundwater Basin

The projects site overlies the Coastal Plain of Orange County Groundwater Basin, Department of Water Resources Basin Number 8-1 (Orange County Basin) (DWR 2004). The Orange County Basin underlies a coastal alluvial plain in the northwestern portion of Orange County. It covers an area of approximately 350 square miles, bordered by the Coyote and Chino Hills to the north, the Santa Ana Mountains to the northeast, the Pacific Ocean to the southwest, and terminates at the Orange County line to the northwest, where the entire aquifer system is contiguous with the Central Basin of Los Angeles County (DWR 2004). Groundwater flow is unrestricted across the county line. The Newport-Inglewood fault zone forms the southwestern boundary of all but the shallow aquifers in the basin. The major surface water drainages overlying this groundwater basin are the San Gabriel and Santa Ana Rivers, as well as San Diego and Santiago Creeks, all of which have headwaters outside of the groundwater basin.

The aquifers comprising the Orange County Basin extend over 2,000 feet deep and form a complex series of interconnected sand and gravel deposits (DWR 2004). The proportion of fine materials increases from the mountain areas towards the coast, resulting in areas of recharge (forebay area) where materials are coarser and more interconnected and pressure areas where materials are finer and the aquifer becomes confined. In coastal and central portions of the Orange County Basin, these deposits are separated by extensive lower-permeability clay and silt deposits, known as aquitards. In the inland area, generally northeast of Interstate 5 (I-5), the clay and silt deposits become thinner and more discontinuous, allowing for larger quantities of groundwater to flow more easily between shallow and deeper aquifers.

Historical groundwater flow was generally toward the ocean in the southwest, but pumping has greatly altered the hydraulic gradient and caused water levels to drop to below sea level inland of the Newport-Inglewood fault zone. The present hydraulic gradient is primarily from recharge areas toward withdrawal areas. Salt water intrusion has migrated inland along the coastal regions and some water supplies have been contaminated in this area. A salt-water intrusion barrier in the Alamitos and Talbert Gaps has been successful in blocking this intrusion. Overall, groundwater storage capacity in the Orange County Basin is estimated at 38,000,000 AF.

The Orange County Basin is recharged primarily from local rainfall (greater in wet years), base flow from the Santa Ana River (much of which is actually recycled wastewater from treatment plants in Riverside and San Bernardino Counties), imported water percolated into the basin, and reclaimed wastewater directly recharged into the basin (HB 2005b).

The Orange County Basin is not adjudicated based on the Department of Water Resources' official departmental bulletins, California's Groundwater Bulletin 118 (updated 2003) and Bulletin 160, and the California Water Plan Update (2005); the Orange County Basin is not specifically identified as a basin in an overdraft condition. However, the Orange County Water District (OCWD) considers the Orange County groundwater basin to be in an overdrafted condition. OCWD's Groundwater Management Plan

summarizes the accumulated overdraft and water level elevations within the basin. OCWD estimates that the accumulated overdraft in June 2004 was approximately 400,000 AF (OCWD 2004).

OCWD manages the City's groundwater basin and conducts a comprehensive water quality monitoring program. OCWD collects over 13,500 groundwater samples each year from over 800 wells. The water quality data collected from these wells are used to assess ambient conditions of the basin, monitor the effects of extraction, monitor the effectiveness of the seawater intrusion barriers, evaluate impacts from historic and current land use, address poor water quality areas, and also provide early warning of emerging contaminants of concern.

The project site is underlain by the SARWQCB's Orange Groundwater Management Zone (hydrologic units 801.13, 801.14, 845.61, and 845.63). The Orange Groundwater Management Zone is the portion of the Orange County Basin north of State Route 55 and south of the Coyote Hills. This groundwater management zone has the designated beneficial uses of municipal and domestic, agricultural, industrial service, and industrial process supplies (SARWQCB 2008). Specific groundwater quality objectives for the Orange Groundwater Management Zone are only identified for total dissolved solids (TDS < 580 mg/L) and nitrate as nitrogen (Nitrate-N < 3.4 mg/L). Otherwise, general narrative and numeric water quality objectives listed in the Basin Plan for the designated beneficial uses apply.

OCWD groundwater monitoring has assessed the following potential pollutants (HB 2005b):

- **Nitrates—**The Orange County groundwater basin has a number of constituents that are water quality concerns. Although nitrates are present throughout the basin, only a small number of areas, primarily east of Interstate 5 and north of State Route 22 (MWD 2007), exceed the drinking water regulatory maximum contaminant level (MCL). The Regional Water Quality Control Board's groundwater subbasin nitrate-nitrogen water quality objective is 3.4 mg/L (the MCL is 10 mg/L).
- **Total Dissolved Solids (TDS)—**OCWD has been proactive to combat increased salinity within the basin; however, many wells within OCWD, with the exception of any in the City of Huntington Beach, exceed the SARWQCB's water quality objective of 580 mg/L. TDS concentrations from groundwater pumped from the City of Huntington Beach wells averages about 336 mg/L of TDS.
- **Volatile Organic Compounds (VOC)—**OCWD has an aggressive VOC monitoring program. Because of the monitoring program, VOCs have been detected in a number of wells within OCWD. Several drinking water wells have been taken out of service, although none within the City of Huntington Beach.
- **Methyl Tertiary-Butyl Ether (MTBE)—**Drinking water wells within OCWD are tested for methyl tertiary-butyl ether, more commonly known as MTBE. The health effects of MTBE are uncertain; however, the U.S. Environmental Protection Agency currently classifies MTBE as a possible human carcinogen. Two wells within OCWD, but not within the City of Huntington Beach, have been taken out of service because of MTBE contamination.
- **N-nitrosodimethylamine (NDMA)—**Ultraviolet light treatment was added to the process for recycled water treatment and used at the Talbert Barrier to reduce the occurrence of NDMA, a known carcinogen, in injection waters. The City of Huntington Beach's wells have been tested for NDMA and have not had measured concentrations that exceeded the action level.

- **Emerging Contaminants—**Pharmaceuticals, personal care products, and endocrine disruptors[15] are considered emerging environmental contaminants. There are water quality concerns associated with these emerging contaminants because of their wide spread use among the population and their impact on human health because of exposure to low doses over long periods of time. OCWD is aware of these contaminants and is working with California Department of Health and Safety (DHS) to track and report their concentrations in the groundwater.
- **Colored Groundwater—**The OCWD 2004 Groundwater Management Plan reports nine wells that have been drilled in the colored zone,[16] including the City of Huntington Beach's Well No. 8. These wells aid in reducing the groundwater level of the colored aquifer and, thus, minimize the potential for upward vertical migration of colored water into the clear zones. Additionally, the use of nonpotable water for irrigation conserves potable water resources.

Overall, groundwater supplies do not exceed drinking water regulatory requirements (maximum contaminant level or MCL) (HBPWD 2008).

Local Groundwater

The perched (shallow) water table is high throughout the entire City of Huntington Beach. Most of the soils also cause water to percolate very slowly downward into deeper layers so that any water entering the soil tends to remain near the surface or in local ponds (HB 1996). Figure EH-11 in the City of Huntington Beach General Plan displays the approximate depth to shallow groundwater within the City (HB 1996). Within the majority of the Town Center Boulevard segment of the project site, from about Terry Drive northward (including Edinger Avenue), shallow groundwater is expected at about 5 to 10 feet below ground surface (bgs). From about Terry Drive to Warner Avenue, shallow groundwater is about 10 to 15 feet bgs. In the northern portion of the Neighborhood Boulevard section of the project site, from about Warner Avenue to Holland Drive, shallow groundwater is about 15 to 30 feet bgs. Within the Residential Parkway portion of the project site, shallow groundwater ranges in depth; from Adams Avenue to about Indianapolis Avenue, shallow groundwater is about 10 to 30 feet bgs; from Indianapolis Avenue to Atlanta Avenue, shallow groundwater is about 5 to 10 feet bgs; and from Atlanta Avenue southward, shallow groundwater is less than 3 feet bgs. Shallow groundwater in the remainder of the project site is more than 30 feet bgs, except for the portion from Utica Avenue to Adams Avenue where shallow groundwater is about 10 to 30 feet bgs.

Water Supply

Water at the project site would be served by the City and derived from a combination of local groundwater and imported water. Historically, the City has used groundwater more than imported water to satisfy water system demands. Actual percentages of groundwater and imported water vary somewhat on an annual basis depending on the extent to which these programs are implemented. Currently, the

[15] Endocrine disruptors are natural and man-made chemicals that can either mimic or disrupt the action of hormones. Their impact on human biology is still unclear, but they have been implicated in a number of reproductive and health problems in animals.

[16] "Colored water" is groundwater extracted from the basin that is unsuitable for domestic use without treatment because of its high color and odor exceeding drinking water standards. The 'colored zone/aquifer' is where this colored groundwater occurs.

City receives approximately two-thirds of its water supply from groundwater wells accessing the Orange County Basin and approximately one-third of its supply from imported water from MWDOC (PBS&J 2009). To ensure a lasting supply for the region, the basin is managed by the OCWD and the City pays a replenishment assessment to the district for each acre-foot of water taken from the groundwater basin. Allowable Basin Pumping Percentage (BPP) for each purveyor is typically set by OCWD on an annual basis. Details on water supply are provided in Section 4.14 and the associated WSA (included as Appendix G to this EIR).

4.7.2 Regulatory Framework

Federal

Clean Water Act (CWA)

The *Clean Water Act* (CWA) was designed to restore and maintain the chemical, physical, and biological integrity of the Nation's waters. The US EPA has delegated responsibility for implementation of portions of the CWA, including water quality control planning and control programs, such as the NPDES Program, to the State Water Resources Control Board (SWRCB) and Regional Water Quality Control Boards (RWQCBs). While the NPDES system is administered by federal and State programs, the local authority provides the specific details with which projects must comply. Thus, the NPDES program, as implemented in the City of Huntington Beach, is described in detail under the Local regulations.

Total Maximum Daily Loads (TMDLs)

Section 303(d) of the CWA establishes the Total Maximum Daily Load (TMDL) Program. The purpose of the TMDL program is for states to identify streams, lakes, and coastal waters that do not meet certain water quality standards and are not expected to meet standards solely through technology-based controls of point source discharges. For such watersheds, a TMDL must be determined for the constituent(s) that cause or contribute to impairment of the listed water body.

The TMDL is a calculation of the maximum amount of a pollutant that a waterbody can receive and still achieve the target water quality standards. All sources of the constituent(s) must be identified and loads from each source must be quantified. Load reductions are determined and then allocated among the various sources. Finally, an implementation plan is prepared to achieve the required load reductions.

As noted above in the Surface Water Quality section, Anaheim Bay and Huntington Harbour, and Bolsa Chica State Beach are project site receiving waters listed on the 2006 California 303(d) list (see Environmental Setting Section) as impaired and therefore requiring a TDML. Additionally, the East Garden Grove–Wintersburg channel has been proposed to be added to the 2008 303(d). To date, no TMDLs have been established for receiving water bodies that the City discharges to, but the expected completion date is 2019 for all listed constituents.

National Pollutant Discharge Elimination System (NPDES)

As authorized by the CWA, the NPDES permit program controls water pollution by regulating point sources that discharge pollutants into waters of the United States. Point sources are discrete conveyances such as pipes or man-made ditches. Industrial, municipal, and other facilities must obtain permits if their discharges go directly to surface waters. In most cases, including the State of California, the NPDES permit program is administered by authorized states. See discussion below under the State Regulatory Environment.

Floodplain Development

FEMA is responsible for determining flood elevations and floodplain boundaries based on Army Corps of Engineers (Corps) studies. FEMA is also responsible for producing and distributing the Flood Insurance Rate Maps (FIRMs), which are used in the National Flood Insurance Program (NFIP). These maps identify the locations of special flood hazard areas, including the 100-year floodplain.

Federal regulations governing development in a floodplain are set forth in Title 44, Part 60 of the *Code of Federal Regulations* (CFR), which enables FEMA to require municipalities that participate in the National Flood Insurance Program (NFIP) to adopt certain flood hazard reduction standards for construction and development in 100-year flood plains. Section 60.3(c)(2) of the NFIP regulations requires that the lowest occupied floor of a residential structure be elevated to, or above, the 100-year flood elevation (the base flood elevation). Section 60.3(c)(3) adds that nonresidential or commercial structures can either be elevated or dry flood–proofed to, or above, the 100-year flood elevation.

State

Responsibility for the protection of water quality in California resides with the SWRCB and nine RWQCBs. The SWRCB establishes statewide policies and regulations for the implementation of water quality control programs mandated by federal and state water quality statutes and regulations. The RWQCBs develop and implement Water Quality Control Plans (Basin Plans) that consider regional beneficial uses, water quality characteristics, and water quality problems. The Santa Ana Regional Water Quality Control Board (SARWQCB) and SWRCB implement a number of federal and state laws regarding water quality, the most important of which are the State *Porter-Cologne Water Quality Control Act* and the Federal *Clean Water Act*.

Porter-Cologne Water Quality Control Act

The State of California's *Porter-Cologne Water Quality Control Act* (Division 7 of the California Water Code) provides the basis for water quality regulation within California, including the *California Toxics Rule* (CTR), *Policy for Implementation of Toxics Standards for Inland Surface Waters, Enclosed Bays, and Estuaries of California* (State Implementation Plan or SIP), *Inland Surface Water Quality Standards*, *California Urban Water Management Act*, and NPDES permits. The SWRCB administers water rights, water pollution control, and water quality functions throughout the state, while the RWQCBs conduct planning, permitting, and enforcement activities. The *Porter-Cologne Water Quality Control Act* authorizes the SWRCB to adopt,

review, and revise policies for all waters of the state (including both surface and groundwater) and directs the RWQCBs to develop regional Basin Plans. Section 13170 of the California Water Code also authorizes the SWRCB to adopt Water Quality Control Plans on its own initiative.

Water quality standards are set forth in the regional Water Quality Control Plan (discussed below). Designated beneficial uses, along with water quality objectives to meet beneficial uses, comprise the relevant water quality standards. Water quality objectives are achieved primarily through the establishment and enforcement of waste discharge requirements (WDRs). All dischargers of waste to waters of the State are subject to regulation under the *Porter-Cologne Water Quality Control Act*. This includes both point- and nonpoint- source dischargers. All current and proposed discharges to land must be regulated under WDRs, waivers of WDRs, a basin plan prohibition, or some combination of these administrative tools. Discharges of waste directly to State waters would be subject to an individual or general NPDES permit, which also serves as a WDR. WDRs and NPDES permits are further discussed below.

Waste Discharge Requirements

The RWQCBs have primary responsibility for issuing WDRs. The RWQCBs may issue individual WDRs to cover individual discharges or general WDRs to cover a category of discharges. WDRs may include effluent limitations or other requirements that are designed to implement applicable water quality standards, including designated beneficial uses and water quality objectives that are established to protect those uses and to prevent the creation of nuisance conditions.

All projects resulting in discharges, including the proposed project, whether to land or water, are required to obtain approval of WDRs by the RWQCBs. Land and groundwater-related WDRs (i.e., non-NPDES WDRs) regulate discharges of privately or publicly treated domestic wastewater, process and wash-down wastewater, and any allowable wastewater (e.g., recycled water). WDRs for discharges to surface waters also serve as NPDES permits, which are further described below

National Pollutant Discharge Elimination System (NPDES)

The SWRCB and RWQCBs implement, monitor, and enforce the NPDES permitting requirements within their jurisdiction. In general, the regulations require all communities with populations over 50,000 to develop programs for reducing pollutants carried by stormwater runoff into waters of the United States. The SWRCB and RWQCBs also develop and implement state or regional general permits regulating certain types of discharges, as applicable. These permits serve as the mechanism for enforcement of the program. As with WDRs, the SWRCB and RWQCB can issue individual NPDES permits to cover individual dischargers, or general permits to cover a category of dischargers. General permits can be issued on a statewide basis by the SWRCB or on a regional basis by the RWQCB. The following NPDES permits currently applicable to the proposed Specific Plan are listed below. However, NPDES permits are issued/re-issued for 5-year terms and may be substantially revised from one term to the next or expired. Therefore, development of individual projects in accordance with the proposed Specific Plan would be subject to the current approved NPDES permits at the time of development.

NPDES General Permit for Stormwater Discharges Associated with Construction Activity (Construction General NPDES Permit)

The SWRCB permits all regulated construction activities under a general NPDES permit—NPDES General Permit for Stormwater Discharges Associated with Construction Activity (Order No. 98-08-DWQ (1999) (NPDES No. CAS000002). To minimize the potential effects of construction runoff on receiving water quality, California requires that any construction activity affecting 1 acre or more must obtain coverage under the NPDES General Permit for construction activities.

To be covered under an NPDES permit, the permittee first files a Notice of Intent (NOI) to comply with permit conditions and prepares a stormwater pollution prevention plan (SWPPP). Following completion of the NOI, the discharger receives a Waste Discharger Identification (WDID) number that is included on the SWPPP. Components of SWPPPs typically include specifications for construction stormwater quality best management practices (BMPs) that would be implemented during project construction for the purpose of minimizing the discharge of pollutants in stormwater from the construction area. In addition, a SWPPP includes measures to minimize the amount of pollutants in runoff after construction is completed and identifies a plan to inspect and maintain project BMPs and facilities. Specific development projects occurring under the Specific Plan would cumulatively disturb more than 1 acre and construction would be subject to the NPDES General Permit for construction activities.

A Draft (new) NPDES General Permit for construction activities has been prepared by the SWRCB, but has not been released as of the preparation of this EIR section. Development of individual projects occurring under the proposed Specific Plan would be required to comply with the current adopted Construction General NPDES Permit at the time of development.

Local/Regional

Santa Ana River Basin Water Quality Control Plan (Basin Plan)

The Santa Ana RWQCB (Region 8) has jurisdiction over the Santa Ana River Basin. The Santa Ana RWQCB (SARWQCB) is required, by law, to develop, adopt, and implement a Water Quality Control Plan for the entire region. The principal elements of the Water Quality Control Plan are a statement of beneficial water uses that the SARWQCB will protect; water quality objectives needed to protect the designated beneficial water uses; and, strategies and time schedules for achieving the water quality objectives. The water quality objectives are achieved primarily through the establishment and enforcement of WDRs. Both beneficial uses and water quality objectives comprise the relevant water quality standards.

The Santa Ana Water Quality Control Plan Basin Plan ([Basin Plan] SARWQCB 2008a) specifically designates beneficial uses for surface and ground waters; sets narrative and numerical objectives that must be attained or maintained to protect the designated beneficial uses and conform to the state's anti-degradation policy; and describes implementation programs to protect all waters in the region. In cases where the Basin Plan does not contain a criterion for a particular pollutant, other criteria are used to

establish a water quality objective. These may be applied from SWRCB documents (e.g., the Inland Surface Waters Plan and the Pollutant Policy Document) or from water quality criteria developed under Section 304(a) of the *Clean Water Act* (e.g., California Toxics Rule).

The proposed project would be subject to the requirements of the Basin Plan. Discharges from artificial conveyances, such as flood control channels and minor lakes that are part of the City's storm drain system, may not have designated beneficial uses or water quality objectives. In the case where a beneficial use is not designated, the relevant beneficial use for applying water quality standards is the beneficial use of the downstream receiving water for which a beneficial use has been designated. In this case, water quality standards for Huntington Harbor, Bolsa Bay, and Anaheim Bay would comprise the regulatory requirements for discharges from the project site.

General Waste Discharge Requirements for Discharges to Surface Waters That Pose an Insignificant (De Minimus) Threat to Water Quality (De Minimus Threat General Permit)

Low threat discharges are currently regulated under a regional general permit—Order No. R8-2006-0004 Amending Order No. R8-2003-0061, NPDES No. CAG998001 As amended by Order No. R8-2005-0041, General Waste Discharge Requirements for Discharges to Surface Waters That Pose An Insignificant (De Minimus) Threat to Water Quality. De minimus threat (low threat) discharges are not expected to cause toxicity; therefore, no toxicity limits are specified in this general permit. Construction dewatering wastes (except stormwater) are regulated as de minimus threat discharges to surface waters. An NOI to comply with this De Minimus Threat General Permit and Report of Waste Discharge (ROWD) must be submitted to the SARWQCB. The SARWQCB issues a WDID to the discharger if the SARWQCB deems that discharges can be covered under this general permit. Based on the shallow depth to groundwater expected in many segments of the project site, it is anticipated that development of the Specific Plan could require groundwater dewatering during construction and/or operation, and would be subject to the requirements of this De Minimus Threat General Permit.

Orange County Municipal Stormwater NPDES Permit (Municipal NPDES Permit)

Stormwater discharges from the City are also currently regulated under the fourth-term regional individual permit—Santa Ana Region Waste Discharge Requirements for the County of Orange, Orange County Flood Control District, and The Incorporated Cities of Orange County within the Santa Ana Region Areawide Urban Stormwater Runoff Orange County (Order No. R8-2009-0030, NPDES No. CAS618030) (Municipal NPDES Permit).

The co-permittees[17] of this Municipal NPDES Permit are responsible for the management of storm drain systems within their jurisdictions and are required to implement management programs, monitoring programs, implementation plans and all BMPs outlined in the Drainage Area Master Plan (DAMP) within each respective jurisdiction, and take any other actions as may be necessary to meet the Maximum Extent Practicable (MEP) standard. The Municipal NPDES Permit differs from the Construction

[17] The County of Orange was named as the principal permittee and the Orange County Flood Control District (OCFCD) and the incorporated cities were named as the co-permittees.

General NPDES Permit in that it regulates stormwater runoff from sites and activities following construction, as opposed to during construction activities.

This Municipal NPDES Permit requires that discharges from the Municipal Separate Storm Sewer Systems (MS4s) shall not cause or contribute to exceedances of receiving water quality standards (designated beneficial uses and water quality objectives) for surface waters or groundwaters. The DAMP and its components shall be designed to achieve compliance with receiving water limitations. It is expected that compliance with receiving water limitations will be achieved through an iterative process and the application of increasingly more effective BMPs. The existing DAMP will have to be revised in accordance with the fourth-term Municipal NPDES Permit.

Provisions for compliance inspection are incorporated in the Municipal NPDES Permit and include requirements for construction site inspections, including review of erosion and sediment control and BMP implementation plans and effectiveness for residential projects and commercial and industrial developments. Each co-permittee is also required to enforce its ordinances and permits at all construction sites.

Requirements for new development and significant re-development include the establishment of a mechanism to ensure (prior to issuance of any local permits or other approvals) that all construction sites that are required to obtain coverage under the State's NPDES General Permit for construction activities have filed an NOI with the State Board to be covered by the relevant general permit and that a SWPPP is prepared and implemented.

This Municipal NPDES Permit also includes a Monitoring and Reporting Program for the County of Orange, Orange County Flood Control District, and Incorporated Cities of Orange County within the Santa Ana Region Areawide Urban Stormwater Runoff area (Order No. R8-2009-0030 NPDES No. CAS618030).

Water Quality Management Plan (WQMP) for Urban Runoff (New Development and Significant Redevelopment

Under the new Municipal NPDES Permit (Order No. R8-2009-0030 NPDES No. CAS 618030), each permittee, including the City of Huntington Beach, shall ensure that an appropriate WQMP is prepared for the following categories of new development/significant redevelopment projects (priority development projects) below. The WQMP shall be developed in accordance with the approved Model WQMP and shall incorporate Low Impact Development (LID) principles in the WQMP. At a minimum, structural BMPs shall be designed and built in accordance with the approved Model WQMP and must be sized to comply with one of the following numeric sizing criteria listed in the Municipal NDPES Permit. Specific development projects included in the proposed Specific Plan area would be considered a priority project, requiring a project-specific WQMP if they fall into one of the categories summarized below:

Priority Development Projects Categories:

- All significant redevelopment projects, where significant redevelopment is defined as projects that include the addition or replacement of 5,000 square feet or more of impervious surface on a developed site.
- New development projects that create 10,000 square feet or more of impervious surface (collectively over the entire project site).
- Automotive repair shops (with SIC codes 5013, 5014, 5541, 7532-7534, 7536-7539).
- Restaurants where the land area of development is 5,000 square feet or more.
- All hillside developments on 5,000 square feet or more, which are located on areas with known erosive soil conditions or where the natural slope is twenty-five percent or more.
- Developments of 2,500 square feet of impervious surface or more, adjacent to (within 200 feet) or discharging directly into environmentally sensitive areas, such as areas designated in the Ocean Plan as Areas of Special Biological Significance or waterbodies listed on the CWA Section 303(d) list of impaired waters.
- Parking lots of 5,000 square feet or more of impervious surface exposed to storm water.
- Streets, roads, highways and freeways of 5,000 square feet or more of paved surface shall incorporate USEPA guidance, "Managing Wet Weather with Green Infrastructure: Green Streets" in a manner consistent with the maximum extent practicable standard.
- Retail gasoline outlets of 5,000 or more square feet with a projected average daily traffic of 100 or more vehicles per day.
- Emergency and public safety projects in any of the above-listed categories may be excluded if the delay caused due the requirement for a WQMP compromises public safety, public health and/or environmental protection.

The permittees shall require non-priority development projects to document, via a WQMP or similar mechanism, site design, source control, and any other BMPS that may or may not include treatment control BMPs. Minimum structural BMPs must either be sized to comply with either the volume-based or flow-based numeric sizing criteria (Municipal NPDES Permit Section XII.E). Any structural infiltration BMPs must also meet the minimum requirements per the Municipal NPDES Permit Section XII.B.5.

Low Impact Development (LID)

- The LID design goal shall be to maintain or replicate the pre-development hydrologic regime that creates a functionally equivalent post-development hydrologic regime. Each priority development project shall infiltrate, harvest and re-use, evapotranspire, or bio-treat the 85th percentile storm event (design capture volume). Any portion of the design capture volume that is not infiltrated, harvested and re-used, evapotranspired or bio-treated on site by LID BMPs shall be treated and discharged in accordance with Section XII.C.7 and/or Section XII.E of the Municipal NPDES Permit and associated documents (Model WQMP, DAMP, Local Implementation Plans). LID combines hydrologically functional site design with pollution prevention methods to compensate for land development impact on hydrology and water quality.

- LID site design principles shall reduce runoff to a level consistent with the maximum extent practicable standard during each phase of priority projects. Each project shall include site design BMPs during development of the preliminary and final WQMPs. During the early planning stages of a project, the LID principles shall be considered to address pollutants of concern identified in the Watershed Action Plans and TMDL Implementation Plans, and the LID BMPs shall be incorporated into the sites conceptual WQMP. Site design considerations that must be included in the WQMP are listed in the Municipal NPDES Permit.
- If there are constraining factors to implementation of LID principals on a site-specific basis, (such as soil conditions, including soil compaction, saturation (e.g., hydric soils) and permeability; groundwater levels; soil and/or groundwater contaminants (Brownfield developments); space restrictions (in-fill projects, redevelopment projects, high density development, transit-oriented developments); naturally occurring contaminants; and others), the LID principles could be integrated into other programs, such as: Smart Growth, New Urbanism, regional or sub-watershed management approaches, or through alternatives and in-lieu programs as specified in the Municipal NPDES Permit.

Hydromodification[18]

Each priority development project shall also be required to ascertain the impact of the development on the site's hydrologic regime and include the findings in the WQMP. If a hydrologic condition of concern exists, then the WQMP shall include an evaluation of whether the project will adversely impact downstream erosion, sedimentation, or stream habitat. If the evaluation determines adverse impacts are likely to occur, the project proponent shall implement additional site design controls, on-site management controls, structural treatment controls, and/or in-stream controls to mitigate the impacts.

Orange County Drainage Area Management Plan (DAMP)

The purpose of the DAMP is to satisfy Municipal NPDES Permit conditions for creating and implementing an URMP to reduce pollutant discharges to the maximum extent practicable (MEP) for protection of receiving waterbody water quality and support of designated beneficial uses. The DAMP contains guidance on both structural and nonstructural BMPs for meeting these goals.

City of Huntington Beach Local Implementation Plan (City of Huntington Beach LIP)

The current specific water pollution control program elements are documented in the DAMP and the corresponding City of Huntington Beach Municipal NPDES Permit Local Implementation Plan of 2003 (City of Huntington Beach LIP). The City has developed the City of Huntington Beach LIP using the DAMP as its basis. The City of Huntington Beach LIP provides a written account of activities that the City has undertaken, or is undertaking, to meet the requirements of the third-term NPDES Permit (the fourth-term Municipal NPDES Permit is the currently adopted permit). As with the DAMP, the City of Huntington Beach LIP proposes a wide range of continuing and enhanced BMPs and control techniques that will be implemented and reported as part of the third-term Permit reports. The DAMP and City of Huntington Beach LIP will be modified to comply with the fourth-term Municipal NPDES Permit.

[18] Hydromodification (also called hydrograph modification) refers to change in the rate, timing, and volume of runoff; a change in the shape of the flow versus time graph.

The City of Huntington Beach LIP has also incorporated the model construction program described in the DAMP. The construction program includes requirements, guidelines, and methods that construction site owners, developers, contractors and other responsible parties must use for pollution prevention to protect water quality from construction discharges. Regardless of size or priority, all construction projects are required to implement BMPs to prevent runoff and discharges into the storm drain system or water bodies. At a minimum, all construction projects must include erosion and sediment controls, as well as waste and materials management controls. The City of Huntington Beach LIP designates the construction-specific BMPs that the City has determined acceptable for use within the City's jurisdiction.

Citywide Urban Runoff Management Plan (CURMP)

The Citywide Urban Runoff Management Plan (CURMP) provides a broad framework for managing the quantity and quality of all urban runoff that reaches receiving waters from the land surfaces and through the storm drain system within the City. The Water Quality Element of the CURMP focuses primarily on managing runoff quality, while the Drainage Element addresses flood hazards and inconveniences. The CURMP identifies potential common solutions that can address both water quality and quantity concerns.

Section 3: Water Quality Element

The Water Quality Element provides a basis for implementing a comprehensive program for improving water quality through a combination of methods to reduce the level of urban runoff and pollutants emanating from private as well as public property and, thus, enhancing the quality of water discharged from the municipal storm drain system within the City.

Water Quality Management Plan

During the project review, approval, and permitting process, the City requires all new development and significant redevelopment to address the quantity and quality of stormwater runoff from the completed development. A project WQMP, describing how the project will address runoff, is required for all projects qualifying under the City's "Priority Project Category."

Under the Municipal NPDES Permit, a project WQMP would describe how the project will incorporate and implement all applicable BMPs for source control, pollution prevention, site design, LID implementation, and structural treatment control BMPs.

The City has general/standard conditions of approval to protect receiving water quality from short- and long-term impacts of new development and significant redevelopment. Prior to issuance of any grading or building permit for projects that disturb 1 acre or more, the Applicant shall demonstrate, by providing a copy of the Notice of Intent submitted to the SWRCB and a copy of the subsequent issuance of a Waste Discharge Identification number, that coverage has been obtained under the NPDES General Permit for construction activities. Projects subject to this requirement shall also prepare, submit, and implement a SWPPP, including erosion and sediment control measures. This also includes the requirement that the Applicant demonstrate that all structural and nonstructural BMPs described in the project WQMP have been installed and implemented in accordance with approved plans and

specifications prior to close-out of a grading or building permit and/or issuance of a Certificate of Occupancy.

Section 4: Drainage Element

The Drainage Element of the CURMP incorporates a city-based Master Plan of Drainage (MPD) that is a comprehensive drainage study of the community that identifies and creates an inventory of existing storm drain facilities, identifies those areas where system elements do not meet the latest goals established by the City, ranks the severity of the difference between existing capacity and the capacity needed to achieve those goals, prepares planning level cost opinions for system upgrades, and recommends system improvements to initiate the corrections.

City of Huntington Beach Municipal Code

In order to comply with NPDES permit requirements, the City of Huntington Beach has codified requirements in their municipal code. The following sections of the City's municipal code would be applicable to the proposed project:

- Chapter 14.25 (Stormwater and Urban Runoff Management)
- Chapter 14.48 (Drainage)
- Chapter 14.52 (Water Efficient Landscape Requirement)
- Chapter 17.05 (Grading and Excavation Code)

City of Huntington Zoning Code

The City of Huntington Beach Zoning Code Chapter 222 provides methods for reducing flood hazards (Section 222.08) and provides development standards and standards of construction (222.14) for development within Floodplain Overlay Districts. Portions of the project site are located within a Floodplain Overlay District (Section 222.04), and therefore, subject to these Zoning Codes.

City of Huntington Beach General Plan

The following goals, objectives, and policies within the Huntington Beach General Plan are applicable to hydrology and water quality.

Utilities Element

Goal U3 Provide a flood control system which is able to support the permitted land uses while preserving the public safety; upgrade existing deficient systems; and pursue funding sources to reduce the costs of flood control provisions in the City.

Objective U3.1 Ensure that adequate storm drain and flood control facilities are provided and properly maintained in order to protect life and property from flood hazards.

Policy U3.1.1 Maintain existing public storm drains and flood control facilities, upgrade and

expand storm drain and flood control facilities.

Policy U3.1.3 Monitor the demands and manage development to mitigate impacts and/or facilitate improvements to the storm drainage system.

Policy U3.1.5 Limit new development, when necessary, until adequate flood control facilities are constructed to protect existing development and accommodate the new development runoff, or until mitigation is provided in accordance with the Growth Management Element.

Policy U3.1.6 During development review, determine if any structures meant for human habitation are constructed within the 100-year flood plain. If necessary, evaluate the structures' flood safety, and require remedial actions.

Objective U3.2 Ensure the costs of infrastructure improvements to the storm drain and control system are borne by those who benefit.

Policy U3.2.1 Require improvements to the existing storm drain and flood control facilities necessitated by new development be borne by the new development benefiting from the improvements; either through the payment of fees; or by the actual construction of the improvements in accordance with State Nexus Legislation.

Objective U3.3 Ensure that storm drain facilities (channels and outputs) do not generate significant adverse impacts on the environment in which the facilities traverse or empty.

Policy U3.3.1 Evaluate any existing environmental degradation or potential degradation from current or planned storm drain and flood control facilities in wetlands or other sensitive environments.

Policy U3.3.2 Where feasible, utilize natural overland flows, open channels, and swale routings as preferred alignments for components of drainage systems.

Policy U3.3.3 Require that new developments employ the most efficient drainage technology to control drainage and minimize damage to environmental sensitive areas.

Environmental Hazards Element

Goal EH2 Reduce the potential for mesa edge and bluff erosion hazards, and the potential for beach sand loss.

Objective EH2.1 Ensure that land use planning and City policy account for bluff and coastal sand erosion.

Policy EH2.1.1 Minimize bluff and mesa edge erosion.

Policy EH2.2.1 Provide information to the public regarding erosion areas and emergency response plans.

Goal EH4 Eliminate, to the greatest degree possible, the risk from flood hazards to life, property, public investment, and social order in the City of Huntington Beach.

Objective EH4.1 Ensure the City's flood prevention standards and practices provide satisfactory safeguards for public and private development.

Policy EH4.1.1 During major redevelopment or initial construction, require specific measures to be taken by developers, builders or property owners in flood prone areas (Figure EH-11), to prevent or reduce damage from flood hazards and the risks upon human safety.

Policy EH4.1.2 Establish and enforce standards which minimize financial loss and maximize protection of residents and business owner's property.

Objective EH4.2 Maintain and upgrade, as appropriate, the Count of Orange and City of Huntington Beach's flood control system in conjunction with the Santa Ana River Main Stem Project to minimize-hazards due to flooding.

Policy EH4.2.1 Support the Santa Ana River Main Stem Project. (I-EH 2 and I-EH 16)

Policy EH 4.2.2 Increase the local storm drain and flood control capacity up to meet the 100-year the (sic) demand of a storm.

Policy EH 4.2.3 Coordinate with the County of Orange for the operation of the County's portion of the flood control system.

Policy EH 4.2.4 Maintain the City's portion of the flood control system at a level necessary to protect residents from 100-year flood risks.

Objective EH 4.3 Protect individuals from physical harm in the event of flooding.

Policy EH 4.3.1 Provide sufficient early warning and evacuation assistance to residents and others in the path of flooding.

Goal EH5 Protect human life, to the greatest extent feasible, from tsunamis and seiche hazards.

Objective EH 5.1 Provide information regarding tsunami, seiche, and tidal/marine hazards, and promote methods to minimize potential damage.

Policy EH 5.1.1 Identify tsunamic and seiche susceptible areas, and require that specific measures be taken by the developer, builder, or property owner, during major redevelopment or initial construction to prevent or reduce damage from these hazards and the risks upon human safety (see Figure EH-8).

Policy EH 5.1.2 Participate in the National Weather Service or other system for local tsunami and/or seiche warnings.

Consistency Analysis

The project site is located within flood hazard areas and would drain to areas where the storm drain system is inadequate to convey flows. Existing Federal and City floodplain development regulations, including zoning code requirements for development in Floodplain Overlay Districts, would ensure that potential flood hazards are minimized. Mitigation Measures 4.7-3 and 4.7-4 would require implementation of an adequate stormwater conveyance system for development in accordance with the proposed Specific Plan. Existing regulations for the prevention of pollutants in stormwater runoff during construction and operation of the proposed Specific Plan (NPDES General Permit for Construction Activities and associated SWPPP; Municipal NPDES Permit and associated WQMP, DAMP, LIP; and, *Municipal Code* Chapter 17.05 Grading and Excavation Code) would reduce the potential erosion within the project site.

Additionally, the City of Huntington Beach currently operates an Emergency Preparedness Program to prepare for and respond effectively to major emergencies. It establishes and maintains an Emergency Management System that coordinates preparedness, response, and recovery phases for natural disasters and homeland security emergencies. The City's comprehensive Emergency Management Program includes all elements necessary to respond quickly and effectively to major emergencies, including risks from dam failure inundation. Therefore, implementation of the proposed Specific Plan would not conflict with these policies.

4.7.3 Project Impacts and Mitigation

Analytic Method

Potential effects of the Specific Plan on storm drain system capacity were assessed primarily based on the difference between build out of the General Plan and implementation of the Specific Plan because the existing MPD capacity constraints analysis is based on build out of the General Plan. However, potential effects compared to existing conditions are also addressed.

In general, the potential effect of the Specific Plan on stormwater runoff to the storm drain system was estimated by the expected increase in impervious surfaces with implementation of the Specific Plan as compared to existing conditions. For most areas of the Specific Plan, an impervious fraction of 0.9 (or 90 percent of the project site) was used. This provides a reasonable estimate of the impervious fraction for mixed use development because regardless of how many stories or square-footage of retail space, restaurant, office space, or open space is required or allowed, there are no identified limitations on the amount of impervious cover allowed for development, aside from landscaping requirements that may be associated with some land uses. An impervious fraction of 0.9 is typical of commercial lands and was used to estimate impervious fraction in commercial areas when developing the MPD. For the Residential Parkway component, however, high density and low-density residential impervious fractions were averaged to estimate impervious fractions (refer to Table 4.7-3 [Potential Specific Plan Storm Drain Capacity Impacts] and Impact 4.7-3 for details on impervious fractions).

For other potential effects, the Specific Plan is assessed in the context of existing regulatory requirements and potential differences between existing conditions and implementation of the Specific Plan.

Thresholds of Significance

The following thresholds of significance are based on Appendix G of the 2009 CEQA Guidelines. For purposes of this EIR, implementation of the proposed project may have a significant adverse impact if it would do any of the following:

- 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 that 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 that would result in flooding on or off site
- Create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff
- Otherwise substantially degrade water quality
- Place housing 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 that 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
- Expose people or structures to a significant risk of loss, injury, or death involving inundation by seiche, tsunami, or mudflow
- Require or result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects (Utilities)

Some thresholds are addressed in multiple impacts where they overlap with other thresholds and consider similar issues or where the impacts analysis addresses only one part of the threshold.

The Municipal NPDES Permit requires that the following potential impacts be considered during CEQA review:

1. Potential impact of project construction on stormwater runoff.
2. Potential impact of project's post-construction activity on stormwater runoff.
3. Potential for discharge of stormwater pollutants from areas of material storage, vehicle or equipment fueling, vehicle or equipment maintenance (including washing), waste handling, hazardous materials handling or storage, delivery areas, loading docks, or other outdoor work areas.
4. Potential for discharge of stormwater to affect the beneficial uses of the receiving waters.
5. Potential for significant changes in the flow velocity or volume of stormwater runoff to cause environmental harm.
6. Potential for significant increases in erosion of the project site or surrounding areas.
7. Under the Utilities Service Systems section: would the project include a new or retrofitted stormwater treatment control Best Management Practice (BMP), (e.g., water quality treatment basin, constructed treatment wetlands), the operation of which could result in significant environmental effects (e.g., increased vectors and odors)?
8. Potential decreases in quality and quantity of recharge to groundwater.
9. Potential impact of pollutants in storm water runoff from the project site on any 303(d) listed waterbodies.

Some of these additional Municipal NPDES Permit criteria are addressed in the analysis of multiple thresholds and impacts, as noted in the impacts analysis, because each CEQA threshold may only deal with part of the criteria.

Effects Not Found to Be Significant

Threshold	Would the project 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)?

This discussion focuses on groundwater recharge, while the potential effects on groundwater dewatering and water supplies resulting from construction and operation are addressed in Impact 4.7-2. A discussion about the proposed Specific Plan water demand on groundwater supply impacts will be discussed in Section 4.14 and the associated WSA.

According to the WSA, groundwater wells typically supply about two-thirds of the City's water, while the remaining one-third is imported (PBS&J 2009). The project site largely consists of impervious surfaces at this time, and the amount of impervious surfaces would not change substantially with implementation of the Specific Plan. Build out of the Specific Plan area would only increase the amount of impervious surfaces by about 6 percent (based on development of existing vacant parcels). The project site is neither a designated groundwater recharge area nor does the project site serve as a primary source of groundwater recharge. Additionally, soils within the project site are slow to percolate and have high runoff properties (primarily Hydrologic Groups C and D). The City of Huntington Beach has two recharge facilities, the Talbert and Alamitos Barriers; neither of which would be impacted by the proposed project. Therefore, the potential for a reduction in groundwater recharge would be negligible and would not affect City groundwater wells. ***No impact*** on groundwater recharge would result, and no further analysis is necessary in the EIR.

Threshold	Would the project 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 that would result in substantial erosion or siltation on or off site? (Including additional NPDES criteria 1, 2, 5, 6, 7, and 9)

This discussion focuses on off-site erosion, while impacts associated with on-site erosion and siltation hazards are addressed in Impact 4.7-1.

The project would not result in off-site erosion hazards. Implementation of the Specific Plan would not substantially alter the existing drainage pattern of streams or rivers. The project site is located within an entirely urbanized area; there are no natural channels or drainage features, susceptible to bed or bank erosion by increased flow rates, that the project site would discharge to or cross. Discharge from the project site is to a lined drainage system including the City streets and underground storm drain systems. Any potential substantial changes in drainage patterns would result in a slight increase in runoff because

of new impervious surface created with implementation of the Specific Plan; implementation of the MPD required improvements; and/or the inclusion of stormwater detention, which would not increase the potential for off-site erosion or siltation. Overall, even if stormwater runoff increases as a result of Specific Plan implementation, there would be no increase in off-site erosion because the project site does not discharge to susceptible storm drainage features and there would be no effect of increased flow rates or volumes on off-site erosion. Therefore, there would be ***no impact*** of the project site on off-site erosion and no further analysis is necessary in this EIR.

Threshold	Would the project expose people or structures to a significant risk of loss, injury, or death involving inundation by seiche, tsunami, or mudflow?

Tsunamis are large sea waves generated by submarine earthquakes, or similar large-scale, short-duration phenomena, such as volcanic eruptions, that can cause considerable damage to low-lying coastal areas. Portions of the project site are located within a moderate Tsunami Run-up Area as delineated on Figure EH-8 in the City of Huntington General Plan, Hazards Element (HB 1996). Effects associated with tsunamis are addressed in the impacts discussion, below.

Seiches are waves, also caused by large-scale, short-duration phenomena, that result from the oscillation of confined bodies of water (such as reservoirs and lakes) that also may damage low-lying adjacent areas, although not as severely as a tsunami. The closest enclosed bodies of water that could result in earthquake-induced seiches are Huntington Lake, Talbert Lake, and Sully Miller Lake. All of these lakes are more than half a mile from and topographically down gradient from the project site. Therefore, potential seiche activity in these lakes would not be expected to reach the project site (waves would have to travel "uphill" over 0.5 mile), and there would be no risk from seiches. The General Plan indicates that potential seiche effect of most concern would be caused by tsunamis captured and reflected within the enclosed areas of an inner harbor. The nearest harbor is located over 2 miles from the project site; seiche effects would not be expected to reach the project site and there would be ***no impact*** associated with seiches.

Mudflow hazards typically occur where unstable hillslopes are located above gradient, where site soils are unstable and subject to liquefaction, and when substantial rainfall saturates soils causing failure. The edges of the mesas within the project site have a Low Potential for slope instability with the remainder of the City having Very Low or No Potential for slope instability (HB 1996 Figure EH-2). Ellis Avenue west of Beach Boulevard and about 60 percent of the corridor between Yorktown and Atlanta are in areas of Low Potential for slope instability: the remainder of the corridor has No Potential. The surrounding area is relatively flat with no pronounced slopes and there are no known landslides near the corridor, nor is the corridor in the path of any known or potential landslides (HB 1996 Figure EH-2). Therefore, there would be ***no impact*** associated with potential mudslides.

In summary, there would be ***no impact*** that would expose people or structures at the project site to a significant risk of loss, injury, or death involving inundation by a seiche or mudflows and no further analysis of these is required in this EIR.

Impacts and Mitigation Measures

Threshold	Would the project violate any water quality standards or waste discharge requirements or otherwise substantially degrade water quality? (Including additional Municipal NPDES Permit criteria 1 through 7, and 9)
Threshold	Would the project 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 that would result in substantial erosion or siltation on or off site? (Including additional Municipal NPDES Permit criteria 1 through 7, and 9)
Threshold	Would the project create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff? (Including additional Municipal NPDES Permit 1, 2, 4 through 6, and 9)

Impact 4.7-1 **Construction and operation of the Specific Plan could increase stormwater runoff and alter existing land use such that stormwater pollutant loads or concentrations, including erosion and sediment, are increased. These processes could result in a violation of waste discharge requirements or water quality standards and provide substantial additional sources of polluted runoff. However, with implementation of mitigation measures, this impact is considered *less than significant*.**

This impact analysis addresses only those threshold issues pertaining to water quality, including effects on on-site erosion and siltation. Storm drain system capacity exceedance is addressed below under Impact 4.7-3. Off-site erosion is address above under Effects Found Not to Be Significant.

Pollutants in urban runoff can impact the beneficial uses of the receiving waters and cause or threaten to cause a condition of pollution or nuisance. While the Specific Plan would not likely result in any point-source discharge subject to an individual permit (WDR), it would be subject to the NPDES General Permit for Construction Activities, Municipal NPDES Permit, and the De Minimus Threat General Permit for Construction Dewatering. Additionally, sanitary waste discharges would be subject to the individual NPDES permits for the Orange County Sanitary District Reclamation Plant No. 1 and Treatment Plant No. 2 and may be subject to an individual WDR, if required for recycled water use and if the Draft Statewide General Waste Discharge Requirements for Landscape Irrigation Uses of Municipal Recycled Water (Statewide Recycled Water General Permit) is not approved. Applicable water quality standards are listed in the Basin Plan for Bolsa Bay, Huntington Harbour, Anaheim Bay, and the Orange Groundwater Management Zone.

Construction Phase

Development associated with the Specific Plan would include construction activities, such as clearing and grubbing, pavement removal and replacement, excavation and trenching for foundations and utilities, soil compaction, cut and fill activities, and grading, all of which would temporarily disturb soils. Disturbed soils are susceptible to high rates of erosion from wind and rain, resulting in sediment transport from the site. Erosion and sedimentation affect water quality through interference with photosynthesis, oxygen

exchange, and the respiration, growth, and reproduction of aquatic species. Other pollutants, such as nutrients, trace metals, and hydrocarbons, can attach to sediment and be transported with sediment to downstream locations. Sediment-associated pollutants could also cause or contribute to degradation of water quality.

The delivery, handling, and storage of construction materials and wastes, as well as the use of construction equipment, could also introduce a risk for stormwater contamination that could impact water quality. Spills or leaks from heavy equipment and machinery can result in oil and grease contamination, and some hydrocarbon compound pollution associated with oil and grease can be toxic to aquatic organisms at low concentrations. Staging areas or building sites can be sources of pollution because of the use of paints, solvents, cleaning agents, and metals during construction. Impacts associated with metals in stormwater include toxicity to aquatic organisms, such as bioaccumulation, and the potential contamination of drinking supplies. Pesticide use (including herbicides and fungicides) associated with site preparation work (as opposed to pesticide use for landscaping) is another potential source of stormwater contamination during construction. Pesticide impacts to water quality include toxicity to aquatic species and bioaccumulation in larger species.

Larger pollutants, such as trash, debris, and organic matter, are additional pollutants that could be associated with construction activities. Impacts include health hazards and aquatic ecosystem damage associated with bacteria, viruses, and vectors, and physical changes to the aquatic ecosystem. Construction impacts on water quality are potentially significant and could lead to exceedance of water quality objectives or criteria.

All construction activities, including installation and realignment of utilities, would be subject to the following existing regulatory requirements:

- As required by the currently adopted Municipal NPDES Permit, associated DAMP, and NPDES General Permit for construction activities, and as codified in *Municipal Code* 14.25.040 (New Development and Significant Redevelopment), all development within the Specific Plan site that results in a total disturbance of more than 1 acre of land surface shall file a NOI with the State of California to comply with the requirements of the General Construction Permit prior to the issuance of a grading or building permit. This will include the preparation of a SWPPP incorporating BMPs for construction-related control of erosion and sediment contained in stormwater runoff. The SWPPP may include, but would not necessarily be limited to, the following applicable measures (OCFCD 2003):
  - Erosion and Sediment Control BMPs, which may include the following:
    - Construction scheduling, such as phasing and season avoidance, to minimize erosion and sediment
    - Perimeter protection, such as straw wattles or silt fences
    - Check dams to prevent gulley erosion and/or slow water down to allow sediment to settle out
    - Gravel bag berm/barriers to prevent runoff or run-on of surface water flows
    - Street sweeping and vacuuming to remove vehicle-tracked soil and sediment

- Storm drain inlet protection such as filter bags and perimeter protection
- Stabilized construction entrances/exits, stabilized construction roads, tire washing to prevent vehicle tracking of sediment and debris on roadways
- Wind erosion control BMP such as soil stabilizers (would require more water quality modeling), wetting down of dry sediment, or covering exposed surfaces
- Covering exposed surfaces as soon as possible (e.g., hydroseeding, hydraulic mulch, soil binders, and others)
- Velocity dissipation devices
- Water conservation practices BMP
- Storm drain inlet protection

> Vehicle and Equipment Operation BMPs (vehicle and equipment cleaning/maintenance, potable water/irrigation controls)

> Equipment staging areas to localize and establish BMPs for control of pollutants associated with equipment re-fueling, operation, and maintenance which may include the following:

- Construction equipment shall be brought to the site no sooner than it is needed and shall be removed from the site as soon as practical. Major equipment overhaul will take place off site
- Vehicle and equipment maintenance facilities will be prepared and used to prevent discharges of fuel and other vehicle fluids.
- Vehicle and equipment fueling will take place in a contained staging area to prevent discharges of fuel and other vehicle fluids

> Waste Management and Materials Management BMPs for control of pollutants associated with the storage of construction materials and construction activities that may include the following:

- Material Delivery and Storage—materials will be stored either off site or under cover. Hazardous materials will be stored in contained areas
- Material Use—selection of less environmentally detrimental materials will be used, where feasible and practical
- Stockpile Management—stockpiles will be minimized and covered to prevent leaching of potential chemicals and sediment
- Spill Prevention and Control will be implemented to prevent contamination of soil or water with construction and equipment operations chemicals
- Solid Waste Management
- Sanitary/Septic Waste Management
- Hazardous Waste Management—hazardous chemicals used in construction will be disposed of in accordance with hazardous waste materials management regulations, including *Municipal Code* Title VII, Chapter 8.7823(i), which states that "[A]ll hazardous substances and hazardous materials shall be stored in such a manner as to prevent such substances or materials from coming into contact with stormwater or other runoff which discharges into the storm drain system. It is unlawful for any person to dispose of any hazardous waste in any trash container used for municipal trash disposal."

- Contaminated Soil Management—soil found to exhibit signs of pre-existing contamination will be tested and disposed of as required based on level of contamination. No contaminated soil will be brought on site and used as fill material
- Concrete Waste Management, such as contained concrete washout areas

> Water conservation

> Dewatering operations BMPs

> Slope drains

The development of a construction SWPPP, in compliance with the NPDES General Permit for construction activities, has been identified by the SWRCB as protective of water quality during construction activities. Incorporation of required BMPs for materials and waste storage and handling, equipment and vehicle maintenance and fueling, as well as for outdoor work areas, would reduce potential discharge of stormwater pollutants from these sources. The City has codified this requirement and others pertaining to erosion and sediment controls into part of the *Municipal Code*, which requires compliance prior to allowing a project to obtain a Precise Grading or Building permit.

Additional grading permit regulations included in the *Municipal Code* are as follows:

- Section 17.05.310 (Erosion control and water quality requirement systems) including:
  > The prohibition of grading more than 200 cubic yards between October 1 and April 30 on any single grading site under permit unless an erosion control system has been approved or waived by the Director of Public Works (Director)

  > A civil engineer shall be responsible for the design of all erosion control improvements and initial approval of the installation of permanent and semi-permanent erosion control devices during each rainy season

  > Desilting facilities shall be provided and maintained by the owner at drainage outlets from the graded site; equipment and workers for emergency work shall be made available at all times during the rainy season

  > And, any violation of an applicable federal or state-issued stormwater permit, or failure to conform to the City's water quality requirements prepared pursuant to such a permit is also a violation of this Chapter.
- Section 17.05.320 (Erosion control plans) requires preparation of erosion control plans prepared by the engineer of record and in accordance with provisions of the Grading Manual shall be submitted to the Director for approval by September 15 of each year for projects under Precise Grading permit.
- Section 17.05.330 (Erosion control maintenance) specifies required maintenance of erosion control BMPs and Section 17.05.340 (Inspection authority) specifies that grading operations for which a permit is required shall be subject to inspection by the Director.

Furthermore, the City of Huntington Beach LIP requires that all construction projects, regardless of size or priority, are required to implement stormwater BMPs that shall include, at a minimum, erosion and sediment controls, waste and materials management controls BMPS, and prevent construction site runoff discharge to the storm drain system. This LIP has incorporated the model construction program

described in the DAMP and includes requirements, guidelines, and methods that must be used for pollution prevention to protect water quality from construction discharges. As a Standard Condition of Approval, the City requires that, during construction, the specific development Applicant shall comply with erosion control measures such that all construction materials, wastes, grading or demolition debris and stockpiles shall be properly covered, stored and secured to prevent transport into surface waters or groundwaters by wind, rain, tracking, tidal erosion or dispersion.

Because of the shallow depth to groundwater in some areas of the project site (less than 3 feet below ground surface at the southern end and 5 to 10 feet bgs at the northern end and along Edinger Avenue), groundwater is expected to be encountered during construction activities in many locations and may require dewatering during construction. If dewatering is necessary, compliance with the De Minimus Threat General Permit would be required. This general permit requires that the discharger must meet effluent limitations criteria (listed in the De Minimus Threat General Permit) for discharges associated with construction dewatering and comply with the monitoring and reporting requirements.

Therefore, development associated with the Specific Plan would also be subject to the De Minimus Threat General Permit WDR for substantial construction dewatering (minor construction dewatering is covered under the NPDES General Permit for construction activities), including both discharge and effluent limitations based on site and groundwater characteristics. Compliance with the De Minimus Threat General Permit is considered by the RWQCB to be protective of water quality, from discharges associated with dewatering operations. The active monitoring of construction sites for compliance with regulations would also ensure compliance with this General Permit.

The CURMP incorporates provisions for construction site inspection to ensure that construction BMPs are implemented and operating effectively. Consequently, there would be no violation of the NPDES General Permit for construction activities or De Minimus Threat General Permit WDRs with implementation of the Specific Plan.

The applicable WDRs, the NPDES General Permit for construction activities, De Minimus Threat General Permit, and Municipal NPDES Permit are considered protective of water quality during construction and would, therefore, prevent a substantial violation of water quality standards and minimize the potential for contributing additional sources of polluted runoff. Existing regulations, programs, and policies (NPDES General Permit for construction activities and associated SWPPP, De Minimus Threat General Permit and associated ROWD, Municipal NPDES Permit and associated DAMP and City of Huntington Beach LIP, CURMP, *Municipal Code* Section 17.05, City of Huntington Beach Public Works Department permit review process, and General Plan Goal EH2) would ensure that the potential for discharges of polluted stormwater from construction sites to affect beneficial uses of receiving waters and water quality standards, where applicable, would be not be substantial. Implementation of existing regulatory requirements would ensure that on-site erosion and siltation is minimized and that any violation of WDRs, violation of water quality standards, and contributions of additional sources of polluted runoff during construction would be ***less than significant***.

Operation

Wastewater Generation

Details on the potential Specific Plan effects on sanitary sewer systems are discussed in Section 4.14 of this EIR. The remaining capacity at Reclamation Plant No. 1 is 98 million gallons per day (MGD) and the remaining capacity at Reclamation Plant No. 2 is approximately 24 mgd (UWMP 2005). As such, it is assumed there would be more than adequate capacity to treat the net increase of up to about 1.43 MGD of wastewater that would be generated by the Specific Plan (PBS&J 2009). The individual NPDES permits for these treatment facilities are based on effluent quality and design capacity of the treatment systems. Effluent limitations are identified in the permits to be protective of water quality. Because treatment system capacity would not be exceeded with implementation of the Specific Plan, the Specific Plan would not violate these WDRs and there would be no violation of water quality standards associated with wastewater from the Specific Plan.

Stormwater

Operational land uses within the project site would not be greatly altered with respect to a change in impervious surface or type of land use as compared to existing conditions, except in certain areas that are currently vacant (about 26 acres within the 459-acre project site, or 6 percent of the project site). Overall, the amount of project site annual stormwater runoff would likely remain similar to existing conditions because the overall amount of impervious surfaces would not be substantially altered and exposed soils already have a high to moderately high runoff rate (Hydrologic Groups C and D). However, development of some vacant parcels could affect runoff amount and the quantity of pollutants in stormwater runoff.

During the operational phase of the Specific Plan, the major source of pollution in stormwater runoff would be contaminants that have accumulated on rooftops and other impervious surfaces, such as driveways and pedestrian walkways. Pollutants associated with the operational phase of the Specific Plan include nutrients, oil and grease, metals, organics, pesticides, and gross pollutants (including trash, debris, and bacteria).

Nutrients that may be present in post-construction stormwater include nitrogen and phosphorous from fertilizers applied to landscaping, gross debris, and debris from atmospheric deposition of airborne sources. Excess nutrients can impact water quality by promoting excessive and/or rapid growth of aquatic vegetation, which reduces water clarity and results in oxygen depletion. Pesticides can also enter stormwater after application on landscaped areas or overspray on impervious surfaces. Pesticides are toxic to aquatic organisms and can bioaccumulate in larger species, such as birds and fish. Erosion of unprotected surfaces can contribute sediment to runoff and off-site drainage systems. Oil and grease can enter stormwater from vehicle leaks, traffic, and maintenance activities. Metals may enter stormwater as surfaces corrode, decay, or leach. Potential gross pollutants associated with operational activities include clippings associated with landscape maintenance, street litter, and pathogens (bacteria). Pathogens (from sanitary sewer overflows, spills, and leaks from portable toilets, pets, wildlife, and human activities) can affect beneficial uses such as water contact recreation, noncontact water recreation, and shellfish

harvesting. Microbial contamination of the beaches from urban runoff and other sources has resulted in a number of health advisories issued by the Orange County Health Officer.

Pollutants in stormwater runoff depend upon the type of associated land use. Where the land use type does not greatly change, the type and amount of pollutants in stormwater runoff would not be substantially altered. If implementation of the Specific Plan were to substantially increase the amount of runoff, even if the type of land use (and therefore, the type and amount of pollutants in stormwater runoff) were not altered, the total load (or quantity) of pollutants discharged to receiving waters could increase. As noted above, implementation of the Specific Plan is not expected to substantially increase the amount of runoff or substantially alter the acreage of land use types.[19] The conversion of some retail/commercial areas to multifamily or high density residential would result in lower pollutant concentrations in stormwater runoff compared retail/commercial lands (LACDPW 2001). Therefore, the total load (or quantity) of pollutants in stormwater runoff is not expected to substantially increase.

Certain development standards influence the quantity or quality of runoff from a development project, and design details standardize practices for common site design issues features that may also have an influence on water quality features. Examples of such design standards include the following:

- Minimum landscape and pervious surface requirements
- Open space requirements
- Hardscape allowance in lieu of landscape requirement
- Commercial design standards for planter/landscaping
- Drainage facility design standards and details

The Specific Plan could include use of hazardous materials on-site (such as pool and spa cleaning materials and materials associated with automotive dealerships). The addition of residential and retail uses could contribute more gross pollutants (e.g., trash, debris, pet waste) to stormwater runoff. Operation of the Specific Plan could also include vehicle or equipment maintenance or fueling and vehicle storage. Oil and grease, sediment, and metals may increase or decrease, depending upon the site design; for example, covered parking as opposed to surface parking could help reduce pollutants, but implementation of covered surface parking with a higher use rate could contribute to increased pollutants. Pesticides and nutrients used for landscaping would be expected to be similar to existing conditions because the amount of landscaping would remain about the same. Aerially deposited metals, nutrients, and other constituents, would also be expected to remain the same because of the similar amount of impervious surfaces compared to existing conditions.

The City also has general/standard conditions of approval to protect receiving water quality from long-term impacts of new development and significant redevelopment. In brief, the City currently uses the following standard conditions of approval:

- Where appropriate, landscaping plans shall use native, drought-tolerant landscaping materials.

[19] Land use type may change; for instance, there will be about 6,400 more residential units. However, the footprint will not be greatly altered and the amount of pollutants generated from a specific land use is dependant upon the area of each land use. Additionally, the majority of residential land uses within the Specific Plan area are moderate to high density residential and the new residential would be high density residential.

- A suitable location, as approved by the City, shall be depicted on the grading plan for the necessary trash enclosure(s). The area shall be paved with an impervious surface, designed not to allow run-on from adjoining areas, designed to divert drainage from adjoining roofs and pavements diverted around the area, and screened or walled to prevent off-site transport of trash. The trash enclosure area shall be covered or roofed. Connection of trash area drains into the storm drain system is prohibited.
- Prior to issuance of Precise Grading or Building permits, the applicant shall submit to the City a Water Quality Management Plan (WQMP) for review and acceptance.
- Prior to close-out of a Precise Grading or Building permit and/or issuance of certificate of occupancy, the applicant shall demonstrate that all structural and non structural BMPs described in the WQMP have been installed and implemented in conformance with approved plans and specifications, and that all storm drain structures are clean and properly constructed.

In accordance with the DAMP, *Municipal Code* (Chapter 14.25), and City of Huntington Beach LIP, and as noted above, all new development and significant redevelopment projects requiring a grading and/or building permit are required to develop and implement a project WQMP that includes stormwater quality BMPs, depending upon the project size and characteristics. In accordance with the Specific Plan, regardless of the size of development, all developments within the Specific Plan would be required to implement site design and source control BMPs. City-defined priority projects[20] would also be required to implement treatment control BMPs, and treatment control BMPs are also encouraged for nonpriority projects. Significant redevelopment projects and City-defined priority projects require a project-specific WQMP that would be reviewed and approved by the City prior to receiving a Precise Grading permit. Under the Municipal NPDES Permit, the following BMPs shall be considered, unless formally substantiated as unwarranted in a written submittal to the City of Huntington Beach:

- Minimize contaminated runoff, including irrigation runoff, from entering the MS4s.
- Provide appropriate secondary containment and/or proper covers or lids for materials storage, trash bins, and outdoor processing and work areas.
- Minimize stormwater contact with pollutant sources.
- Provide community car wash and equipment wash areas that discharge to sanitary sewers.
- Minimize trash and debris in storm water runoff through regular street sweeping and through litter control ordinances.
- The pollutants in post-development runoff shall be reduced using controls that use best management practices, as described in the California Stormwater Quality Handbooks, Caltrans Storm Water Quality Handbook or other reliable sources. Low Impact Development (LID) principles and BMPs are also required. Priority projects are required to infiltrate, harvest and re-use, evapotranspire, or bio-treat the 85th percentile storm event ("design capture volume"). Any portion of the design capture volume that is not infiltrated, harvested and re-used, evapotranspired or bio-treated onsite by LID BMPs shall be treated and discharged in accordance with the requirements set forth in the Municipal NPDES Permit Section XII Provisions C and D:

[20] City-defined priority projects include those as listed in the DAMP and hillside development on 10,000 square feet or more, which is located on areas with known erosive soil conditions or where natural slope is 25 percent or more.

- > Preventative measures (e.g., non-structural measures) shall be prioritized over mitigation BMPs (e.g., structural treatment measures).
- > The selection of LID principles shall be prioritized with preventive measures as the highest priority; structural site design BMPs shall be prioritized highest to lowest (1) infiltration, (2) harvesting and re-use, and (3) bio-treatment (e.g., biofiltration/bio-retention prior to discharge).

- The LID BMPs shall be designed to mimic pre-development site hydrology through technically and economically feasible preventive and mitigative site design techniques.
- LID site design considerations shall include, but not be limited to:
  - > Minimize impacts from storm water and urban runoff on the biological integrity of natural drainage systems and water bodies.
  - > Minimize changes in hydrology and pollutant loading.
  - > Preserve wetlands, riparian corridors, vegetated buffer zones, and establish reasonable limits on the clearing of vegetation from the project site.
  - > Use properly designed and well-maintained water quality wetlands, bio-retention areas, filter strips, and bio-filtration swales.
  - > Provide for appropriate permanent measures to reduce storm water pollutant loads in storm water from the development site.
- During the early planning stages of a project, the LID principles shall be considered to address pollutants of concern identified in the Watershed Action Plans and TMDL Implementation Plans, and the LID BMPs shall be incorporated into the site's conceptual WQMP.
- Structural BMPs shall be designed and built in accordance with the approved model WQMP and must be sized to comply with one of the following numeric sizing criteria (volume-based or flow-based) as defined in the Municipal NPDES Permit.
- To protect groundwater resources, any structural infiltration BMPs shall meet the following minimum requirements:
  - > Use of structural infiltration treatment BMPs shall not cause or contribute to an exceedance of groundwater water quality objectives.
  - > Source control and pollution prevention control BMPs shall be implemented in conjunction with structural infiltration BMPs to protect groundwater quality.
  - > Structural infiltration treatment BMPs shall not cause a nuisance or pollution, as defined in Water Code Section 13050.
  - > The vertical distance from the bottom of the infiltration BMP to the seasonal high groundwater must be at least 10 feet. Where the groundwater basins do not support beneficial uses, this vertical distance criteria may be reduced, provided groundwater quality is maintained.
  - > Infiltration BMPs must be located at least 100 feet horizontally from any water supply wells.
  - > Prohibition of infiltration BMPs for areas of industrial or light industrial activity; areas subject to high vehicular traffic (25,000 or more daily traffic); automotive repair shops; car washes; fleet storage areas; nurseries; or any other high threat to water quality land uses or activities.

- Each priority development shall be required to ascertain the impact of the development on the site's hydrologic regime and include the findings in the project WQMP, including the following for a two-year frequency storm event:
  - > Increases in runoff volume
  - > Decreases in infiltration
  - > Changes in time of concentration
  - > Potential for increases in post development downstream erosion
  - > Potential for adverse downstream impacts on physical structure, aquatic and riparian habitat
  - > If the evaluation determines adverse effects are likely to occur, the project proponent shall implement additional site design controls, on-site management controls, structural treatment controls, and/or in-stream controls to mitigate the adverse effects.

Under the Municipal NPDES Permit, the Model WQMP, the DAMP, and City of Huntington Beach LIP will govern development and the project-specific WQMP requirements.

Acceptable structural and nonstructural BMPs are listed and described in the DAMP and California Stormwater Quality Association (CASQA) Stormwater BMP Handbook for New Development and Significant Redevelopment (2003) in compliance with the Municipal NPDES Permit. Treatment flow rate or volume design requirements for structural BMPs are specified in the Municipal NPDES Permit.

These existing regulatory requirements would reduce potential Specific Plan effects on water quality. However, based on the project site characteristics (e.g., depth to groundwater, proximity to surface water, type of land use, soil infiltration rate, presence of vegetation, and others), certain BMPs would not be suitable (e.g., infiltration BMPs would not be suitable when depth to groundwater is shallow), and implementation of nonstructural BMPs would not be assured because they rely on operations practices that may not be adequately tracked and enforced. Therefore, Specific Plan impacts would remain potentially significant.

The City currently has Urban Design Guidelines that provide general guidance and incorporate some of the general concepts noted above. There are additional procedures that should be incorporated into the proposed Specific Plan, and additional guidelines that could be adopted to further promote and encourage effective runoff management as identified in the mitigation measure, below.

Implementation of the following mitigation measure, in conjunction with existing regulatory requirements, would ensure that potential Specific Plan impacts on water quality are reduced to a ***less-than-significant*** level.

MM4.7-1 *City of Huntington Beach shall require Applicants for new development and significant redevelopment projects within the Specific Plan area to prepare a project Water Quality Management Plan (WQMP) in accordance with the DAMP requirements and measures described below and with all current adopted permits. The WQMP shall be prepared by a Licensed Civil Engineer and submitted for review and acceptance prior to issuance of a Precise Grading or Building permit.*

BMPs in the WQMP shall be designed in accordance with the Municipal NPDES Permit, Model WQMP, DAMP, and City of Huntington Beach LIP. As noted in the Specific Plan, all development projects shall include site design and source control BMPs in the project WQMP. Additionally, new development or significant redevelopment projects and priority projects shall include LID principles to reduce runoff to a level consistent with the maximum extent practicable and treatment control BMPs in the WQMP.

If permanent dewatering is required and allowed by the City, OCWD, and other regulatory agencies, the Applicant shall include a description of the dewatering technique, discharge location, discharge quantities, chemical characteristics of discharged water, operations and maintenance plan, and WDID number for proof of coverage under the De Minimus Threat General Permit or copy of the individual WDR in the WQMP. Additionally, the WQMP shall incorporate any additional BMPs as required by the City Public Works Department.

The WQMP shall include the following additional requirements:

Project and Site Characterization Requirements

- *Entitlement Application numbers and site address shall be included on the title sheet of the WQMP*
- *In the project description section, explain whether proposed use includes onsite food preparation, eating areas (if not please state), outdoor activities to be expected, vehicle maintenance, service, washing cleaning (if prohibited onsite, please state)*
- *All potential pollutants of concern for the proposed project land use type as per Table 7.II-1 of the Orange County Model Water Quality Management Plan shall be identified*
- *A narrative describing how all potential pollutants of concern will be addressed through the implementation of BMPs and describing how site design BMP concepts will be considered and incorporated into the project design shall be included*
- *Existing soil types and estimated percentages of perviousness for existing and proposed conditions shall be identified*
- *In Section I of the WQMP, state verbatim the Development Requirements from the Planning Department's letter to the Applicant*
- *A site plan showing the location of the selected treatment control BMPs and drainage areas shall be included in the WQMP*
- *A Geotechnical Report shall be submitted to address site conditions for determination of infiltration limitations and other pertinent characteristics.*

Project-Based Treatment Control BMPs

- *Infiltration-type BMPs shall not be used unless the Geotechnical Report states otherwise. Depth to seasonal high groundwater is determined to provide at least a 10-foot clearance between the bottom of the BMP and top of the water table. It is expected that infiltration BMPs may be feasible between Holland Drive and Utica Drive, however, a Geotechnical Investigation must be conducted to ensure sufficient properties*
- *Wet swales and grassed channels shall not be used because of the slow infiltration rates of project site soils, the potentially shallow depth to groundwater, and water conservation needs*

- *If proprietary Structural Treatment Control devices are used, they shall be sited and designed in compliance with the manufacturers design criteria*
- *Surface exposed treatment control BMPs shall be selected such that standing water drains or evaporates within 24 hours or as required by the County's vector control*
- *Excess stormwater runoff shall bypass the treatment control BMPs unless they are designed to handle the flow rate or volume from a 100-year storm event without reducing effectiveness. Effectiveness of any treatment control BMP for removing the pollutants of concern shall be documented via analytical models or existing studies on effectiveness.*
- *The project WQMP shall incorporate water efficient landscaping using drought tolerant, native plants in accordance with Landscape and Irrigation Plans as set forth by the Association (see below)*
- *Pet waste stations (stations that provide waste pick-up bags and a convenient disposal container protected from precipitation) shall be provided and maintained*
- *Building materials shall minimize exposure of bare metals to stormwater. Copper or Zinc roofing materials, including downspouts, shall be prohibited. Bare metal surfaces shall be painted with non-lead-containing paint*

The following BMPs shall not be used because they have not been shown to be effective in many situations. Therefore, unless sufficient objective studies and review are available and supplied with the WQMP to correctly size devices and to document expected pollutant removal rates the WQMP shall not include:

- *Hydrodynamic separator type devices as a BMP for removing any pollutant except trash and gross particulates*
- *Oil and Grit separators*

Any Applicant proposing development in the Specific Plan Area is encouraged to consider the following BMPs:

- *Sand filters or other filters (including media filters) for rooftop runoff*
- *Dry swales. A dry swale treatment system could be used if sufficient area, slope gradient, and length of swale could be incorporated into the project design. Dry swales could remove substantial amounts of nutrients, suspended solids, metals, and petroleum hydrocarbons*
- *Other proprietary treatment devices (if supporting documentation is provided)*

Non-Structural BMPs

The WQMP shall include the following operations and maintenance BMPs under the management of a Homeowners/Business Association (Association), where applicable. The Association shall fund and implement an operational and maintenance program that includes the following:

- *The Association shall dictate minimum landscape maintenance standards and tree trimming requirements for the total project site. Landscape maintenance shall be performed by a qualified landscape maintenance company or individual in accordance with a Chemical Management Plan detailing chemical application methods, chemical handling procedures, and worker training. Pesticide application shall be performed by a certified applicator. No chemicals shall be stored on-*

site unless in a covered and contained area and in accordance with an approved Materials Management Plan. Application rates shall not exceed labeled rates for pesticides, and shall not exceed soil test rates for nutrients. Slow release fertilizers shall be used to prevent excessive nutrients in stormwater or irrigation runoff.

- *The Association shall have the power and duty to establish, oversee, guide, and require proper maintenance and tree trimming procedures per the ANSI A-300 Standards as established by the International Society of Arborist. The Association shall require that all trees be trimmed by or under the direct observation/direction of a licensed/certified Arborist for the entire area. The Association shall establish minimum standards for maintenance for the total community, and establish enforcement thereof for the total community. The Association shall rectify problems arising from incorrect tree trimming, chemical applications, and other maintenance within the total community.*
- *Landscape irrigation shall be performed in accordance with an Irrigation Management Plan to minimize excess irrigation contributing to dry- and wet-weather runoff. Automated sprinklers shall be used and be inspected at least quarterly and adjusted yearly to minimize potential excess irrigation flows. Landscape irrigation maintenance shall be performed in accordance with the approved irrigation plans, the City Water Ordinance and per the City Arboricultural and Landscape Standards and Specifications.*
- *Proprietary stormwater treatment systems maintenance shall be in accordance with the manufacturer's recommendations. If a nonproprietary treatment system is used, maintenance shall be in accordance with standard practices as identified in the current CASQA (2003) handbooks, operations and maintenance procedures outlined in the approved WQMP, City BMP guidelines, or other City-accepted guidance.*
- *Signage, enforcement of pet waste controls, and public education would improve use and compliance, and therefore, effectiveness of the program, and reduce the potential for hazardous materials and other pollution in stormwater runoff. The Association shall prepare and install appropriate signage, disseminate information to residents and retail businesses, and include pet waste controls (e.g., requirements for pet waste clean up, pet activity area restrictions, pet waste disposal restrictions) in the Association agreement/Conditions, Covenants, and Restrictions.*
- *Street sweeping shall be performed at an adequate frequency to prevent build up of pollutants (see http://www.fhwa.dot.gov/environment/ultraurb/ for street sweeping effectiveness).*
- *The Association shall develop a maintenance plan for BMPs and facilities identifying responsible parties and maintenance schedules and appropriate BMPs to minimize discharges of contaminants to storm drain systems during maintenance operations.*
- *Reporting requirements: the Association shall prepare an annual report and submit the annual report to the City of Huntington Beach documenting the BMPs operations and maintenance conducted that year. The annual report shall also address the potential system deficiencies and corrective actions taken or planned.*

Site Design BMPs

Any Applicant proposing development in the Specific Plan Area is required to incorporate LID principles as defined in the Municipal NPDES Permit and is encouraged to consider the following BMPs, if allowed in accordance with the Geotechnical Report and limitations on infiltration BMPs:

- *Use of porous concrete or asphalt (if acceptable to the Geotechnical Engineer and where infiltration will not adversely affect groundwater) or other pervious pavement for driveways, paths, sidewalks, and courtyards/open space areas, to the maximum extent practicable, would reduce pollutants in stormwater runoff as well as provide some detention within the material void[21] space. If porous paver blocks are used, they shall be adequately maintained to provide continued porosity (effectiveness)*
- *Incorporation of rain gardens or cisterns to reuse runoff for landscape irrigation*
- *Green roofs to reduce runoff and treat roof pollutants*
- *Site design and landscape planning to group water use requirements for efficient irrigation*

There are no water quality standards for the lakes in Huntington Central Park, East Garden Grove–Wintersburg Channel, and Huntington Beach Channel; therefore, there would be no violation of water quality standards for discharges to these systems, although WDRs remain in effect. However, there are water quality standards for Huntington Harbor, Bolsa Bay, and Anaheim Bay to which the Huntington Beach Channel and East Garden Grove–Wintersburg Channel flows to. These receiving waters, therefore, determine the relevant water quality standards.

Prior to the issuance of a grading permit, building permit or nonresidential plumbing permit for any new development or significant redevelopment, the Planning Department and/or Public Works Department is required to review the project plans and impose terms, conditions and requirements on the project in accordance with Section 14.25.040 (*Municipal Code* Section 14.25.040). If the new development or significant redevelopment will be approved without application for a grading permit, building permit or nonresidential plumbing permit, the Planning Department and/or the Public Works Department is required to review the project plans and impose terms, conditions and requirements on the project in accordance with *Municipal Code* Section 14.25.040 prior to the issuance of a discretionary land use approval or, at the city's discretion, prior to recordation of a subdivision map. Section 14.25.050 includes the City's right to inspect sites for compliance with these ordinances and codes and Section 14.25.060 provides for enforcement authority and actions.

Implementation of the current adopted regulations, programs, and policies (Municipal NPDES Permit and associated DAMP, CURMP, Model WQMP, and City of Huntington Beach LIP; *Municipal Code* Section 14.25; City conditions of approval and permit review process; and, General Plan Goal EH2), along with mitigation measure MM4.7-1 would reduce potential pollutant loads and sediment in runoff and ensure that appropriate BMPs are employed to ensure that regulatory requirements are met and that any post-construction violation of WDRs would not be substantial.

The SARWQCB considers the applicable WDRs as protective of water quality. Therefore, effects on water quality standards would not be substantial and impacts of the Specific Plan on on-site erosion and siltation and violation of WDRs or water quality standards or discharges to 303(d)-listed waters would be ***less than significant***. Furthermore, existing regulatory requirements, such as preparation and implementation of a project WQMP and the permit review process, ensure that the potential for discharge of stormwater pollutants from new or significant redeveloped areas of material storage, vehicle

[21] Void space is the empty space between individual particles.

or equipment fueling, vehicle or equipment maintenance (including washing), waste handling, hazardous materials handling or storage, delivery areas, loading docks or other outdoor work areas would be ***less than significant***.

Threshold	Would the project 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)? (Including additional Municipal NPDES Permit 8)

Impact 4.7-2 **Implementation of the proposed project could result in substantial groundwater dewatering or deplete groundwater supplies. However, with implementation of code requirements and mitigation measures, this impact is considered *less than significant*.**

Construction

Shallow groundwater levels within the project site occur at less than 3 feet to more than 30 feet bgs, and unsaturated soils within portions of the project site generally have a high water content (Geotechnical Professionals, Inc. 2002). Consequently, construction dewatering for utilities, foundation excavation and fill, and below-grade parking or other structures could be required. However, any potential dewatering impacts would be temporary (no permanent groundwater dewatering is anticipated). Development within the project site would require coverage under the De Minimus Threat General Permit for substantial construction dewatering; minor construction dewatering is covered under the NPDES General Permit for construction activities. The De Minimus Threat General Permit would include discharge quantity and quality limitations based on site and groundwater characteristics. Consequently, potential impacts associated with construction dewatering on the local groundwater table and water supplies would be ***less than significant***.

Operation

Some permanent structures (e.g., basements and underground parking) could be located below the local groundwater table. If a site developer elects to use a permanent groundwater dewatering system instead of dry flood-proofing and full-hydrostatic pressure load construction to protect these structures, the site development could permanently lower the localized groundwater table. The extent of this effect on the local groundwater table would depend upon the lateral transmissivity of groundwater beneath the project site, neighboring subsurface materials, and depth of dewatering. Permanent dewatering activities would require coverage under the De Minimus Threat General Permit or an individual WDR/NPDES Permit, and, consequently, it would be subject to discharge quantity limitations. The actual amount of required dewatering may not be substantial, based on the large amount of underlying alluvial materials with low permeabilities within the project site and surrounding areas. Additionally, depending upon the exact nature and location of development, the groundwater table may be below the lowest floor level during construction, but above this level during the wet weather season, requiring dewatering only during certain conditions or not at all.

The City has identified project conditions of approval for groundwater dewatering and surface drainage that would also serve to minimize potential effects of temporary or permanent groundwater dewatering.

CR4.7-1 *Prior to receiving any grading or building permit, the Applicant for a specific development project shall prepare a Precise Grading and Drainage Plan containing the recommendations of the final Soils and Geotechnical Reports analysis for temporary and permanent groundwater dewatering, as well as for surface drainage.*

If an individual project Applicant proposes to develop underground structures that include permanent groundwater dewatering within the Specific Plan, implementation of mitigation measure MM4.7-2 would ensure that permanent groundwater dewatering does not cause or contribute to a lowering of the local groundwater table that would affect nearby water supply wells.

MM4.7-2 *The City of Huntington Beach shall require that any Applicant prepare a Groundwater Hydrology Study to determine the lateral transmissivity of area soils and a safe pumping yield such that dewatering activities do not interfere with nearby water supplies. The Groundwater Hydrology Study shall make recommendations on whether permanent groundwater dewatering is feasible within the constraints of a safe pumping level. The Applicant's engineer of record shall incorporate the Hydrology Study designs and recommendations into project plans. If safe groundwater dewatering is determined to not be feasible, permanent groundwater dewatering shall not be implemented. The City Director of Public Works, OCWD, and other regulatory agencies shall approve or disapprove any permanent groundwater dewatering based on the Groundwater Hydrology Study and qualified Engineers' recommendations.*

Potential impacts associated with permanent dewatering on the local groundwater table and water supplies would be ***less than significant*** with implementation of existing regulatory requirements, project conditions of approval CR4.7-1, and mitigation measure MM4.7-2.

The potential effect of the proposed Specific Plan on overall water supply, including water conservation and efficient water use requirements and mitigation, is addressed in Section 4.14 and the proposed Specific Plan WSA. The Specific Plan would not implement any new water supply wells. Increased development, in accordance with the proposed Specific Plan could increase overall domestic water supply demands that would be met by local and regional groundwater resources and surface water resources. Groundwater resources used by the City of Huntington Beach (Orange County Sub-basin) are managed by the OCWD, which sets allowable pumping rates for all purveyors to manage overdraft conditions and ensure adequate recharge and long term groundwater supplies. The City of Huntington Water Efficient Landscape ordinance (*Municipal Code* 14.52.00) requires design, installation, and maintenance of water efficient landscaping for redevelopment and new development. The water conservation requirements are also incorporated in the Water Management Program (*Municipal Code* 14.82.00). Furthermore, the City of Huntington Beach has begun preparation of a Water Use Efficiency Master Plan (WUEMP), which serves to create a reliable water supply through more aggressive water conservation. These mechanisms would ensure that potential effects on the local groundwater table and water supplies are not substantial.

The project area is not located within a substantial groundwater recharge area and is primarily impervious. Implementation of the proposed Specific Plan would not substantially increase the amount

of impervious area that could impede groundwater recharge. Compliance with the Municipal NPDES Permit would encourage infiltration of stormwater, where infiltration would not cause or contribute to groundwater quality degradation and potential effects on groundwater recharge would not be substantial.

Therefore, the Specific Plan impacts on groundwater supplies, groundwater recharge, and lowering of the local groundwater table would be ***less than significant***.

Threshold	Would the project 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 that would result in flooding on or off site? (Including additional Municipal NPDES Permit criteria 1, 2, and 5)
Threshold	Would the project create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff? (Including additional Municipal NPDES Permit 1, 2, 4, and 6 and 7)

Impact 4.7-3 **Implementation of the proposed project could increase stormwater runoff, exceed the capacity of existing or planned stormwater drainage systems, and cause on- or off-site flooding. However, with implementation of mitigation measures, this impact is considered *less than significant*.**

This impact analysis addresses only those threshold issues pertaining to stormwater runoff rate and amount, which could potentially lead to flooding. Stormwater quality issues are addressed above under Impact 4.7-1.

The storm drain system serving the project site is currently constrained for build out of the General Plan (as assessed in the MPD) and may be constrained for existing conditions (refer to Table 4.7-1 and Figure 4.7-1a through Figure 4.7-1c). Development in accordance with the Specific Plan could occur on existing vacant parcels or redevelopment of other parcels, resulting in an increase in the amount of impervious surfaces compared to existing conditions by up to about 6 percent, and hence, runoff that drains to an already constrained system. The MPD assumed a general amount of impervious cover for all commercial and residential lands within the City, including the project site, to determine storm drain system capacity constraints for build out of the General Plan. These numbers may not accurately reflect exact conditions that would occur with development of the Specific Plan, although they do provide a basis on which to determine potential effects at the programmatic level. Assigning the same impervious fractions for similar land uses associated with implementation of the Specific Plan as with buildout of the General Plan provides an ability to assess potential Specific Plan effects on the storm drain system. Table 4.7-3 (Potential Specific Plan Storm Drain Capacity Impacts) lists the potential changes in impervious fraction with implementation of the Specific Plan and potential impacts associated with those changes provided that the maximum impervious fraction is not greater than 0.9 (as assumed for commercial development in the MPD). Actual impervious fractions may be lower or greater, depending upon site development characteristics. Potential significance of increased impervious area is noted in the last two columns in Table 4.7-1 (Potential Specific Plan Storm Drain Capacity Impacts) for the Specific

Plan in comparison to both existing conditions (column headed "Estimated Existing") and build out of the General Plan (column headed "GP").

Table 4.7-3 shows that implementation of the Specific Plan would substantially increase the amount of impervious surfaces compared to existing conditions in many areas. Compared to the General Plan Build-out, the Specific Plan would not, overall, substantially increase the amount of impervious area; the impervious fraction would increase in a few areas. For all areas where Specific Plan and General Plan have the same impervious fraction, even when the impervious fraction is higher than Existing Conditions, there would be no effect on storm drain system capacity if these areas drain to storm drain lines where no improvements were required in accordance with the MPD (refer to Table 4.7-1 Existing Project Site Drainage Characteristics and Capacity Constraints). Areas where the Specific Plan and General Plan have the same impervious fraction and drain to a storm drain system with MPD-required improvements, effects of the Specific Plan on the storm drain system capacity would be potentially significant in comparison to Existing Conditions.

Implementation of the Municipal NPDES Permit requires that priority development projects must infiltrate, harvest and re-use, evapotranspire, or bio-treat (e.g., biofilter) 85th percentile storm event. This would also result in a reduction in peak flow rates for all design storms,[22] but this reduction may not be sufficient enough to ensure that Specific Plan new development or significant redevelopment runoff does not exceed existing conditions and that existing or planned storm drain system capacity is adequate. Consequently, implementation of the Specific Plan would have a potentially significant impact on both existing and planned storm drainage systems.

Implementation of mitigation measures MM4.7-3 and MM4.7-4 would assess each specific development contributions to potential system capacity constraints and provide for mitigation of constraints such that potential impacts to storm drain system capacities would be ***less than significant***.

MM4.7-3 *The City of Huntington Beach shall require that the Applicant's Licensed Civil Engineer for each site-specific development prepare a Hydrology and Hydraulic Study to identify the effects of potential stormwater runoff from the specific development on the existing storm drain flows for the 10-, 25-, and 100-year design storm events. The Hydrology and Hydraulic Study shall identify existing runoff and proposed runoff, in addition to existing storm drain system capacity at the development site discharge location to the nearest down-gradient main junction. The Applicant shall design site drainage and document that the proposed development would not increase peak storm event flows over existing conditions for the design storm events. The final site plan shall not exceed an impervious fraction of 0.9, unless sufficient retention is incorporated into the site design to accommodate excess runoff.*

[22] Design storms, as described in the MPD, include the 10-year, 25-year, 50-year, and 100-year storm events, where chance of a storm event occurring in any given year is 10 percent for the 10-year storm event, 4 percent for the 25-year storm event, 2 percent for the 50-year storm event, and 1 percent for the 100-year storm event.

Table 4.7-3 Potential Specific Plan Storm Drain Capacity Impacts

TAZ[a]	Area (acres)	Drainage Pattern up to Major Drain/Subchannel[i]	Improvements Required for Capacity[b]	Impervious Fraction			Specific Plan Increase in Impervious Fraction Over[e]:		Specific Plan Level of Significance Compared to:[f]	
				Estimated Existing[c]	Estimated GP[c]	Specific Plan[d]	Estimated Existing	Estimated GP	Estimated Existing	Estimated GP
19	2.04	Edinger (street) to Edinger SD	None to new SD in Edinger and Improved in Edinger	0.90	0.9	0.9	0	0	NI	NI
41 (west)	12.54	Edinger (street) to Edinger SD	None to new SD in Edinger and Improved in Edinger	0.88	0.9	0.9	0.02	0	PS	NI
41 (east frontage)	1.78	Goldenwest (street)	None to improved connector	0.79	0.9	0.9	0.11	0	PS	NI
39 (western frontage)	1.84	Goldenwest (street) to local (street) to Wishingwell (street) to Sunlight SD	New SD in Wishingwell, improved portion of Sunlight SD	0.77	0.9	0.9	0.13	0	PS	NI
39 (east)	15.37	Edinger (street) to north-south SD	None	0.88	0.9	0.9	0.02	0	NI[g]	NI
37	8.57	Gothard (street)	None	0.48	0.9	0.9	0.42	0	NI[g]	NI
21	8.69	Edinger SD to north-south SD	Improved Edinger SD	0.90	0.9	0.9	0	0	NI	NI
36	6.13	Gothard (street)	None	0.70	0.9	0.9	0.20	0	NI[g]	NI
22	9.63	Gothard (street) to Edinger SD to N/S SD	None to new SD in Gothard, improved Edinger SD	0.25	0.725	0.65	0.40	-0.08	PS	NI
23	18.24	Gothard (street) to Edinger SD to N/S SD	New SD in Gothard, improved Edinger SD	0.90	0.9	0.9	0	0	NI	NI
35[h] (northwest)	6.99	Edinger SD	None	0.90	0.9	0.9	0	0	NI	NI
35[h] (southeast of western portion)	6.99	Local (street) to Travelway SD	Improved Travelway SD	0.90	0.9	0.9	0	0	NI	NI
35[h] (northwest of eastern portion)	6.07	Local (street) to Travelway SD	Improved Travelway SD	0.90	0.9	0.9	0	0	NI	NI
35 (southeast of eastern portion)	4.42	Local (street) to Parkside (street) to Travelway SD	New SD in Parkside, improved Travelway SD	0.90	0.9	0.9	0	0	NI	NI
33 (north)	4.08	Local (street) to Parkside (street) to Travelway SD	New SD in Parkside, improved Travelway SD	0.44	0.9	0.72	0.28	-0.18	PS	NI
33 (north central)	1.97	Local (street) to Travelway SD	Improved Travelway SD	0.71	0.9	0.9	0.19	0	PS	NI

Table 4.7-3 Potential Specific Plan Storm Drain Capacity Impacts

TAZ[a]	Area (acres)	Drainage Pattern up to Major Drain/Subchannel[b]	Improvements Required for Capacity[b]	Impervious Fraction			Specific Plan Increase in Impervious Fraction Over[e]:		Specific Plan Level of Significance Compared to:[f]	
				Estimated Existing[c]	Estimated GP[c]	Specific Plan[d]	Estimated Existing	Estimated GP	Estimated Existing	Estimated GP
33 (south)	2.20	Travelway SD; Local (street) to Parkside (street) to Travelway SD	Improved Travelway SD; new SD in Parkside, improved Travelway SD	0.90	0.9	0.9	0	0	NI	NI
34	4.85	Local (street) to Silver SD to Heil SD	None to improved Silver SD	0.90	0.9	0.9	0	0	NI	NI
32 (north ⅔)	10.37	Beach (street) to Stark SD to Malaga SD	None to new SD in Stark, improved Malaga SD	0.90	0.9	0.9	0	0	NI	NI
32 (south ⅓)	5.01	Local	Improved Local SD	0.90	0.9	0.9	0	0	NI	NI
85	4.90	Local	Improved Local SD	0.90	0.9	0.9	0	0	NI	NI
87	6.66	Viewpoint (street) to Local SD	None to new SD in Viewpoint, improved Local SD connector	0.90	0.9	0.9	0	0	NI	NI
88	3.13	Local	None to improved connector	0.90	0.9	0.9	0	0	NI	NI
89 (northeast)	2.78	Beach (street); direct	Improved connector	0.90	0.9	0.9	0	0	NI	NI
89 (southwest)	2.42	Warner (street) to Warner SD	None to improved Warner SD connector	0.90	0.9	0.9	0	0	NI	NI
90 (north)	2.91	Local	None to improved connector	0.90	0.9	0.9	0	0	NI	NI
90 (south)	8.61	Beach SD	Improved Beach SD (possibly new SD in Beach to improved Beach SD)	0.90	0.9	0.9	0	0	NI	NI
91 (north)	4.08	Beach SD	Improved Beach SD	0.90	0.9	0.9	0	0	NI	NI
91 (south)	2.36	Beach (street) to Beach SD	None	0.90	0.9	0.9	0	0	NI	NI
99 (north)	7.03	Local (street) to Sycamore SD to Ash SD to Warner SD	Improved Sycamore SD, improved Ash SD, improved Warner SD connector	0.90	0.9	0.9	0	0	NI	NI
99 (south)	5.31	Beach SD	None to improved Beach SD (last block)	0.90	0.9	0.9	0	0	NI	NI
100 (north)	4.11	Beach (street) to Beach SD	None to improved Beach SD (last block)	0.90	0.9	0.9	0	0	NI	NI

Table 4.7-3 Potential Specific Plan Storm Drain Capacity Impacts

TAZ[a]	Area (acres)	Drainage Pattern up to Major Drain/Subchannel[b]	Improvements Required for Capacity[b]	Impervious Fraction			Specific Plan Increase in Impervious Fraction Over[e]:		Specific Plan Level of Significance Compared to:[f]	
				Estimated Existing[c]	Estimated GP[c]	Specific Plan[d]	Estimated Existing	Estimated GP	Estimated Existing	Estimated GP
100 (south)	4.11	Beach (street) to Beach SD to Slater SD	None to improved Slater SD; most SDs to HCP require improvements	0.90	0.9	0.9	0	0	NI	NI
97	5.00	Beach SD; Local street = Local (street) to direct C6SCI	None to improved Beach SD (last block); local street = none	0.90	0.772	0.9	0	0.13	NI	PS
98 (north)	2.46	Beach (street) to Beach SD	None to improved Beach SD (last block)	0.52	0.9	0.9	0.38	0	PS	NI
98 (south)	2.35	Beach (street) to Slater (street) to Slater SD	None	0.90	0.9	0.9	0	0	NI	NI
98 (middle street corner)	0.45	Holland (street) to direct	None	0.90	0.9	0.9	0	0	NI	NI
124	4.54	Beach SD to Slater SD	Improved portions of Beach SD, improved Slater SD, most SDs to HCP require improvements	0.83	0.9	0.9	0.07	0	PS	NI
126 (northeast ⅔)	5.06	Local SD to Van Buren SD to Slater SD	None to improved Local SD, improved Van Buren SD	0.71	0.9	0.9	0.19	0	PS	NI
126 (southwest ⅓)	1.50	Beach (street) to Beach SD to Slater SD	None to new connector to Beach SD, improved Beach SD (last block), improved Slater SD (most of length)	0.59	0.9	0.90	0.31	0	PS	NI
125 (north ⅔)	3.46	Beach (street); Beach SD to Slater SD	Improved portions of Beach SD to improved Slater SD (most of length)	0.68	0.9	0.9	0.22	0	PS	NI
125 (south ⅓)	1.70	Talbert SD to pond SD	Intermittent improved Talbert SD, improved pond SD	0.90	0.9	0.9	0	0	NI	NI
128 (northwest ⅔)	9.32	Beach (street) to Beach SD to Slater SD	None to new connector to Beach SD, improved Beach SD (last block), improved Slater SD (most of length)	0.90	0.9	0.9	0	0	NI	NI
128 (southeast ⅓)	4.59	Direct to pond SD	Improved pond SD	0.90	0.9	0.9	0	0	NI	NI
133	13.86	Beach (street) to Beach SD to Talbert SD	None to improved Beach SD connector to intermittent improved pond SD	0.90	0.9	0.9	0	0	NI	NI

Table 4.7-3 Potential Specific Plan Storm Drain Capacity Impacts

TAZ[a]	Area (acres)	Drainage Pattern up to Major Drain/Subchannel[b]	Improvements Required for Capacity[b]	Impervious Fraction			Specific Plan Increase in Impervious Fraction Over[e]:		Specific Plan Level of Significance Compared to:[f]	
				Estimated Existing[c]	Estimated GP[c]	Specific Plan[d]	Estimated Existing	Estimated GP	Estimated Existing	Estimated GP
134 (northwest)	3.94	Local (street) to Delaware SD to Ellis SD	None to improved Delaware SD	0.86	0.9	0.87	0.01	-0.03	PS	NI
134 (east and south)	11.47	Beach SD to Franklin SD to Delaware SD to Ellis SD	None/improved Beach SD, intermittent improved Franklin SD, improved Delaware SD	0.84	0.9	0.90	0.06	0	PS	NI
130	18.06	Local SD to pond SD	None to improved connector, intermittent improved pond SD	0.90	0.9	0.9	0	0	NI	NI
132	4.63	Local SD/Beach SD to Franklin SD to Delaware SD to Ellis SD	None/improved Beach SD, intermittent improved Franklin SD, improved Delaware SD	0.90	0.9	0.9	0	0	NI	NI
150	12.74	Local SD to Ellis SD	Improved Local SD, improved Ellis SD connector	0.90	0.9	0.9	0	0	NI	NI
151 (northeast)	8.80	Local SD to Ellis SD	New Local SD connector, improved Local SD, improved Ellis SD connector	0.90	0.9	0.9	0	0	NI	NI
151 (southwest)	14.94	Local SD	Improved Local SD	0.90	0.9	0.9	0	0	NI	NI
152 (north)	4.40	Local SD to Ellis SD	New Local SD connector, improved Local SD, improved Ellis SD connector	0.90	0.9	0.9	0	0	NI	NI
152 (south)	4.00	Local SD	Improved Local SD	0.90	0.9	0.9	0	0	NI	NI
153	7.50	Beach (street) to Beach SD to Clay SD	Improved Clay SD	0.59	0.9	0.59	0	-0.31	NI	NI
154 (northwest corner)	5.19	Local SD to Franklin SD to Delaware SD to Ellis SD	Improved Local SD, intermittent improved Delaware SD, partial improved Ellis SD	0.90	0.9	0.9	0	0	NI	NI
154 (south)	3.29	Beach SD to Constantine SD to Lindenwood/Modale SD	Partial improved Linwood/Modale SD	0.90	0.9	0.9	0	0	NI	NI
154 (northeast corner)	1.20	Local (street) to Lindenwood/Modale SD	Partial improved Linwood/Modale SD	0.90	0.9	0.9	0	0	NI	NI

Table 4.7-3 Potential Specific Plan Storm Drain Capacity Impacts

TAZ[a]	Area (acres)	Drainage Pattern up to Major Drain/Subchannel[b]	Improvements Required for Capacity[b]	Impervious Fraction			Specific Plan Increase in Impervious Fraction Over[e]:		Specific Plan Level of Significance Compared to:[f]	
				Estimated Existing[c]	Estimated GP[c]	Specific Plan[d]	Estimated Existing	Estimated GP	Estimated Existing	Estimated GP
155 (near Garfield)	1.42	Beach (street) to Garfield (street)	None	0.90	0.9	0.9	0	0	NI	NI
155 (north of Garfield)	4.25	Beach (street) to Constantine SD to Lindenwood/Modale SD	Intermittent improved Linwood/Modale SD	0.90	0.9	0.9	0	0	NI	NI
175 (north of Clay)	12.15	Beach SD to Clay SD	Improved Clay SD	0.86	0.9	0.9	0.04	0	PS	NI
175 (between Owen and Clay)	1.11	Owen (street) to Florida SD to Clay SD	None to improved Owen SD connector, improved Florida SD, improved Clay SD	0.90	0.9	0.9	0	0	NI	NI
175 (south of Owen)	2.92	Beach SD	Improved connectors	0.77	0.86	0.9	0.13	0.04	PS	PS
174 (between Garfield and Clay)	10.52	Beach SD to Clay SD	Improved connector, improved Clay SD	0.54	0.9	0.90	0.36	0	PS	NI
174 (Clay to Yorktown —northwest)	4.16	Beach (street) to Beach SD	None to intermittent improved Beach SD	0.90	0.9	0.9	0	0	NI	NI
174 (Clay to Yorktown —southeast)	6.97	Worchester SD to Yorktown SD	None	0.90	0.9	0.9	0	0	NI	NI
217 (near Utica)	0.27	Utica (street) to Local SD to Florida SD	New SD in Utica, improved Utica SD connector, improved Florida SD	0.90	0.9	0.9	0	0	NI	NI
217 (except near Utica)	6.53	Beach (street) to Beach SD	Improved Beach SD connector	0.90	0.9	0.9	0	0	NI	NI
218 (near Utica)	0.47	Local (street) to Florida SD	Improved Florida SD	0.90	0.9	0.9	0	0	NI	NI
218 (except near Utica)	7.85	Beach (street) to Beach SD	Improved Beach SD connector	0.87	0.9	0.87	0	-0.03	NI	NI
219 (northeast and east)	9.38	Direct	None to new SD in ponded area	0.59	0.9	0.90	0.31	0	PS	NI
219 (west)	17.61	Beach (street) to Beach SD	None to blue connector	0.90	0.9	0.9	0	0	NI	NI
242 (north ¾)	0.52	Direct	None	0.90	0.9	0.9	0	0	NI	NI
242 (south ¼)	2.25	Beach SD to Indianapolis SD	Improved Indianapolis SD	0.92	0.85	0.87	-0.05	0.02	NI	PS

Table 4.7-3 Potential Specific Plan Storm Drain Capacity Impacts

TAZ[a]	Area (acres)	Drainage Pattern up to Major Drain/Subchannel[g]	Improvements Required for Capacity[b]	Impervious Fraction			Specific Plan Increase in Impervious Fraction Over[e]:		Specific Plan Level of Significance Compared to:[f]	
				Estimated Existing[c]	Estimated GP[c]	Specific Plan[d]	Estimated Existing	Estimated GP	Estimated Existing	Estimated GP
239	3.63	Direct	None	0.90	0.85	0.9	0	0.05	NI	PS
241	2.44	Beach/Local (street); direct	Improved connector	0.90	0.9	0.9	0	0	NI	NI
251	0.74	Beach (street) to Beach SD to local SD	Partial improved Beach SD	0.79	0.5	0.79	0	0.29	NI	PS
268	7.34	Local SD to Indianapolis SD	Improved local SD, improved Indianapolis SD	0.90	0.9	0.9	0	0	NI	NI

SOURCE: PBSJ 2009, MPD 2005

a. TAZ = Traffic Analysis Zone; Specific Plan area only. Parenthesis indicates sub-portion of Specific Plan area within the associated TAZ

b. Improvements required per MPD; new = new SD needed; improved = existing SD but undersized and capacity upgrades needed.

c. From Table 4.7-1, where GP = General Plan

d. Estimated based on primarily commercial and mixed use impervious fraction of no more than 0.90 and area-weighted average residential land use types

e. The overall increase in impervious fraction resulting from the Specific Plan compared first to existing conditions and then to build out of the General Plan. Negative values denote a reduction in impervious fraction resulting from implementation of the Specific Plan.

f. Level of significance where NI = no impact (no change or reduction in impervious fraction) and PS = potentially significant impact (increase in impervious fraction)

g. Although the Specific Plan would increase the impervious fraction compared to existing conditions, build out of the General Plan with the same impervious fraction as the Specific Plan, indicates no system capacity constraints and required improvements

h. According to the MPD, there are no current off-site system capacity deficiencies in the Murdy Channel. However, the MPD analysis was based on stormwater detention mitigation measures identified for the adjacent Bella Terra Mall project, which were not implemented. Therefore, without the stormwater detention that was originally tabled for the Bella Terra Mall, it can be assumed that conveyance capacity of the City storm drainage system within the Murdy Channel drainage area is constrained.

The Hydrology and Hydraulic Study shall also incorporate all current adopted Municipal NPDES Permit requirements for stormwater flow calculations and retention/detention features in effect at the time of review.

MM4.7-4 *The City of Huntington Beach shall require that adequate capacity in the storm drain system is demonstrated from the specific development site discharge location to the nearest main channel to accommodate discharges from the specific development. If capacity is demonstrated as adequate, no upgrades will be required. If capacity is not adequate, the City of Huntington Beach shall identify corrective action(s) required by the specific development Applicant to ensure adequate capacity. Corrective action could include, but is not limited to:*

- *Construction of new storm drains, as identified in the MPD or based on the Hydrology and Hydraulic Study, if the Hydrology and Hydraulic Study identifies greater impacts than the MPD*
- *Improvement of existing storm drains, as identified in the MPD or based on the Hydrology and Hydraulic Study, if the Hydrology and Hydraulic Study identifies greater impacts than the MPD*
- *In-lieu fees to implement system-wide storm drain infrastructure improvements*
- *Other mechanisms as determined by the City Department of Public Works.*
- *For nonresidential areas, if redevelopment would result in an impervious fraction of less than 0.9 and does not increase the directly connected impervious area compared to existing conditions, runoff is expected to remain the same or less than as assessed in the MPD and only MPD improvements would be required.*

Because some storm drain system constraints may be located far downgradient from the actual development site, several properties may serve to contribute to system capacity constraints. Therefore, the City Department of Public Works shall assess each site development and system characteristics to identify the best method for achieving adequate capacity in the storm drain system. Drainage assessment fees/districts to improve/implement storm drains at downstream locations or where contributing areas are large are enforced through Municipal Code *(Section 14.20).*

The City Department of Public Works shall review the Hydrology and Hydraulic Study and determine required corrective action(s) or if a waiver of corrective action is applicable. The site-specific development Applicant shall incorporate required corrective actions into their project design and/or plan. Prior to receiving a Certificate of Occupancy or final inspection, the City Department of Public Works shall ensure that required corrective action has been implemented.

Threshold	Would the project otherwise substantially degrade water quality?

Impact 4.7-4 **Implementation of the proposed project would not contribute more wastewater that could contribute to water quality degradation but it could increase the use of recycled water, which could cause or contribute to groundwater quality degradation. This impact is considered *less than significant*.**

Wastewater

Bacterial contamination of Southern California beaches within the vicinity of the City of Huntington Beach occurs on a regular basis, primarily during wet weather conditions (Heal the Bay n.d.). Wastewater from the City and Specific Plan area could cause or contribute to water quality degradation of coastal areas if high bacteria levels are discharged from the reclamation plants or leaks from old sewer pipes and migrate to groundwater that discharges to coastal areas (exfiltration). Studies have indicated that sources such as possible exfiltration from sewers are not a contributor to high bacteria counts in coastal waters (OCSD 2002; Sanders et al. 2005). Additionally, discharges from the OCSD outfalls to the ocean are not a contributor to high bacteria counts in coastal waters (Nobel et al 2003). Further studies conducted by the City and others are continuing to identify sources and work toward the specific objective of minimizing posting and closure of coastal waters (CURMP). Therefore, there would be ***no impact*** from increased wastewater generated by the development of the Specific Plan.

Recycled Water

Decreasing water supplies and increasing water demands require extreme conservation methods that may include substantial use of recycled water from captured stormwater runoff. Recycled urban runoff water would be expected to have a higher salt content compared to fresh water or potable water because it picks up urban pollutants during runoff and may experience some salt concentration during evaporation. Groundwater below portions of the project site is shallow and infiltrating recycled water could cause or contribute to increased salinity. Additionally, conservative irrigation with recycled water during the dry season can lead to salt build up in soils that are flushed to deeper depths during wet season rain events.

Existing soils within the project site have a moderately high-to-high runoff rate and infiltration rates are not expected to be high. Shallow groundwater is not used as a water supply as it may be somewhat influenced by salt-water intrusion from the Pacific Ocean. Therefore, it is not expected that use of higher salt content recycled water would percolate to deeper groundwater that would substantially affect groundwater quality used for potable purposes.

If recycled water contributes to dry-weather runoff, the high salinity runoff could also affect surface water quality. Water quality measurements in City drainage channels indicate that dry weather flows already have high salt content (HB 2006b) and recycled water would not be expected to exceed existing dry weather flow salinities. Recycled water would have to meet California Code of Regulations Title 22 standards for drinking water, which recommend total dissolved solids (TDS)[23] concentration less than or equal to 500 mg/L with an upper limit of 1,000 mg/L, and only short term concentrations of up to 1,500 mg/L. Dry weather flows within the storm drainage system range from 610 to 26,000 mg/L TDS, with typical concentrations exceeding 1,000 mg/L (HB 2006b). Use of recycled water would be subject to either an individual WDR or the final Recycled Water WDR (when adopted), which would impose effluent limitations to minimize potential degradation of water resources. Additionally, surface runoff ultimately discharges to the Pacific Ocean, which would not be affected by higher salt content surface

[23] TDS is a measure of salinity.

runoff. Therefore, any high salt surface discharges would not cause or contribute to increased surface water quality salinity and water quality impacts from recycled water use would be ***less than significant***.

Threshold	Would the project place housing 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?
Threshold	Would the project 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 dams?
Threshold	Would the project expose people or structures to a significant risk of loss, injury, or death involving inundation by seiche, tsunami, or mudflow?

Impact 4.7-5 **Implementation of the proposed project could place housing and structures within a 100-year flood hazard area and expose people and structures to risk of loss, injury, or death involving flooding, including flooding by failure of a levee or dam, or tsunamis. With existing regulatory requirements and programs, this impact is considered *less than significant*.**

100-year Flood Hazards

Portions of the project site are located within a 100-year flood hazard area from failure of the East Garden Grove–Wintersburg Channel and Huntington Beach Channel, as mapped by FEMA. Portions of the East Garden Grove–Wintersburg Channel drainage area are identified as a FEMA flood Zone A, which means they are subject to flooding during a 100-year flood event but no Base Flood Elevation[24] (BFE) has been determined (refer to Figure 4.7-2). The City General Plan (Figure EH-11) indicates that flood depths in these areas range from less than 1 foot to 3 feet in depth. FEMA, the County of Orange, and the City have agreed to use best engineering data available for this Zone A area regarding flood impacts. Areas flooded from failure of levee systems during the 100-year flood event are included in the Revised FEMA maps (February 18, 2004), where applicable, that reflect improvements made to the Santa Ana River Channel and changes in flooding sources (FEMA LOMR March 30, 2009).

Below-Grade Channels

The Murdy Channel, Ocean View Channel, and C6-SCI channel are below-grade structures (not confined in a levee system) and, therefore, are not subject to levee failure. There would be ***no impact*** from these channels and no further analysis is required.

Above Grade Channels

The East Garden Grove–Wintersburg Channel is located down gradient of the project site but is an at-grade structure (confined within levees). The East Garden Grove–Wintersburg Channel levees have not

[24] The Base Flood Elevation (BFE) is the elevation to which flooding would occur. In other words, if the BFE of a site is 11 feet above msl, and the ground surface is 8 feet above msl, then the site would experience a 3-foot depth of flooding.

been certified by FEMA, and, therefore, must be considered to be potentially subject to levee failure. Revised FEMA maps[25] (February 18, 2004) show the areas of the project site and surrounding areas that would be inundated during a 100-year flood event (1 percent chance of occurring in any given year), including levee failure (refer to Figure 4.7-2). Therefore, the potential flood hazards associated with failure of the East Garden Grove–Wintersburg Channel levee system is addressed above, and depicted in current FEMA flood maps. Flood Hazard Areas, including levee failure analysis, are depicted on Figure 4.7-2.

The Huntington Beach Channel is located adjacent to the project site and is confined within levees. The Base Flood Elevation (BFE), which provides the depth of flooding in the event of a 100-year storm event, has been determined for the Huntington Beach Channel flood hazard area. A Letter of Map Revision[26] has removed this area from the SFHA, re-categorized the flood zone as a 500-year flood zone, and amended the highest BFE to 10 feet above mean sea level and is contained within the channel.

FEMA allows development of residential uses within a flood hazard area if the lowest floor is elevated to, or above, the 100-year flood elevation. Nonresidential or commercial structures can be either elevated or dry flood-proofed to, or above, the 100-year flood elevation. Therefore, the following existing regulatory requirements apply:

- Residential uses (including basements) must be elevated such that the lowest floor would be constructed one foot above the expected flood depth or BFE, as applicable (as required by FEMA and Chapter 222 of the City of Huntington Beach Zoning and Subdivision Ordinance).
- Nonresidential structures, including utilities and sanitary facilities must be elevated or flood-proofed to one foot above the flood depth and capable of resisting hydrostatic and hydrodynamic loads and effects of buoyancy as required by Chapter 222 of the City of Huntington Beach Zoning and Subdivision Ordinance.

In accordance with FEMA regulations, the following minimum development requirements would also apply, which would help prevent potential effects associated with on-site flooding:

- The site-specific development Applicant shall comply with the following and the City of Huntington Beach shall review the development plan/design to ensure that requirements are met:[27]
  - (1) Obtain all necessary permits from those governmental agencies from which approval is required by Federal or State law, including section 404 of the Federal Water Pollution Control Act Amendments of 1972, 33 U.S.C. 1334;
  - (2) Comply with Floodplain Overlay District requirements (City of Huntington Beach Zoning Code Title 22, Chapter 222)
  - (3) Ensure that proposed building sites will be reasonably safe from flooding. If a proposed building site is in a flood-prone area, all new construction, and substantial improvements shall be

[25] FEMA Flood Insurance Rate Maps issued February 18, 2004 with subsequent revisions issued on October 21, 2004; April 13, 2005; July 30, 2007; and March 30, 2009.
[26] FEMA Flood Insurance Rate Map revision March 30, 2009.
[27] Federal Code of Regulations Title 44 Emergency Management and Assistance Section 60.3 Flood plain management criteria for flood-prone areas.

(a) designed (or modified) and adequately anchored to prevent flotation, collapse, or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy,

(b) constructed with materials resistant to flood damage,

(c) constructed by methods and practices that minimize flood damages, and

(d) constructed with electrical, heating, ventilation, plumbing, and air conditioning equipment and other service facilities that are designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding.

(4) New and replacement water supply systems to be designed to minimize or eliminate infiltration of flood waters into the systems; and

(5) New and replacement sanitary sewage systems to be designed to minimize or eliminate infiltration of flood waters into the systems and discharges from the systems into flood waters and onsite waste disposal systems to be located to avoid impairment to them or contamination from them during flooding.

- In accordance with FEMA regulations, the City of Huntington Beach is required to:[28]

> Review the proposed new development to determine whether it would be reasonably safe from flooding. If a development proposal is in a flood-prone area, any such proposals shall be reviewed to ensure that (i) all such proposals are consistent with the need to minimize flood damage within the flood-prone area, (ii) all public utilities and facilities, such as sewer, gas, electrical, and water systems are located and constructed to minimize or eliminate flood damage, and (iii) adequate drainage is provided to reduce exposure to flood hazards;

These standards have been designed to be protective of human health and safety. Consequently, adherence to existing regulations would ensure that impacts associated with risks to people or structures, from placement of housing or structures within a flood hazard area would be ***less than significant***.

Levee Failure

The nearest large watercourse is the Santa Ana River, located over 2 miles east of the project site. Levees constructed along the Santa Ana River help to minimize the flood risks to areas within the project site. As noted above, in 1997 and through 2002, FEMA revised the flood maps for areas within the City of Huntington Beach in recognition of the improvements made to the Santa Ana River Channel. These revisions reduced the anticipated flood level in the City. Impacts associated with flood channel capacity exceedance and failure of the Santa Ana River levee system is already included in the Revised FEMA maps (February 18, 2004) and discussed above.

Other surface watercourses within the project vicinity are the Murdy Channel, Ocean View Channel, East Garden Grove West Channel, and Huntington Beach Channel. Nearby, off-site channels include the City C6-SCI Channel and the East Garden Grove–Wintersburg Channel.

The potential flood hazards associated with levee system failure is addressed above under the 100-year flood hazards. With implementation of existing regulatory requirements, including City and FEMA floodplain development requirements, flood impacts associated with levee failure are ***less than significant***.

[28] Federal Code of Regulations Title 44 Emergency Management and Assistance Section 60.3 Flood plain management criteria for flood-prone areas.

Dam Failure

The project site is located within the Prado Dam Failure Inundation Area, as identified in the Orange County General Plan Hazards Element, Figure 2-19 (OC 2005a). People and structures in the City of Huntington Beach could be subject to inundation risks in the event of a failure of the Prado Dam.

The significance of failure of the Prado Dam would highly depend upon the depth of flooding experienced in the area, and if any warning and monitoring systems are in place. The Prado Dam was originally designed in the 1930s to contain 200-year storm event runoff from expected build out of the watershed (OC 2005). Since the Prado Dam was built, however, changes have occurred in the drainage area. Historic data on rainfall and runoff, coupled with advances in predicting future flood potential, have shown Prado Dam to presently offer only a 70-year flood protection and would not accommodate the probable maximum flood that would result in overtopping of the dam (OC 2005). Another serious concern is that the existing Prado Dam and spillway could not accommodate a probable maximum flood, which would result in overtopping of the dam (OC 2005).

Since the General Plan Hazards Element was prepared, significant improvements to the Santa Ana River system, on which the Prado Dam is constructed, have been completed that are not reflected in the General Plan. The Santa Ana River Mainstem Project, contained in the *Water Resources Development Act of 1986* (PL 99-662), was signed into law by President Reagan on November 17, 1986. As signed by President Reagan, the Act authorized the following Santa Ana River improvements:

- Raise Prado Dam and increase reservoir capacity
- Construct a new dam to be called "Seven Oaks Dam" on the Santa Ana River northeasterly of the communities of East Highlands and Mentone
- Implement flood plain management between Seven Oaks and Prado dams
- Acquire the floodway in the Santa Ana Canyon reach of the river to carry the water releases from Prado Dam, providing some structural protection along certain bends in the river, but maintaining the natural conditions as much as possible as a floodway and for environmental enhancement

The plan of improvements for the Prado Dam included the following (OCFCCD n.d.):

- Raising the existing embankment 28.4 feet to an elevation of 594.4 feet
- Raising the spillway crest from elevation of 543 feet to 563 feet
- Construct a new outlet works from 9,000 cfs to 30,000 cfs maximum outlet capacity
- Constructing new levees and dikes. Acquisition of additional acreage behind the Dam is required to enlarge the existing reservoir

These improvements have increased the capacity of the Prado Reservoir and enhanced the ability of the Prado Dam to contain the probable maximum flood. Although there was a reported leak in 2005, the dam remained stable enough such that evacuation of the City was not required.

The City of Huntington Beach currently operates an Emergency Preparedness Program to prepare for and respond effectively to major emergencies. It establishes and maintains an Emergency Management

System that coordinates preparedness, response, and recovery phases for natural disasters and homeland security emergencies. The City's comprehensive Emergency Management Program includes all elements necessary to respond quickly and effectively to major emergencies. These elements include: an Emergency Management Plan, Emergency Operations Center, trained and equipped Public Safety Officers, Employee Safety Officer Program, Public Education Program, and trained volunteers.

The County of Orange also operates the Orange County Operational Area Emergency Operations Center (OC OA/EOC) for managing disaster response and recovery for County Agencies and Departments and constituents served by the operational areas. The EOC coordinates disaster response and recovery for the Operational Area, including all political subdivisions of Orange County, and communicates operations resource requirements and availability with the State Regional Operations Center. The Standardized Emergency Management System (SEMS) is the state-mandated framework for emergency response and recovery.

In accordance with SEMS, the EOC is to act as a central point for coordination of operational, administrative, and support needs of emergency workers. Designated officials gather and process information to and from County agencies and departments, school and special districts, business and industry, volunteer organizations, individuals and State and Federal Governments. The Orange County and Operational Area Emergency Operations Center is staffed with trained personnel from all agencies within the County of Orange and various operational area These conditions reduce the potential for substantial risk in the event of a dam failure.

Improvements to the Santa Ana River and Prado Dam reduce the risk of dam failure, and existing emergency response mechanisms would also minimize the risk to people and structures from failure of the Prado Dam. Therefore, potential impacts associated with dam failure would be ***less than significant***.

Tsunami

The lower portion of the Specific Plan area, from just north of Indianapolis Avenue continuing to the southern boundary, is located within a Moderate Tsunami Run-Up Area (HB 1999). This inundation area is estimated on the maximum past occurrence in California from distant and local earthquakes. The probability of such an occurrence is considered very low (HB 1999). This portion of the proposed Specific Plan area is also located in a Floodplain Overlay District and subject to floodplain development requirements. Additionally, the Huntington Beach Channel, which has been recently determined to contain the 100-year flood event, would serve to reduce potential tsunami run-up flooding because it would contain run-up water within the channel. Consequently, the potential for a significant tsunami impacts is ***less than significant***.

Threshold	Would the project place within a 100-year flood hazard area structures that would impede or redirect flood flows?

Impact 4.7-6 **Implementation of the Specific Plan could place structures within a 100-year flood hazard area, but wouldn't impede and redirect flood flows. This impact is considered *less than significant*.**

As mentioned above, the Specific Plan would place structures within a flood hazard area as mapped by FEMA. The regulatory floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 100-year flood discharge can be conveyed without increasing the base flood elevation more than a specified amount. FEMA has mandated that projects cannot cause a rise in the regulatory floodway of more than a one-foot cumulative rise for all projects in the base (100-year) floodplain. The southern portion of the project site (BFE) is not located within a floodway and there would be no impedance or redirection of flood flows with development in this area (Residential Parkway). The floodway zone for flood hazard area Zone A has not yet been defined by FEMA. However, the majority of the project site is located at the edge of the flood hazard area, in an area that is likely flooded by lateral spreading, and would not result in substantially more structures in the overall floodplain compared to existing conditions (the floodplain is currently primarily developed with structures). A portion of the project site, between Edinger Avenue and Heil Avenue, may be in an area where infill could cause or contribute to impedance of flood flows. However, Specific Plan development in this area would not create substantially more fill compared to existing conditions; the project site currently contains large structures with little vacant lands that would be developed. Therefore, potential impacts of Specific Plan structures on flood flows would be ***less than significant***.

Threshold	Would the project result in the construction of new stormwater drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects? (Including additional Municipal NPDES Permit 7)

Impact 4.7-7 **Implementation of the Specific Plan would result in the construction of new and/or improved stormwater drainage facilities. However, with implementation of mitigation measures and existing regulations, this impact is considered *less than significant*.**

Please refer to Impact 4.7-1 and Impact 4.7-3 for detailed discussions regarding existing regulations and mitigation measures that would be applicable to new or expanded storm drain facilities. This impact discussion summarizes the information presented therein.

Implementation of local on-site storm drainage systems required by implementation of the Specific Plan would include construction activities that could contribute additional sources of polluted runoff to the storm drain system. Existing regulations require preparation and implementation of a SWPPP and a City Precise Grading permit would be required. Any potential construction dewatering would be subject to the De Minimus Threat General Permit conditions. The City of Huntington Beach LIP also requires that all construction projects, regardless of size or priority, implement stormwater BMPs that shall include, at a minimum, erosion and sediment controls. The construction of additional new or expanded on-site or off-site storm drain facilities would be required for implementation of the Specific Plan developments.

Construction of these new facilities would be subject to the same regulatory requirements, or more (if the site development is less than 1 acre and does not trigger requirement for coverage under the NPDES General Permit for construction activities) as implementation of on-site storm drainage. Therefore, existing regulatory requirements would ensure that construction of a new or expanded stormwater drainage facility would not result in substantial environmental effects and potential impacts would be ***less than significant***.

4.7.4 Cumulative Impacts

A cumulative impact analysis is only provided for those thresholds that result in a less-than-significant, potentially significant, or significant and unavoidable impacts. A cumulative impact analysis is not provided for Effects Found Not to Be Significant, which result in no project-related impacts.

The geographic context for surface water hydrology and water quality cumulative impact analyses is the Westminster Watershed. The limits of the Orange County Groundwater Basin provide the cumulative geographic context with regard to groundwater impacts. The surface area above the Orange County Groundwater Basin is largely built-out (OC 2005). However, there are still some open space and rural residential areas within the groundwater basin surface area. Major areas of vacant lands within the Westminster Watershed include the Seal Beach Naval Area and coastal wetland areas (OCWCRD n.d.a). Residential development is not permitted in these lowland wetlands, and they are currently designated as Open Space Reserves.

Major areas of vacant lands in the Talbert/Greenville Banning Channel Watersheds are in coastal wetland areas (OCWCRD n.d.e) and the Banning Ranch deferred certification area (NB 2005). The Banning Ranch consists of 505 acres where oil and gas operations are conducted throughout the County portion of the property. The property also contains a number of sensitive habitat types and steep coastal bluffs along the southern and western edges of the mesa. Future land use is under review. The Coastal Commission retains permitting authority.

The cumulative analysis includes full buildout of the Westminster Watershed, which includes portions of the cities of Anaheim, Cypress, Fountain Valley, Garden Grove, Huntington Beach, Los Alamitos, Santa Ana, Seal Beach, Stanton, and Westminster. The Westminster Watershed covers 74.1 square miles in the southwestern corner of Orange County. Three main tributaries drain this watershed. The Los Alamitos Channel drains into the San Gabriel River, while the Bolsa Chica Channel empties into Huntington Harbour and then to Anaheim Bay. The East Garden Grove–Wintersburg Channel drains past the Bolsa Chica Wetlands and then into Huntington Harbour. Land use within the Westminster Watershed is primarily single and multi-family residential, commercial, and industrial with some parkland (HB 2005a). The cumulative analysis includes full buildout of the Talbert/Huntington Beach Channel subwatershed of the Westminster Watershed; the Banning Channel of the Talbert/Greenville Banning Watershed is located on the eastern side of the Santa Ana River from the Talbert/Huntington Beach Channel subwatershed. This analysis also includes implementation of TMDLs for 2006 303(d)-listed water quality limited segments (Huntington Harbour and Anaheim Bays) and addresses potential effects of global climate change.

Water Quality

Some receiving waters in the Westminster Watershed have been listed pursuant to Section 303(d) as not attaining water quality standards established by EPA. Anaheim Bay is listed as impaired (not meeting its designated beneficial uses) by dieldrin, nickel, PCBs, and sediment toxicity from unknown sources. Huntington Harbour is listed as impaired by chlordane, copper, lead, nickel, PCBs, and sediment toxicity from unknown sources, and by pathogens from urban runoff/storm sewers. Dry and wet-weather discharge within the watershed have exceeded chronic and acute California Toxics Rule (CTR) criteria for certain pollutants. Consequently, even reducing the Specific Plan discharges of pollutants to existing conditions levels could contribute to cumulative violations of water quality standards if existing project site runoff concentrations exceed the CTR criteria.

Additionally, although no TMDLs have yet been developed for these impaired water bodies, they are scheduled for completion by 2019. Additionally, the East Garden Grove–Wintersburg Channel has been proposed for listing as impaired by ammonia for the 2008 303(d) list and may, therefore, require a TMDL. Implementation of these TMDLs and continued monitoring in the watershed would provide potential mitigation for both existing pollutants and new pollutants found to be contributing to degradation of water quality and would further ensure that water quality standards are not violated.

The Federal Clean Vessel Act prohibits the discharge of sewage into No Discharge Zone (NDZ) waters. Huntington Harbour was designated a NDZ by the U.S. EPA in 1976. In 1994, Huntington Harbour was listed on the 303(d) list of impaired water bodies due to bacterial contamination. No bacteria TMDL have yet been established for Huntington Harbour. Once established, the TMDL is expected to include a zero waste load allocation for vessel waste discharges, in light of the NDZ status of Huntington Harbour. However, because existing facilities did not have the capacity to handle vessel sewage, the Santa Ana Regional Board developed a comprehensive Vessel Sewage Disposal Program under the SWRCB General Order Requiring Owners and Operators of Specified Vessel Terminals Located in Newport Bay and Huntington Harbour to Install, Maintain, and Operate Pumpout Facilities and Dump Stations where Necessary to Protect Water Quality (SWRCB Water Quality Order No. 2004-0017-DWQ). The Vessel Sewage Disposal Program requires the installation of pumpout facilities and dump stations in compliance with existing mandates of the Harbours and Navigation Code and applicable State Board regulations. The Santa Ana Regional Board's program is consistent with the State Board's minimum standards for the design, construction, operation, and maintenance of pumpout facilities. This program will help reduce potential cumulative bacterial contamination of Huntington Harbour.

There are no listed impairments for waters in the Talbert/Huntington Beach Channel subwatershed. This subwatershed discharges to the Talbert Marsh and then to the Pacific Ocean. Development within this subwatershed would be subject to the same regulations as noted above, except for those pertaining to harbors.

Continued development and redevelopment within the Westminster Watershed area would be subject to the current adopted Municipal NPDES Permit and associated DAMP, NPDES General Permit for construction activities, De Minimus Threat General Permit, and potentially the NPDES General Permit for Industrial Discharges, along with any specific municipal codes and Local Implementation Plans. New

development and significant redevelopment would also have to undergo the environmental review process to determine project-specific potential impacts and mitigation. All construction activities that disturb more than 1 acre of land surface would be required to prepare and implement a construction SWPPP, which would minimize potential pollutant transport during construction and potential violation of water quality standards. The SWPPP and De Minimus Threat General Permit include water quality monitoring requirements and Reports of Waste Discharge to the RWQCB for individual WDR that may be required. Additionally, the Municipal NPDES Permit requires incorporation of both the NPDES General Permit for construction activities and Municipal NPDES Permit requirements into local regulatory ordinances and codes. The Municipal NPDES Permit and DAMP requires local agency/municipality construction site inspection, Local Implementation Plans, and Water Quality Monitoring Programs to be implemented by the permittees to ensure local implementation of the permit conditions and DAMP and that these programs are effective. These existing regulations and programs would ensure that the WDRs are not violated during construction and these permits have been identified as protective of water quality during construction activities.

The Principal Permittee (OCFCD), is to modify the Model WQMP per the Municipal NPDES Permit. Furthermore, all priority projects in the area would be required by the DAMP to develop a project WQMP. Other, nonpriority projects would also be required to document, via a WQMP or similar mechanism, site design, source control and any other BMPs that may or may not include treatment control BMPs, including erosion and sediment controls. Implementation of required water conservation measures would minimize potential dry-weather runoff and, therefore, potential pollutant transport to surface waters. These conditions would ensure that potential pollutants in stormwater and dry-weather runoff are minimized and that violation of the Municipal NPDES Permit or water quality standards would not be cumulatively considerable.

Individual dischargers are also subject to individual NPDES permits or WDRs and are regulated by the SARWQCB, which issues cease-and-desist orders for dischargers in violation of their permits/WDRs. The Orange County Sanitary District (OCSD), an individually permitted discharger, was originally considered a potential major contributor to degradation of coastal water quality by bacteria contamination. In 2002, the Orange County Sanitary District (OCSD) began chlorination of wastewater effluent. Since then, fecal coliform counts within the OCSD discharge have either been minimal to below detection limits and not correlated with bacterial contamination of Huntington Beach. These results suggest that tidal flow out of the Santa Ana River may be a source of high bacteria concentration (particularly, total coliforms) potentially impacting the beach and that the OCSD does not violate its WDRs or contribute to cumulative violation of water quality standards.

In summary, potential additional sources of polluted runoff and violation of water quality standards or waste discharge requirements would not be cumulatively considerable with implementation of existing requirements and future TMDLs. Furthermore, the Specific Plan impacts on polluted runoff, water quality standards, and waste discharge requirements are less than significant; Specific Plan mitigation measure MM4.6-1 would be implemented to reduce potential stormwater pollutant loads. Therefore, the Specific Plan would not contribute considerably to cumulative impacts and cumulative impacts would be ***less than significant***.

Drainage Patterns (Erosion and Siltation)

Development of the Specific Plan in the Westminster Watershed could alter the watershed drainage patterns, which could contribute to increases in erosion and siltation. However, most of the area is already built out and existing regulations would apply to any new development or re-development activities, which would minimize potential effects, as discussed above for pollutants in stormwater runoff. Additionally, the storm drain system within the Westminster watershed is lined or piped and would not be subject to erosion from increased storm flows, except for the East Garden Grove–Wintersburg Channel, which experiences levee erosion. Development of the Specific Plan in the Talbert/Huntington Beach Channel subwatershed would not be substantial regarding effects on drainage patterns, erosion, and siltation. Additionally, most of the area is built out and discharges to drainage features that are not susceptible to bed or bank erosion (streets, underground storm drains, and lined channels). The Municipal NPDES Permit requires stormwater runoff controls to reduce runoff to existing levels if priority projects would increase the peak rate, volume, or time of concentration of stormwater runoff. This would substantially prevent hydromodification caused by development and reduce erosion potential in the East Garden Grove–Wintersburg Channel. Therefore, cumulative effects on erosion and siltation would not be considerable.

In addition, compliance with existing regulations, including the Precise Grading permit, City of Huntington Beach LIP, the DAMP, and incorporation of Specific Plan mitigation measure MM4.7-1 would ensure that the potential Specific Plan contributions to cumulative erosion and siltation are not cumulatively considerable and cumulative impacts would therefore be ***less than significant***.

Groundwater Supply and Quality

Water supply demands and groundwater dewatering within the Westminster Watershed and Talbert/Huntington Beach Channel subwatershed could occur as development in the area increases and as surface water resources become more limited. The Orange County Water District manages groundwater withdrawals within the Orange County Groundwater Basin to ensure that substantial overdraft conditions do not occur. Water conservation methods, increased use of surface water, and increased use of recycled water would reduce the potential for substantial effects on the groundwater table. Therefore, potential effects of cumulative demands on groundwater resources would be less than significant.

Limited water supplies may result in increased use of both urban runoff and treated wastewater recycled water. Recycled water tends to have a higher salinity than natural surface water or groundwater. High-salinity recycled water could lead to degradation of groundwater and surface water quality. Dry weather runoff within the City and County channels already has a very high salinity content; contributions of salt loading from recycled water use would not be expected to be substantial compared to existing flows because the flows already have a high salt concentration. Furthermore, because surface runoff in the cumulative context discharges drain to estuaries and the Pacific Ocean, higher salt loadings would not adversely affect these water features. Use of recycled water would also be subject to either an individual WDR or the final Recycled Water WDR (when adopted). The proximity to the Pacific Ocean also indicates that groundwater salinity may be affected by ocean salinity. Therefore, cumulative impacts on

groundwater and surface water quality from increased use of urban runoff or treated wastewater recycled water would not be considerable. For the same reasons, urban runoff recycled water use in the Specific Plan area contributions to cumulative groundwater quality degradation are not cumulatively considerable and cumulative impacts would be ***less than significant***.

Drainage Patterns (Stormwater Runoff)

Continued development of the Westminster Watershed could alter the watershed drainage patterns, which could increase stormwater runoff. Many stormwater conveyance facilities within areas of Huntington Beach are currently considered inadequate for conveying stormflows and flood during storm events. Planned storm drain system improvements would be subject to existing regulatory requirements, including the NPDES General Permit for construction activities, Municipal NPDES Permit, and the DAMP, which would minimize impacts associated with development of new or planned stormwater drainage systems within the watershed because increases in stormwater runoff and alterations in drainage patterns would be minimized. Furthermore, most of the area is already built out (OCWCRD n.d.b) and existing regulations would be applicable to any new development or redevelopment, which would minimize potential impacts on stormwater runoff and drainage patterns associated with their implementation. Furthermore, local agencies (e.g., municipalities, OCFCD, and others) and the Army Corps of Engineers have or are remediating existing flooding conditions through channel and stormwater infrastructure improvements. Therefore, cumulative effects on stormwater runoff would not be considerable. Incorporation of Specific Plan mitigation measure MM4.7-3 and MM4.7-4 would ensure that the potential proposed project contributions to cumulative storm drain conveyance capacity exceedance and flooding are not cumulatively considerable and cumulative impacts would therefore be ***less than significant***.

Global climate change could, however, alter existing drainage conditions, which could exacerbate the existing and potentially future flood conditions in the watershed. Global climate change could affect regional surface water hydrology and sea level rise, both of which could contribute to increased flooding. Warming in western mountains is projected to cause decreased snowpack, more winter flooding, and reduced summer flows (IPCC 2007). Because of uncertainties in climate sensitivity, it is not clear how rapidly sea levels will rise, even under the highest emission scenarios (CCC 2006). Therefore, cumulative impacts of flooding could be potentially significant and unavoidable but it is, as yet, a speculative impact. Incorporation of Specific Plan mitigation measure MM4.7-3 and MM4.7-4 would ensure that the potential Specific Plan contributions to cumulative stormwater flows are not considerable, and cumulative impacts would therefore, be ***less than significant***.

Flooding

Portions of the Westminster Watershed and Talbert/Huntington Beach Channel subwatershed are subject to flooding during a 100-year storm event. The 2004 revised FEMA maps, and subsequent amendments through March 2009, take into account flooding as a result of levee failure, where levees are not engineered to current design standards. The Base Flood Elevation for some of the area is not identified on the FEMA flood hazard maps (except for the Huntington Beach Channel area).

Additionally, the floodway boundary has not been defined by FEMA. Development within these areas could, therefore, subject residential uses and structures to flooding during the 100-year flood event and structures within this area could impede or redirect flood flows. FEMA minimum floodplain development requirements and local agency codes and ordinances include provisions, which would be applied to development. Additionally, the majority of the flood zone is already built out; redevelopment of existing structures and placement of new structures would not be expected to impede or redirect flood flows because it would simply replace existing structures in the flood zone. However, during the project-specific environmental review process, if a project is anticipated to create substantial fill in the floodplain, an analysis of the effect of this fill on flood flows would be required. Therefore, development within the FEMA Zone A of the Westminster watershed would not result in hazardous conditions for people or structures and would not substantially impede or redirect flood flows; cumulative impacts would not be considerable and would be less-than-significant. Implementation of the Specific Plan would require that residences be elevated to above the expected depth of flooding as identified by the City Department of Planning or Public Works or FEMA. Therefore, the Specific Plan would not contribute considerably to cumulative impacts, and cumulative impacts would be ***less than significant***.

Dam Failure

Large areas within the Westminster Watershed and Talbert/Huntington Beach Channel subwatershed are subject to inundation from failure of the Prado Dam. The County of Orange operates the Orange County Operational Area Emergency Operations Center (OC OA/EOC) for managing disaster response and recovery for County Agencies and Departments and constituents served by the operational areas. The Standardized Emergency Management System (SEMS) is the state mandated framework for emergency response and recovery.

In accordance with SEMS, the EOC is to act as a central point for coordination of operational, administrative and support needs of the emergency workers. Designated officials gather and process information to and from County agencies and departments, school and special districts, business and industry, volunteer organizations, individuals and State and Federal Governments. The Orange County and Operational Area Emergency Operations Center is staffed with trained personnel from all agencies within the County of Orange and various operational area

Existing emergency response mechanisms would minimize the risk to human health from failure of the Prado Dam and cumulative impacts would not be considerable. For the same reasons, and because the City of Huntington Beach currently operates an Emergency Preparedness Program to prepare for and respond effectively to major emergencies, the Specific Plan impacts associated with dam failure inundation would not contribute considerably to cumulative impacts. Improvements to the Santa Ana River and Prado Dam further reduce the risk of dam failure, and cumulative impacts associated with dam failure would be ***less than significant***.

Expanded Storm Drain Facilities

In accordance with the Master Plan of Drainage, new and expanded storm drainage system components are planned. Construction of these new facilities would be subject to the same regulatory requirements

(NPDES General Permit for construction activities, Municipal NPDES Permit and associate DAMP, and local codes and programs) that would prevent substantial hydrology or water quality environmental effects and cumulative impacts would not be considerable. For the same reason, the Specific Plan impacts associated with new or expanded off-site storm drain facilities not be cumulatively considerable. Cumulative impacts on new or expanded off-site storm drainage facilities would be ***less than significant***.

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