5.6 HYDROLOGY AND WATER QUALITY

This section compares the 2012 Modified Project's potential impacts on hydrology and water quality to those of the 2011 Approved Project. The analysis in this section is based, in part, upon the following technical studies:

- *Hydrology Study Heritage Fields Project 2012 - General Plan Amendment and Zone Change*, RBF Consulting, June 15, 2012.

- *Project Water Quality Technical Report – Great Park Neighborhoods TTOD*, ENGEO Incorporated, June 22, 2012.

These studies are included in their entirety in Appendices G and H of this DSSEIR. In addition, the following previously prepared technical studies were used in this analysis and are available for review at the City of Irvine, Community Development Department:

- *Compliance Report for PA 51 and 30 Watershed Updated Marshburn Channel, Bee Canyon Channel, Agua Chinon Channel, and Borrego Canyon Channel*, RBF Consulting, March 2011.

- *Conceptual Project Water Quality Management Plan (WQMP), Updating the Integrated Master Plan of Drainage, Water Quality and Habitat Mitigation, Orange County Great Park Neighborhoods.* RBF Consulting, April 20, 2009, updated August 11, 2011.

5.6.1 Hydrology

5.6.1.1 Environmental Setting

The Proposed Project Site lies within the San Diego Creek watershed, which is 105 square miles and encompasses portions of the Cities of Irvine, Tustin, Santa Ana, Costa Mesa, Lake Forest, Laguna Hills, Orange, and Newport Beach, as well as unincorporated Orange County. The watershed includes the San Diego Creek along with Peters Canyon channel and their tributaries.

In September 2011, Heritage Fields El Toro, LLC ("Heritage Fields") and the City of Irvine (the "City") completed a document entitled "*Amendment to [Existing] PA 51 and PA 30 Watershed Update*" approved by the Orange County Public Works Department. The watersheds analyzed in the Watershed Update included: Marshburn Channel (F16), Bee Canyon Channel (F17), Agua Chinon Channel (F18) and Borrego Canyon Channel (F20). The purpose of this document was to show that the proposed drainage for the 2011 Approved Project were in compliance with the discharge amounts established by the previously approved Master Plans.

As was true for the 2011 Approved Project, the Orange County Hydrology Manual, dated 1986, governs the procedure used to analyze surface water conveyance for the 2012 Modified Project.

5.6.1.2 Thresholds of Significance

Based on Appendix G of the CEQA Guidelines, the City of Irvine has determined that a project would normally have a significant effect on the environment if the project would:

HYD-4 Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site.

HYD-5 Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff.

HYD-7 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.

HYD-8 Place within a 100-year flood hazard area structures which would impede or redirect flood flows.

HYD-9 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.

HYD-10 Be subject to inundation by seiche, tsunami, or mudflow.

Chapter 8, *Impacts Found Not to Be Significant*, substantiates the City's determination in the Initial Study for the 2012 Modified Project (Appendix A to this DSSEIR)that the following potential impacts would be less than significant:

- Potential Impacts HYD-2, HYD-9 and HYD-10

Those impacts will not be addressed in the following analysis. For analysis of the 2012 Modified Project with respect to Potential Impacts HYD-1, HYD-3, HYD-5, and HYD-6, see Subsection 5.6.2, *Water Quality*, below.

5.6.1.3 The 2011 Approved Project

The 2011 Approved Project includes all of the mitigation measures from the 2011 Certified EIR and associated MMRP, and all of the analyses, studies and reports prepared to implement those mitigation measures.

Mitigation Measure H/WQ3 from the 2011 Certified EIR and associated MMRP requires that, prior to approval of the first tentative tract or parcel map for Existing Planning Areas 30 and 51, detailed hydrologic and hydraulic analyses be conducted in accordance with Orange County Flood Control District ("OCFCD") methodologies and standards and the Flood Control Master Plan for San Diego Creek, as well as any additional guidelines in effect at the time of project design. To comply with that mitigation measure, the following updates to the Flood Control Master Plan for San Diego Creek (collectively, "Master Plans") were amended and approved in July 2011.

- *Amendment to the San Diego Creek Master Plan- Planning Area 51/30 for Bee Canyon, Agua Chinon, Borrego, Serrano and Upper San Diego Creek, RBF Consulting, July 2011*.

- *Amendment to Planning Area 51 Marshburn Watershed Update, RBF Consulting, July 2011.*

These Master Plans were prepared in accordance with the Orange County methodologies and standards, and the Peak Flow rates at Hydrologic Nodes along the existing downstream regional facilities and San Diego Creek were compared to the values established by the Flood Control Master Plan for San Diego Creek. Orange County approved the methodology and accepted Peak Runoff rates established by the Master Plans. As part of Orange County's approval, the City completed a review of the Master Plans and found the Master Plans to be consistent with the requirements of the 2011 Certified EIR. Copies of these Master Plans are on file with the City and available for inspection at the Irvine Public Works Department, located at the City of Irvine Civic Center during normal business hours.

The Master Plans identified the Tributary Runoff Area for each drainage channel system. In addition, the Master Plans identified the Average Land Use, drainage patterns and backbone storm drain system for the 2011 Approved Project. By using the Average Land Use (created by the zoning designations for the Proposed Project Site) and drainage patterns, Peak Flow Rates were identified at specific downstream locations, referred to as Hydrologic Nodes. The Master Plans establish Peak Flow rates at these Hydrologic Nodes and compare those values to the flow rates that were used as the basis of the design for the existing regional drainage facilities. Peak Flow rates at these locations were acceptable to the OCFCD and the City and were approved as part of the Master Plans. The additional backbone storm drain facilities included in the Master Plans confirmed that development of the 2011 Approved Project would have a less than significant impact on hydrology.

5.6.1.4 Environmental Impacts of the 2012 Modified Project

Existing Plans, Programs, and Policies

The following measures are existing plans, programs, or policies ("PPPs") that apply to both the 2011 Approved Project and the 2012 Modified Project and will help to reduce and avoid potential impacts related to hydrology.

PPP 6-1 Prior to the issuance of a precise grading permit, the applicant shall submit a hydrology and hydraulic analysis of the site. The analysis shall be prepared by a professional civil engineer versed in flood control analysis and shall include the following information and analysis (Standard Condition A.6):

a. Hydrology/hydraulic analysis of 100-year surface water elevation at the project site to determine building elevation or flood proofing elevation.

b. Analysis of existing and post-development peak 100-year storm flow rates, including mitigation measures to reduce peak flows to existing conditions.

c. An analysis demonstrating that the volume of water ponded on the site and stored underground in the drainage system outside of the building envelope in the proposed condition is greater than or equal to the corresponding volume in the existing condition. The water surface used to determine the ponded volume shall be based on the water surface in the major flood control facility that the site is tributary to.

Project Design Features

There are no project design features related to hydrology that apply to the 2012 Modified Project.

The following impact analysis addresses impacts that the City determined in the Initial Study could be potentially significant impacts of the 2012 Modified Project. The applicable potential impacts are identified in brackets after the impact statement.

Methodology

There are two methods of hydrologic calculations that were used to determine the design discharges in the regional facilities at the Hydrologic Nodes for all Master Plan modeling. Generally, the "rational" method is used to calculate the design discharge for the local drainage areas when the tributary watershed area is less than one square mile (640 acres), whereas the unit hydrograph method is used when the tributary watershed area is in excess of 640 acres. However, all watersheds being studied for the 2012 Modified Project, including Hydrologic Nodes CP 3B, CP 4B, and 421, have drainage areas larger than 640 acres; therefore, the unit hydrograph method was used. Flow rate values to be compared were derived using unit hydrographs in accordance with the current Orange County Hydrology Manual, dated October, 1986. Hydrologic calculations were done using the 2004 Advanced Engineering Software (AES).

2012 Modified Project Conditions

Like the 2011 Approved Project, the 2012 Modified Project includes all of the mitigation measures from the 2011 Certified EIR and associated MMRP, and all of the analyses, studies and reports prepared to implement those mitigation measures.

The 2012 Modified Project proposes modifications to the 2011 Approved Project's land use plan, and Area weighted percent pervious ("Ap"). The effects of these proposed changes were analyzed in the following report, a copy of which is included in Appendix G to this DSSEIR:

- *Hydrology Study Heritage Fields Project 2012 - General Plan Amendment and Zone Change*, RBF Consulting, June 15, 2012.

As more fully described in Chapter 3, *Project Description*, the 2012 Modified Project proposes to change certain non-residential land uses to residential land uses primarily within Districts 5 and 6 (tributary to Agua Chinon and Borrego Channel). The areas that are south of the Railway (Districts 2 and 3) are consistent with the land use intensities in the Master Plan for the 2011 Approved Project. At this time, site planning and tentative maps are not being processed for the 2012 Modified Project. Therefore; the watershed boundaries and drainage patterns are effectively the same as for the 2011 Approved Project.

The Master Plans of Drainage define the drainage control components for the Approved Project Site, which includes the Proposed Project Site. The Master Plans' on-site channels will continue to drain the Combined PA 51 area for the 2011 Modified Project in the same manner as shown in the Master Plans for the 2011 Approved Project. The Master Plans already incorporate the backbone storm drain facilities needed to accommodate the changes in surface runoff caused by development of the 2012 Modified Project.

Watershed Boundary Update

Tributary areas to Agua Chinon Channel, Borrego Canyon Channel, Serrano Creek Channel and Upper San Diego Creek are still consistent with the Master Plan for the 2011 Approved Project. The watershed boundaries from the 2011 Approved Project were used for this analysis.

Conveyance Update

Tentative map level hydrology maps for Districts 2, 3, 5 and 6 are not being processed as part of the 2012 Modified Project and therefore an update to this study is not required at this time. The proposed drainage patterns are still consistent when compared with the Master Plan for the 2011 Approved Project. The drainage patterns from the 2011 Approved Project were, therefore, used for this analysis.

Land Use

Land uses for the 2012 Modified Project were adjusted from what was reflected in the Master Plan (see Figure 5.6-1, *2011 Approved Master Plan Land Use Plan*). For this analysis, subareas from the detailed hydrology in the Master Plan were assigned a land use based on the 2012 Modified Project. From this land use an average pervious area (Ap) was used for each of the subareas (See Figure 5.6-2, *Hydrology Land Use*). This generalized breakdown allows for a land use representation that is more suitable for a regional hydrology analysis, while still accurately reflecting the 2012 Modified Project.

Results and Summary

Since the drainage patterns and watershed boundaries of Agua Chinon Channel, Borrego Canyon Channel, Serrano Creek Channel and Upper San Diego Creek watersheds for the 2011 Approved Project are not changed by the 2012 Modified Project, the only changes to hydrology relate to the land uses within a few of the subareas within the Proposed Project Site. Additionally, the Relocated Wildlife Corridor Feature would stay within the same watershed boundary. For these reasons, only the subareas of those Watersheds that were modified were analyzed. The results of the revised Unit Hydrograph Analysis for each node have been summarized below in Table 5.6-1 for the 2012 Modified Project. The updated peak discharge amounts for all watersheds are consistent with or slightly above values established in the Master Plan for the 2011 Approved Project. The slight increases at Node 421 and CP 4B are each less than 1.0 percent of the overall peak discharge amount. Future site planning and subsequent hydrology reports will refine those discharge amounts.

Table 5.6-1
2012 Modified Project Hydrologic Node Summary

Node	Tributary Watershed	Tributary Area (Ac)	Average Ap		Peak Flow Rate, Q (cfs)		
		Master Plan	Master Plan	Revised	Master Plan	Revised	Delta
CP 3B	Agua Chinon Channel	2,969	0.770	0.608	2,194	2,184	-10
421	Agua/Borrego Confluence	7,049	0.732	0.694	6,477	6,506	+29
CP 4B	Borrego Channel	4,025	0.716	0.694	4,521	4,559	+38

Hydrology Study Heritage Fields Project 2012 - General Plan Amendment and Zone Change, RBF Consulting, June 15, 2012.

Agua Chinon Channel

Although the change in land use proposed by the 2012 Modified Project resulted in a change to the pervious area (imperviousness), when compared to the entire watershed, the peak discharge amount is consistent with the values from the Master Plan for the 2011 Approved Project. This is due to the fact that the initial area and the majority of the watershed lie much further upstream of the proposed Combined PA 51 development area, which allows the 2012 Modified Project to drain prior to the peak event arriving.

Borrego Canyon Channel

Similar to Agua Chinon watershed, the change in land use proposed by the 2012 Modified Project tributary to Borrego Canyon Channel resulted in a change to the pervious area (imperviousness), but when compared to the entire watershed, the peak discharge amount is slightly above the values from the Master Plan for the 2011 Approved Project. The slight increases of discharge amounts at Hydrologic Nodes CP 4B (0.8 percent increase) and 421 (0.4 percent increase) are consistent with the Master Plan for the 2011 Approved Project. Future site planning and subsequent hydrology reports for this tributary area will refine those discharge amounts.

The Relocated Wildlife Corridor Feature was analyzed within this tributary area for the 2012 Modified Project. The drainage characteristics remain the same as for the 2011 Approved Project, since the Relocated Wildlife Corridor Feature would remain within the Borrego Canyon Channel watershed.

Serrano Creek Channel

The 2012 Modified Project for this tributary area is consistent with the land use, watershed boundary and controlling flow paths in the Master Plan for the 2011 Approved Project. Therefore, there are no changes to discharge amounts at hydrologic nodes.

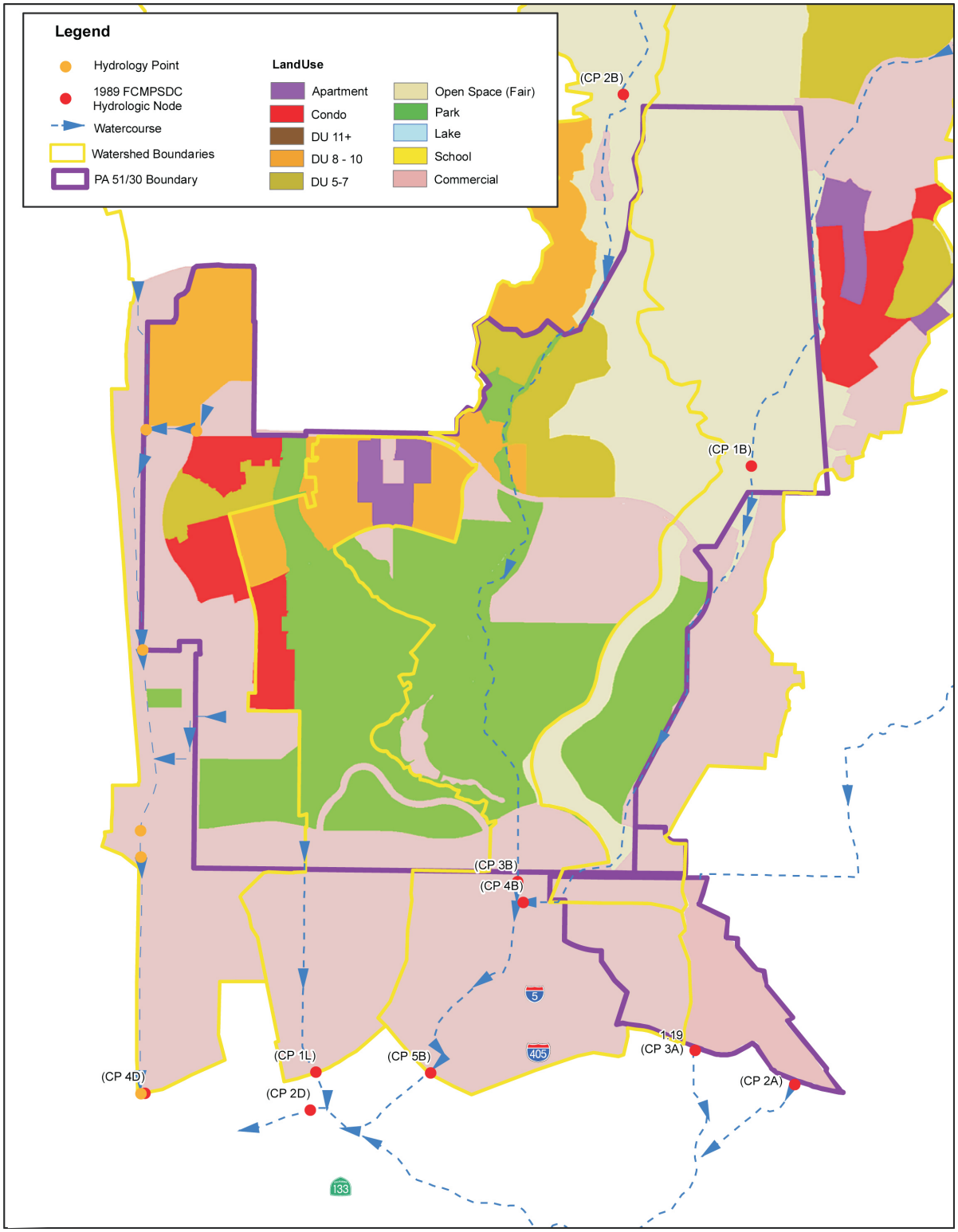
Upper San Diego Creek

Similar to the Serrano Creek Channel, the 2012 Modified Project for the Upper San Diego Creek tributary area is consistent with the land use, watershed boundary and controlling flow paths in the Master Plan for the 2011 Approved Project. Therefore, there are no changes to discharge amounts at the appropriate hydrologic nodes.

IMPACT 5.6.1-1: THE 2012 MODIFIED PROJECT WOULD NOT SUBSTANTIALLY INCREASE SURFACE WATER FLOWS INTO DRAINAGE SYSTEMS AS COMPARED TO THE 2011 APPROVED PROJECT. [IMPACTS HYD-4 AND HYD-5]

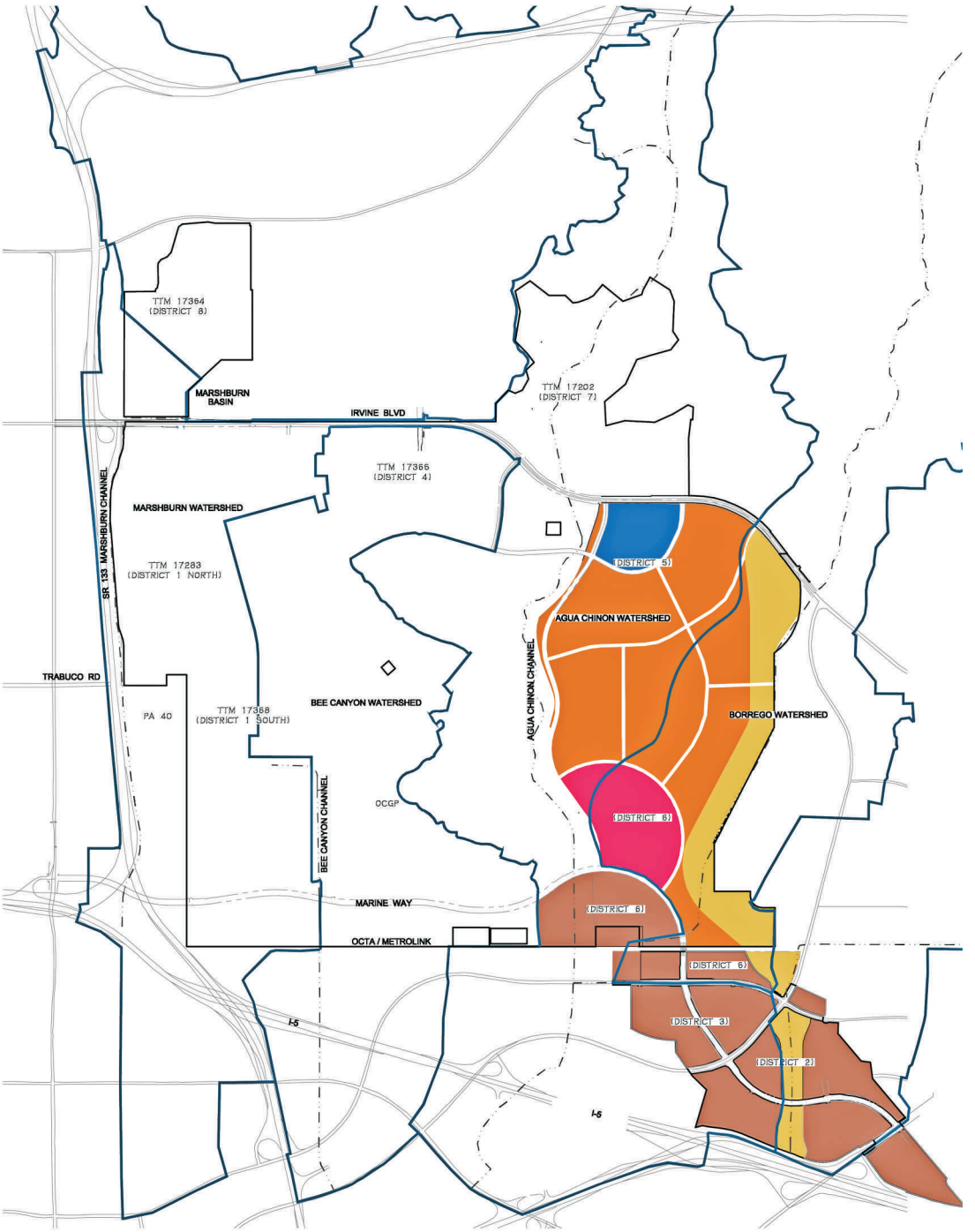
Impact Analysis: As discussed above, during operations, the 2012 Modified Project will not substantially increase surface water flows into drainage systems as compared to the 2011 Approved Project. Therefore, like the 2011 Approved Project, the 2012 Modified Project would result in a less than significant impact.

2011 Approved Master Plan Land Use Plan



Source: RBF Consulting 2011

Proposed Hydrology Land Use



Source: RBF Consulting 2012

IMPACT 5.6.1-2: THE 2012 MODIFIED PROJECT WOULD NOT LOCATE ADDITIONAL DEVELOPMENT AREAS WITHIN A 100-YEAR FLOOD HAZARD AREA. [IMPACTS HYD-7 AND HYD-8]

Impact Analysis: Current City development standards and the Zoning Code prohibit the construction of any structure within a 100-year Flood Hazard Area. Per the Zoning Code and Mitigation Measure H/WQ-4, which is incorporated into both the 2011 Approved Project and the 2012 Modified Project, a Letter of Map Revision ("LOMR") must be completed prior to building any structure within an area mapped on the Federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map. The LOMR must be filed upon the completion of the design of the flood control improvements required to contain or redirect the 100 year flood hazard. The LOMR process will be completed upon the completion of Record Drawings for the flood control facility. As a result, like the 2011 Approved Project, the 2012 Modified Project will result in a less than significant impact.

Mitigation Program and Net Impact

The 2012 Modified Project would result in minor changes to the 2011 Approved Project's drainage patterns and peak flows with minor alterations in impervious surfaces, but in general, the drainage areas, discharge points, and peak flow discharges will be consistent with the 2011 Approved Project. As was true for the 2011 Approved Project, any drainage improvements constructed as part of the 2012 Modified Project would be subject to the design criteria and capacities required by the City and Orange County. No additional mitigation measures are introduced in this DSSEIR as hydrology impacts would be less than significant with the mitigation measures identified in the 2011 Certified EIR and associated MMRP.

5.6.1.5 Cumulative Impacts

The geographic area for addressing cumulative hydrology impacts is the drainage area for the Proposed Project Site. Like the 2011 Approved Project, the 2012 Modified Project includes PPPs that assure there will be no off-site drainage impacts.

The area surrounding the Proposed Project Site is either developed, approved for development or planned for development. However, all related new development and redevelopment projects in Irvine and surrounding cities will be subject to the City's and the County of Orange's hydrology-related requirements, as are the 2011 Approved Project and the 2012 Modified Project. Therefore, all such projects would have to submit a hydrology report that would identify Peak Flow rates and drainage improvements that will be used to control runoff. Additionally, cumulative flows would be evaluated and addressed in terms of required Flood Control Master Plans for each cumulative project, which are specifically intended and designed to define the flood control system necessary to accommodate runoff from future area-wide development. As such, like the 2011 Approved Project, the 2012 Modified Project's cumulative impacts related to hydrology would be less than significant.

5.6.1.6 Applicable Mitigation Measures from the 2011 Certified EIR

The 2011 Certified EIR and associated MMRP identified two mitigation measures to reduce the effects on hydrology to a less than significant level. Both of these mitigation measures are incorporated into both the 2011 Approved Project and the 2012 Modified Project.

H/WQ3 Prior to approval of the first tentative tract or parcel map in the project area, detailed hydrologic and hydraulic analysis shall be conducted. Studies and analysis shall be prepared in accordance with OCFCD methodologies and standards and the Flood Control Master Plan for San Diego Creek, as well as any additional guidelines in effect at the time of project design. Recommendations contained in the hydrology studies and/or hydraulic analysis to address drainage/flooding issues related to proposed development shall be implemented. Compliance with this measure shall be verified by the Community Development Department.

H/WQ4 Prior to issuance of a building permit for any unit within the 100-year floodplain, developers with property located in the newly delineated 100-year floodplain shall be required to construct such improvements as necessary to remove the property from the 100-year floodplain. Additionally, the developer shall prepare a Letter of Map Revision (LOMR) request to have the FIRMs revised to remove the development areas from the 100-year floodplain upon completion of the approved flood control facilities. The LOMR request shall be filed upon completion of design of the flood control improvements to contain or redirect the 100-year flood flows away from the property.

After the improvements are constructed, Record Drawings and a maintenance agreement with, or letter from, a public agency shall be submitted to FEMA to complete the LOMR process.

5.6.1.7 Level of Significance Before Additional Mitigation

Upon implementation of regulatory requirements, the standard conditions of approval, and the 2011 Approved Project's mitigation measures, which are incorporated into the 2012 Modified Project, Impacts 5.6.1-1 and 5.6.1-2 would be less than significant.

5.6.1.8 Additional Mitigation for the 2012 Modified Project

No additional mitigation measures are required, as the 2012 Modified Project would result in less than significant impacts on hydrology without additional mitigation.

5.6.1.9 Level of Significance After Additional Mitigation

All of the 2012 Modified Project's impacts on hydrology would be less than significant upon implementation of regulatory requirements, the standard conditions of approval, and the mitigation measures already in place under the 2011 Approved Project.

5.6.2 Water Quality

5.6.2.1 Environmental Setting

Regulatory Setting

Clean Water Act

The federal Water Pollution Control Act (also known as the Clean Water Act [“CWA”], 33 U.S.C. 1251 et seq.) is the principal federal statute that governs water quality. The CWA establishes the basic structure for the regulation of discharges of pollutants into the waters of the United States and gives the U.S.

Environmental Protection Agency ("EPA") the authority to implement pollution control programs, such as setting wastewater standards for industry. The statute's goal is to end all polluted discharges entirely and to restore, maintain, and preserve the integrity of the nation's waters. The CWA regulates both the direct and indirect discharge of pollutants into the nation's waters. Under the CWA, water quality standards for contaminants in surface waters are set, and the CWA makes it unlawful for any person to discharge any pollutant from a point source into navigable waters, unless a permit is obtained under its provisions. The CWA mandates permits for wastewater and storm water discharges, requires states to establish site-specific water quality standards for navigable bodies of water, and regulates other activities that affect water quality, such as dredging and the filling of wetlands. The CWA also funded the construction of sewage treatment plants and recognized the need for planning to address non-point sources of pollution. Section 402 of the CWA requires a permit for all point source (a discernible, confined, and discrete conveyance, such as a pipe, ditch, or channel) discharges of any pollutant (except dredge or fill material) into waters of the U.S.

Section 303(d) of the CWA requires that states identify waters that do not or that are not expected to meet water quality standards (beneficial uses, water quality objectives, and the anti-degradation policy) with the implementation of technology-based controls, even after point sources of pollution have installed the minimum required levels of pollution control technology.

Once a water body has been placed on the Section 303(d) list of impaired waters, states are required to develop a Total Maximum Daily Load ("TMDL") to address each pollutant causing impairment. A TMDL defines how much of a pollutant a water body can tolerate and still meet water quality standards. Each TMDL must account for all sources of the pollutant, including: discharges from wastewater treatment facilities; runoff from homes, forested lands, agriculture, and streets or highways; contaminated soils/sediments, legacy contaminants such as DDT and PCBs on-site disposal systems (septic systems) and deposits from the air. Federal regulations require that the TMDL, at a minimum, account for contributions from point sources (permitted discharges) and contributions from nonpoint sources, including natural background. In addition to accounting for past and current activities, TMDLs may consider projected growth that could increase pollutant levels. TMDLs allocate allowable pollutant loads for each source, and identify management measures that, when implemented, will assure that water quality standards are attained.

National Pollutant Discharge Elimination System

Runoff water quality is regulated by the federal National Pollution Discharge Elimination System ("NPDES") program established by the Clean Water Act of 1972. The NPDES program's objective is to control and reduce pollutants to water bodies from non-point discharges. The program is administered by Regional Water Quality Control Boards ("RWQCBs") throughout the State. The RWQCB issues NPDES point source permits for discharges from major industries and non-point source permits for discharges for municipalities and other non-agricultural dischargers.

Under the NPDES program, facilities that discharge pollutants from any point source into waters of the U.S. are required to obtain an NPDES permit. The term "pollutant" broadly includes any type of industrial, municipal, and agricultural waste discharged into water. Point sources are generally defined as discharges from publicly owned treatment works ("POTWs"), discharges from industrial facilities, and discharges associated with urban runoff. While the NPDES program addresses certain specific types of agricultural activities, the majority of agricultural facilities are defined as non-point sources and are exempt from NPDES regulation. Pollutant contributors come from direct and indirect

sources. Direct sources discharge wastewater directly to receiving waters, whereas indirect sources discharge wastewater to POTWs, which in turn discharge to receiving waters. Under the national program, NPDES permits are issued only to direct point source discharges. The National Pretreatment Program addresses industrial and commercial indirect dischargers. Municipal sources are POTWs that receive primarily domestic sewage from residential and commercial customers. Specific NPDES program areas applicable to municipal sources are the National Pretreatment Program, the Municipal Sewage Sludge Program, Combined Sewer Overflows ("CSOs"), and the Municipal Storm Water Program. Non-municipal sources include industrial and commercial facilities.

Specific NPDES program areas applicable to these industrial/commercial sources are: Process Wastewater Discharges, Non-Process Wastewater Discharges, and the Industrial Storm Water Program. NPDES issues two basic permit types: individual and general. Also, the USEPA has recently focused on integrating the NPDES program further into watershed planning and permitting.

The NPDES has a variety of measures designed to minimize and reduce pollutant discharges. All counties with storm drain systems that serve a population of 50,000 or more, as well construction sites one acre or more in size, must file for and obtain an NPDES permit. Another measure for minimizing and reducing pollutant discharges to a publicly owned conveyance or system of conveyances (including roadways, catch basins, curbs, gutters, ditches, man-made channels and storm drains, designed or used for collecting and conveying stormwater) is the EPA's Storm Water Phase II Final Rule. The Phase II Final Rule requires an operator (such as a city) of a regulated small municipal separate storm sewer system ("MS4") to develop, implement, and enforce a program (e.g., Best Management Practices ['BMPs"], ordinances, or other regulatory mechanisms) to reduce pollutants in post-construction runoff to the city's storm drain system from new development and redevelopment projects that result in land disturbances of greater than or equal to one acre. The City of Irvine Community Development Department is the local enforcing agency of the MS4 NPDES permit relevant to the Proposed Project Site.

The provisions of the MS4 Permit require the installation of post-construction BMPs for new development as part of the federal NDPES program and have set standards for their implementation. These standards have been updated most recently in Order No. R8-2009-0030 NPDES No. CAS618030 as amended by Order No. R8-2010-0062 from the State of California, California Regional Water Quality Control Board, Santa Ana Region. The provisions of this order were implemented in July 2011.

The intent of these regulations is to rigorously regulate the quality and quantity of post-construction stormwater runoff from any new impervious surface over 10,000 square feet so that receiving waters downstream are not adversely impacted. To comply with these requirements, new developments are required to install water quality stormwater runoff BMPs that filter or treat rainfall runoff generated from storm events up to approximately the 85th percentile rainfall event (or approximately the 1-inch storm event) before discharging into a receiving waters such as the San Diego Creek. Additional hydrograph modification BMPs are also required so that post-project runoff does not exceed pre-project rates or durations if such an increase could contribute to erosion in receiving waters downstream from the Proposed Project Site.

The Orange County Stormwater Program issued a Drainage Area Management Plan ("DAMP") in July 2003, pursuant to NPDES regulations. The 2003 DAMP requires a project's engineer to prepare a Water Quality Management Plan that specifies how the project will use BMPs to meet the aforementioned waste discharge requirements.

Although the 2012 Modified Project would not discharge directly into an impaired water body, runoff from the Proposed Project Site is tributary to Reach 2 of the San Diego Creek, which is listed on the current 2010 Section 303(d) List as impaired for metals and has established TMDL requirements for metals, nutrients, siltation and unknown toxicity (Tables 5.6-2 and 5.6-3). Reach 1 of San Diego Creek is also 303(d) listed as impaired for fecal coliform, selenium and Toxaphene, and has established TMDL requirements for metals, nutrients, pesticides and siltation (Tables 5.6-2 and 5.6-3).

Porter-Cologne Water Quality Act

The Porter-Cologne Water Quality Act (California Water Code section 13000 et seq.) is the basic water quality control law for California. Under this Act, the State Water Resources Control Board ("SWRCB") has ultimate control over State water rights and water quality policy. In California, the USEPA has delegated authority to issue NPDES permits to the SWRCB. The State is divided into nine regions related to water quality and quantity characteristics. The SWRCB, through its nine RWQCBs, carries out the regulation, protection, and administration of water quality in each region. Each regional board is required to adopt a water quality control plan or basin plan that recognizes and reflects the regional differences in existing water quality, the beneficial uses of the region's ground and surface water, and local water quality conditions and problems. The basin plans must include an implementation plan that describes what methods and practices will be used to meet the water quality standards established in the basin plan. TMDLs, with their associated implementation plans, are adopted into the basin plans through the basin planning process.

Santa Ana River Basin Plan

The City of Irvine is located in the Santa Ana River Basin, Region 8, in the Upper Santa Ana Watershed. The Water Quality Control Plan for the Santa Ana River Basin ("Basin Plan") includes the San Diego Creek watershed as well as Newport Bay, which are located downstream of the Proposed Project Site. According to the Basin Plan, beneficial uses for the San Diego Creek Drainage include water recreation, warm freshwater habitat, wildlife habitat and intermittent groundwater recharge.

Several pollutants of concern have been identified in the Basin Plan for San Diego Creek watershed and Newport Bay. Total TMDLs have been established for several of these pollutants including fecal coliform, metals, sediment, diazinon, organochlorine compounds and nutrients.

Table 5.6-2 lists the Proposed Project Site's receiving water bodies (EPA 303d and Santa Ana RWQCB) and those bodies' impairments as of 2010, while Table 5.6-3 presents the status of the TMDL for the Site's receiving waters as of 2012.

Storm Water Pollution Prevention Plans

Pursuant to the CWA, on September 2, 2009, the SWRCB issued a statewide general NPDES Permit (Order No. 2009-0009 DWQ) for storm water discharges from construction sites (NPDES No. CAS000002) that became fully effective on July 1, 2010 ("Construction General Permit"). Under that Construction General Permit, discharges of storm water from construction sites with a disturbed area of one or more acres, or if part of a larger development, are required to either obtain individual NPDES permits for construction storm water discharges or be covered by the Construction General Permit. Coverage by the Construction General Permit is accomplished by completing and filing a Notice of Intent

("NOI") with the SWRCB and developing and implementing a Storm Water Pollution Prevention Plan ("SWPPP").

Each applicant under the Construction General Permit must ensure that a SWPPP is prepared and a Waste Discharge Identification ("WDID") Number is issued prior to grading, and that the SWPPP is implemented during construction. Under Order No. 2009-0009 DWQ, the SWPPP must be developed by a Qualified SWPPP Developer ("QSD") and implemented by a Qualified SWPPP Practitioner ("QSP") for each site covered by the Construction General Permit.

Table 5.6-2
Impaired Proposed Project Site Receiving Water Bodies and TMDLs
(EPA 303d)

Watershed	*Pollutant of Concern*	*303(d)/TMDL*	*Phase*
Serrano Creek	Ammonia	2010 303(d) Listed	2021
	Indicator Bacteria	2010 303(d) Listed	2021
	pH	2010 303(d) Listed	2021
San Diego Creek, Reach 1	Fecal Coliform	2010 303(d) Listed	Expected 2019
	Selenium	2010 303(d) Listed	Delayed as of 2012*
	Toxaphene	2010 303(d) Listed	Part of Orange County Watershed (OC) TMDL
San Diego Creek, Reach 2	Metals	2010 303(d) Listed	Delayed as of 2012*
	Indicator Bacteria	2011 303(d) Listed**	Expected 2021
Lower Newport Bay	Chlordane	2010 303(d) Listed	Part of OC TMDL
	Copper	2010 303(d) Listed	Delayed as of 2012*
	DDT	2010 303(d) Listed	Part of OC TMDL
	PCBs	2010 303(d) Listed	Part of OC TMDL
	Sediment Toxicity	2010 303(d) Listed	Expected 2019
Upper Newport Bay	Chlordane	2010 303(d) Listed	Part of OC TMDL
	Copper	2010 303(d) Listed	Delayed as of 2011*
	DDT	2010 303(d) Listed	Part of OC TMDL
	PCBs	2010 303(d) Listed	Part of OC TMDL
	Sediment Toxicity	2010 303(d) Listed	Expected 2019
	Metals	2010 303(d) Listed	Expected 2019
Newport Bay	Fecal Coliform	River Basin (RB) TMDL	In Effect 2000
San Diego Creek/Newport Bay			
	Sediment	RB TMDL	In Effect 1999
	Diazinon/Chlorpyrifos	RB TMDL	In Effect 2004
	Organochlorine Compounds (OC)	RB TMDL	Pending
	Nutrient	RB TMDL	In Effect 1999

Source: http://www.waterboards.ca.gov/water_issues/programs/tmdl/303d_lists2010_epa.shtml
* - Discussion with John Peng, Orange County Stormwater Program, April 24, 2012.
** - Added by USEPA in 2011 after reviewing California's list.

Table 5.6-3
TMDL Status of Proposed Project Site Receiving Water Bodies
(303d and RWQCB, Santa Ana)

Watershed	Pollutant of Concern	TMDL Status
Newport Bay	Fecal Coliform	Santa Ana RWQCB Resolution Order 99-10 amended the Santa Ana Basin Plan to incorporate a TMDL for Fecal Coliform in Newport Bay. The counties and cities within the watershed are named as stakeholders on this TMDL. In response to Letter 13267 from the Santa Ana RWQCB, the Newport Watershed Permittees, IRWD and the Irvine Company are currently supporting studies and monitoring the Bay.
San Diego Creek/ Newport Bay	Metals	In 2002, in response to a 1996 lawsuit, EPA issued the Toxics TMDL for San Diego Creek/Newport Bay. This TMDL covers 14 different constituents, including several currently used and banned pesticides, copper and other metals and PCBs. The Santa Ana RWQCB is preparing the corresponding state TMDLs but has decided to issue five separate constituent and geographically specific TMDLs. When adopted, these State TMDLs will supersede the EPA TMDL. Santa Ana RWQCB is still in data collection stage.
	Sediment	The Santa Ana RWQCB issued Resolution Order 98-101 to amend the Santa Ana Basin Plan to incorporate a TMDL for sediment in Newport Bay and San Diego Creek. The counties and cities within the watershed are named as stakeholders on this TMDL. The objectives of the TMDL are to reduce the annual average sediment load in the San Diego Creek watershed from a total of 250,000 tons per year to 125,000 tons per year, thereby reducing the sediment load to Newport Bay to 62,500 tons per year within 10 years (a 50% reduction) and to lower the frequency of dredging.
	Diazinon/ Chlorpyrifos	The Santa Ana RWQCB adopted TMDLs on 4/4/2003. The Waste Load Allocation (WLA) is 72 ng/L acute Diazinon and 45 ng/L chronic Diazinon. WLA is 18 ng/L acute Chlorpyrifos and 12.6 ng/L chronic Chlorpyrifos. County of Orange, the Cities of Tustin, Irvine, Costa Mesa, Santa Ana, Orange, Lake Forest and Newport Beach and the agricultural operators in Newport Bay watershed are named stakeholders.
	Organochlorine Compounds	A technical TMDL for Toxic Pollutants, San Diego Creek and Newport Bay, was promulgated by EPA Region 9 in June 2002. The Constituents addressed in the TMDL included the organophosphate (OP) pesticides, selenium, metals and organochlorine (OC) compounds. The Santa Ana RWQCB approved the organochlorine compounds TMDL on 9/7/2008.
	Nutrient	Santa Ana RWQCB Resolution 98-9 as amended by 98-100 amended the Santa Ana Basin Plan to incorporate a TMDL for Nutrients for Newport Bay/San Diego Creek. The TMDL establishes targets for reducing the annual loading of nitrogen and phosphorus to Newport Bay by 50% and meeting the numeric and narrative water quality objectives by 2012. To achieve these targets, the TMDL establishes a number of interim targets requiring a 30% and 50% reduction in nutrients in summer flows by 2002 and 2007, respectively, and a 50% in non-storm winter flows by 2012. As of 2011, the Santa Ana RWQCB is considering revising the TMDL and establishing new water quality objectives for nitrogen in tributaries to Newport Bay*.

Source: http://www.ocwatersheds.com/TMDL.aspx
* Discussion with Jain Peng, Orange County Stormwater Program, April 24, 2012.

A SWPPP must include a risk level determination based upon the project's sediment risk and receiving water risk. Based on the combined risks, a Risk Level is assigned to each project, Risk Level 1, 2, or 3. Risk Level 1 is the least stringent, while Risk Level 3 is the most stringent. Based on the project's Risk

Level, BMPs are designed to reduce potential impacts to surface water quality through the construction and life of the project. Order No. 2009-0009 DWQ includes the following additional elements:

- Annual Reports are to be submitted each year the permit is active and all standards and BMPs outlined in the project SWPPP shall be followed and enhanced as necessary to maintain the project in compliance with the then current Construction General Permit.

- Minimum BMPs include good site management for construction materials, waste management, vehicle storage and maintenance, landscape materials, and potential pollutant sources; non-stormwater management; erosion controls; sediment controls; and run-on and runoff controls. Site-specific project risk-level determination for sediment and receiving water (such as if stormwater discharges directly or indirectly into a Section 303d listed impaired water body) yields additional BMP measures.

- Primary sediment control BMPs (interceptors/barriers) include perimeter protection, natural channel barriers, and storm drain inlet protection to prevent temporary construction-related erosion from entering into permanent drainage systems. Primary erosion control BMPs include preserving existing vegetation, tracking, and soil stabilization within 14 days after completion. In addition, dust control measures and stockpile protection are required year-round.

- A Sampling and Analysis Plan instituted for sediment related and non-visible pollutants in stormwater discharges attributed to a breach or malfunction of a BMP or if contaminants stored or used on the construction site are not properly contained and result in a spill. In addition, each site SWPPP receives a site-specific Risk Level determination based on sediment and receiving water risks (such as if stormwater discharges directly or indirectly into a Section 303d listed impaired water body) that yield specific Stormwater discharges sampling and testing requirements for pH and turbidity.

- Year-round Construction Site Monitoring and SWPPP inspection, maintenance and repair based upon site-specific risk level determination requirements. As a minimum, construction site monitoring shall be performed once every 7 days, prior to and after storm events, and at least once each 24-hour period during extended storm events (normal work days, daylight hours). Quarterly non-stormwater monitoring is also required.

The primary objective of the SWPPP is to identify, construct, implement and maintain proper BMPs to reduce or eliminate pollutants in stormwater discharges and authorized non-stormwater discharges from the construction site during construction. The SWPPP also outlines the monitoring and sampling program required to verify compliance with the requirements of effluent discharge. Depending upon the project Risk Level, Numeric Action Levels ("NALs") and Numeric Effluent Limitations ("NELs") are set by the Construction General Permit for stormwater discharges from construction sites. Compliance with the Construction General Permit is used as one method of evaluating a project's construction-related impacts on surface water quality.

5.6.2.2 Thresholds of Significance

Based on Appendix G of the CEQA Guidelines, the City of Irvine has determined that a project would normally have a significant effect on the environment if the project would:

HYD-1 Violate any water quality standards or waste discharge requirements.

HYD-3 Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in a substantial erosion or siltation on- or off-site.

HYD-5 Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff.

HYD-6 Otherwise substantially degrade water quality.

Note that Potential Impacts HYD-4, HYD-5, HYD 7, and HYD-8, are addressed above in Subsection 5.6.1, *Hydrology*. For analysis of the 2012 Modified Project under Potential Impact HYD-2, see Subsection 5.12.1, *Water Supply*, in Section 5.12, *Utilities and Service Systems*, of this DSSEIR.

5.6.2.3 The 2011 Approved Project

The 2011 Approved Project will convert former agricultural and military uses on the former MCAS to primarily residential and commercial uses. As stated in Section 5.6.1, above, the 2011 Approved Project includes all of the mitigation measures from the 2011 Certified EIR and associated MMRP, and all of the analyses, studies and reports prepared to implement those mitigation measures. The 2011 Approved Project includes the following Conceptual Project Water Quality Management Plan (WQMP) prepared in conformance with the Orange County DAMP standards.

- *Conceptual Project Water Quality Management Plan (WQMP), Updating the Integrated Master Plan of Drainage, Water Quality and Habitat Mitigation, Orange County Great Park Neighborhoods*, RBF Consulting, April 20, 2009, update and clarification August 11, 2011.

With the proposed removal of many features of the former MCAS, the 2011 Approved Project was calculated to achieve a total net reduction in Approved Project Site watershed imperviousness of roughly 15 percent, resulting in a regional watershed percent imperviousness of roughly 41 percent.

Mitigation Measure H/WQ1 requires that a SWPPP be prepared prior to the approval of grading permits for any portion of the Approved Project Site in order to reduce sedimentation and erosion. The SWPPP must include the adoption of erosion and sediment control practices such as desilting basins and construction site chemical control management measures.

Mitigation Measure H/WQ2 requires demonstration that all stormwater runoff and dewatering discharges from the Approved Project Site be managed to the maximum extent practicable ("MEP") or treated as appropriate to comply with water quality requirements identified in the Basin Plan, including the TMDL Implementation Plan adopted for the San Diego Creek/Upper Newport Bay Watershed.

The WQMP implements standards from the DAMP based on the Approved Project Site's imperviousness, land use type, and downstream receiving water characteristics by incorporating project design features

("PDFs") and BMPs which reduce discharges of pollutants of concern from the 2011 Approved Project to the maximum extent practicable.

The pollutants of concern that were identified for the 2011 Approved Project by the above-referenced WQMP are listed in Table 5.6-4.

Table 5.6-4
2011 Approved Project Pollutants of Concern

Land Use	Pollutant Concerns:
Agriculture and Parks	Pesticides, Nutrients, Bacteria
Educational/Exposition Center/Research and Development, Commercial and Industrial	Bacteria, Nutrients, Pesticides, Sediments, Trash, Oxygen Demanding Substances, Oil and Grease, Metals
Residential	Bacteria, Nutrients, Pesticides, Sediments, Trash, Oxygen Demanding Substances, Oil and Grease, Metals
Roadway	Metals, Organic Compounds, Sediment, Trash, Oil and Grease, Bacteria, Nutrients, Pesticides, Oxygen Demanding Substances

Source: RBF Consulting, 2009; Update and Clarification, August 2011

Through the WQMP, the 2011 Approved Project incorporates source control, site design and treatment control measures as generally described below:

Site Design BMPs

Site design BMPs decrease the amount of potential runoff where practical to mimic pre-development hydrology to the maximum extent practicable. The 2011 Approved Project incorporates the following site design BMPs as part of its WQMP:

1. Conservation of Natural Areas to reduce imperviousness.
2. Disconnection of directly connected impervious areas allowing greater natural infiltration and time of concentration to downstream watercourses.

Source Control BMPs

Source controls are BMPs that are intended to reduce the amount of pollutants mobilized during rain storm or other events. They include both non-structural and structural BMPs. Table 5.6-5 lists the source control BMPs incorporated into the 2011 Approved Project:

Treatment Control BMPs

Treatment control BMPs capture stormwater before it leaves the site and cleanse the water through various processes prior to discharge, or infiltrate the water where practical to mimic pre-development hydrology to the maximum extent practicable.

The 2011 Approved Project incorporates several treatment control BMPs through its approved WQMP. The main treatment control BMP identified by the WQMP is the incorporation of 13 water quality (bioretention) facilities designed according to the Irvine Ranch Water District's NTS Master Plan Design

Guidelines, in addition to existing NTS Site 18 (Marshburn Retarding Basin). Of these 13 facilities, five drain into Marshburn Channel, one drains into Bee Canyon Channel, four drain into Agua Chinon, two drain into Borrego Canyon Channel, and one drains into Serrano Creek. These Natural Treatment System (NTS) facilities are designed to capture 80 percent of the average annual runoff from the developed areas of the Approved Project Site, and to cleanse the captured water through the settlement of particles and direct infiltration in areas where the underlying strata is permeable. In addition, these facilities are designed to capture and either evapotranspirate or treat summer dry-weather nuisance flows in order to reduce discharges to downstream receiving waters to the maximum extent practicable (MEP) (ENGEO 2012). A more complete list of Treatment Control BMPs incorporated into the 2011 Approved Project by the WQMP is presented in Table 5.6-6.

The bioretention cell design met the applicable standard for MEP treatment of post-construction stormwater flows as defined by the Orange County Stormwater Program MS4 permit (Orange County MS4), since the facilities would promote on-site detention and infiltration, when feasible, of stormwater during rainfall events in a manner intended to mimic pre-development hydrologic conditions throughout the Approved Project Site, as well as at points of discharge. These combined elements will reduce geomorphic impacts associated with changes in flow, duration or volume of existing downstream watercourse hydrographs, known as watershed "hydromodification" (hydrograph modification).

Because site imperviousness is similar to or slightly reduced in the 2011 Approved Project condition as compared to the former MCAS condition, the 2011 Certified EIR considered the effects of hydrograph modification to downstream receiving waters due to implementation of the 2011 Approved Project to be negligible.

Table 5.6-5
2011 Approved Project Source Control BMPs

BMPs	Residential	Commercial	Industrial	Recreational
Structural Source Control BMPs				
Storm Drain Stenciling	X	X	X	X
Outdoor Material Storage		X	X	X
Trash/Waste Storage	X	X	X	X
Irrigation Systems and Landscape Design	X	X	X	X
Slope and Channel Protection/Energy Dissipation	X	X	X	X
Maintenance Bay and Docks		X	X	
Vehicle Wash Areas		X	X	
Outdoor Processing Areas		X	X	
Equipment Wash Areas		X	X	
Fueling Areas		X	X	
Hillside Landscaping	X	X	X	X
Wash Water Control		X	X	
Car Wash Racks	X	X	X	
Non-Structural Source Control BMPs				
Educational Materials	X	X	X	X
Activity Restriction		X	X	
Common Area Landscape Management	X	X	X	X
BMP Maintenance	X	X	X	X
Title 22 CCR Compliance		X	X	
Local Industrial Permit Compliance			X	
Spill Contingency Plan		X	X	
Underground Storage Tank Compliance		X	X	
Hazardous Materials Disclosure		X	X	
Uniform Fire Code Implementation	X	X	X	X
Common Area Litter Control	X	X	X	X
Employee Training		X	X	X
Loading Dock Housekeeping		X	X	
Common Area Catch Basin Inspection	X	X	X	X
Street Sweeping	X	X	X	X
Commercial Vehicle Washing		X		
Retail Gasoline Outlets		X		

Source: RBF Consulting, 2009; Update and Clarification, August 2011

Table 5.6-6
2011 Approved Project Treatment Control BMPs

BMPs	Residential	Commercial	Industrial	Recreational
Bioretention	X	X	X	X
Vegetated Strips	X	X	X	X
Vegetated Swales	X	X	X	X
Extended Detention Basins	X	X		X
Wet Detention Basins	X	X	X	X
Constructed Wetland	X	X	X	X
Porous Landscape Detention	X	X	X	X
Permeable Surfaces	X	X	X	X
Infiltration Basins		X	X	X
Infiltration Trench		X	X	X
Media Filters	X	X	X	X
Proprietary Control Measures	X	X	X	X

Source: RBF Consulting, 2009; Update and Clarification 2011

5.6.2.4 Environmental Impacts of the 2012 Modified Project

Existing Plans, Programs, and Policies

The following measures are existing plans, programs, or policies ("PPPs") that apply to both the 2011 Approved Project and the 2012 Modified Project and that will help to reduce and avoid potential impacts related to water quality:

PPP 6-2 Prior to the issuance of a precise grading permit, the applicant shall submit a groundwater survey of the site. The analysis shall be prepared by a geotechnical engineer versed in groundwater analysis and shall include the following information and analysis (Standard Condition A.7):

a. Potential for perched groundwater intrusion into the shallow groundwater zone upon buildout.

b. Analysis for relief of groundwater buildup and properties of soil materials on-site.

c. Impact of groundwater potential on building and structural foundations.

d. Proposed mitigation to avoid potential for groundwater intrusion within five feet of the bottom of the footings.

PPP 6-3 This project will result in soil disturbance of one or more acres of land that has not been addressed by an underlying subdivision map. Prior to the issuance of preliminary or precise grading permits, the applicant shall provide the City Engineer with evidence that a Notice of Intent (NOI) and relevant Permit Registration Documents have been filed with the State Water Resources Control Board and that a Waste Discharge Identification ("WDID") Number

is issued. Such evidence shall consist of a copy of the NOI Receipt letter with WDID retrieved from the State Water Resources Control Board Stormwater Multi-Application and Report Tracking System (SMARTS) website or the Regional Water Quality Control Board, or a letter from either agency stating that the NOI has been filed (Standard Condition A.10).

PPP 6-4 Prior to the issuance of precise grading permits, the applicant shall submit, and the Director of Community Development shall have approved, a project water quality management plan (WQMP). The WQMP shall identify the best management practices that will be used on the site to control predictable pollutant runoff (Standard Condition A.13).

As detailed below, although the 2012 Modified Project includes minor changes to the distribution of land uses on the Proposed Project Site as it relates to water quality, these changes equate to approximately the same site imperviousness as the 2011 Approved Project. (Please refer to Chapter 3, *Project Description,* for a complete description of the 2012 Modified Project.) Therefore, water quality impacts associated with the 2012 Modified Project would be substantially the same as those associated with the 2011 Approved Project, and the water quality impacts of both the 2012 Modified Project and the 2011 Approved Project would be less than significant.

Methodology

The following technical study (see Appendix H to this DSSEIR) has been prepared to analyze potential water quality impacts of the 2012 Modified Project as compared to those of the 2011 Approved Project, based on the 2012 Modified Project's land uses:

- *Project Water Quality Technical Report,* ENGEO Incorporated, June 22, 2012.

This report concludes that the 2012 Modified Project would result in approximately the same overall net impervious area as the 2011 Approved Project, and would include the same general land uses and pollutants of concern. Since the 2012 Modified Project makes only minor refinements to the 2011 Approved Project as it relates to water quality, as outlined in the Project Water Quality Technical report, the impacts of the 2012 Modified Project will be similar to those of the 2011Approved Project, and both would be less than significant.

IMPACT 5.6.2-1: THE 2012 MODIFIED PROJECT WOULD NOT SUBSTANTIALLY ALTER THE DRAINAGE PATTERN OF THE PROPOSED PROJECT SITE OR AREA, INCLUDING THROUGH THE ALTERATION OF THE COURSE OF A STREAM OR RIVER, IN A MANNER WHICH WOULD RESULT IN SUBSTANTIAL EROSION OR SILTATION ON- OR OFF-SITE. [IMPACT HYD-3]

According to the Orange County Stormwater Program DAMP, the 2012 Modified Project's post-construction water quality impacts would differ from those of the 2011 Approved Project if the 2012 Modified Project's drainage patterns were different. Since the 2011 Approved Project and the 2012 Modified Project both contain the same land uses, develop generally the same land areas and generally have the same site imperviousness, the drainage patterns for the 2012 Modified Project would be the same as for the 2011 Approved Project. Therefore, the 2012 Modified Project's and the 2011 Approved Project's water quality impacts are the same and, are less than significant.

IMPACT 5.6.2-2: THE 2012 MODIFIED PROJECT WOULD NOT SIGNIFICANTLY INCREASE WATER POLLUTANT CONCENTRATIONS IN RUNOFF FROM THE PROPOSED PROJECT SITE DURING LONG-TERM OPERATION OR ALTER THE QUALITY OF STORMWATER RUNOFF, OR OTHERWISE SUBSTANTIALLY DEGRADE WATER QUALITY, AS COMPARED TO THE 2011 APPROVED PROJECT. [IMPACTS HYD-1, HYD-5 AND HYD-6]

Construction Phase Water Quality Impacts

Like the 2011 Approved Project, the 2012 Modified Project incorporates mitigation measure H/WQ 1, which requires that, prior to issuance of a grading permit, the project applicant demonstrate that construction of the 2012 Modified Project will comply with the requirements of the NPDES General Construction Permit to ensure that construction activities reduce, to the maximum extent practicable, their water quality impacts. Among other requirements, a SWPPP must be prepared prior to the approval of grading permit(s) for any portion of the Proposed Project Site exceeding 1 acre in disturbed area (or part of a larger development) in order to reduce sedimentation and erosion that could impact downstream receiving waters. The 2012 Modified Project also incorporates mitigation measure H/WQ 2, which requires that, prior to the issuance of a grading permit, a construction management plan be submitted to demonstrate that all storm water runoff and dewatering discharges from the Proposed Project Site will be managed to the maximum extent practicable or treated as appropriate to comply with water quality requirements identified in the Santa Ana Basin Plan.

Although the footprint of the 2012 Modified Project's disturbed area differs slightly from the 2011 Approved Project's footprint due to land plan refinements and the inclusion of the 11 additional acres (currently included in PA 9) into proposed Combined PA 51, no significant impacts would result. Implementation of the SWPPP and compliance with the NPDES General Construction Permit and the Santa Ana Basin Plan during construction (land development, utility/streets, vertical, landscaping, and inactive) would ensure that the 2012 Modified Project's construction phase water quality impacts will be, like those of the 2011 Approved Project, less than significant.

Post-Construction Water Quality Impacts

According to the Orange County Stormwater Program DAMP, the 2012 Modified Project's post-construction water quality impacts would differ from those of the 2011 Approved Project if the 2012 Modified Project's Pollutants of Concern were different. Since the 2011 Approved Project and the 2012 Modified Project both contain generally the same types of land uses, develop generally the same land areas, and generally have the same site imperviousness, the Pollutants of Concern for the 2012 Modified Project would be the same as for the 2011 Approved Project. Therefore, the 2012 Modified Project's and the 2011 Approved Project's water quality impacts are the same, and are less than significant.

The 2012 Modified Project impacts to storm drainage systems are addressed above in Section 5.6.1 and are not analyzed further here.

5.6.2.5 Cumulative Impacts

The area surrounding the Proposed Project Site in the San Diego Creek Watershed is either already developed, approved for development or planned for development. As is true for the 2011 Approved Project, by adherence to the Orange County DAMP standards, which is required of all new development and redevelopment projects, the cumulative water quality impact of the 2012 Modified Project together with additional development in the area would be regulated in conformance with Santa Ana Basin Plan standards adopted by the Santa Ana RWQCB. These standards take a watershed scale approach to water quality issues and are periodically updated based on regional water quality studies. These studies include additional specific constituents of concern (TMDLs) and broader objectives (Beneficial Uses). Also, the Maximum Extent Practicable (MEP) standard associated with water quality mitigation is reevaluated periodically based on advances in technology associated with project design features and regulated through the Santa Ana RWQCB and the Orange County DAMP standards.

While related projects could result in erosion and sedimentation impacts during construction, such projects would also comply with Construction General Permit requirements regarding preparation and implementation of SWPPPs and implementation of BMPs for minimizing construction water quality impacts. Cumulative impacts on water quality from construction activities would be less than significant.

Therefore, through the regulatory approval process, additional development would also mitigate to a level considered to be less than significant. As such, like those of the 2011 Approved Project, the 2012 Modified Project's cumulative impacts related to water quality would be less than significant.

Mitigation Program and Net Impact

The 2012 Modified Project would have minor changes in the impervious surfaces, as compared to the 2011 Approved Project, and would only result in minor changes to the 2011 Approved Project's drainage patterns and peak flows. In general, the drainage areas, discharge points, and peak flow discharges will be consistent with the 2011 Approved Project. Because the source controls and structural practices for surface water quality management are the same, the post-construction water quality Best Management Practices (BMPs) proposed in the 2012 Modified Project are consistent with the NTS Water Quality Facilities and other BMPs used in the 2011 Approved Project, and both the 2012 Modified Project and 2011 Approved Project water quality BMPs are consistent with BMPs described in the approved Conceptual Project Water Quality Management Plan (RBF, August 2009 Update and Clarification August 2011). In addition, the conversion from non-residential uses to residential uses will not significantly alter the types of urban pollutants generated on-site and no changes to the water quality BMPs are necessary. As is true for the 2011 Approved Project, any drainage improvements constructed as part of the 2012 Modified Project would be subject to the Orange County DAMP standards. No additional mitigation measures are introduced in this DSSEIR as water quality impacts would be less than significant with the mitigation measures identified in the 2011 Certified EIR and associated MMRP.

Applicable Mitigation Measures from the 2011 Certified EIR

Like the 2011 Approved Project, the 2012 Modified Project will incorporate two mitigation measures to reduce its effects on water quality. Implementation of already imposed Mitigation Measures H/WQ1 and H/WQ2 (listed below) ensure that the 2012 Modified Project's impacts on water quality will be less than significant.

H/WQ1 Prior to issuance of a grading permit, the applicant shall provide evidence that the development of the project area shall comply with City of Irvine adopted Grading and Water Quality Ordinances to ensure that the potential for soil erosion is minimized on a project-by-project basis. Specifically, the NPDES discharge permitting requirements to which the City is obligated will ensure that construction activities reduce, to the maximum extent feasible, the water quality impacts of construction activities. The NPDES permit guidance states that "industrial/commercial construction operations that result in a disturbance of one acre or more of total land area…and residential construction sites that result in the disturbance of five acres or more…shall be required to develop and implement BMPs…to control erosion and siltation and contaminated runoff from the construction sites." Note: In March 2003 this provision will apply to residential construction sites that result in the disturbance of one acre or more.

The City's standard conditions of approval indicate that a Storm Water Pollution Prevention Plan (SWPPP) shall be prepared prior to the approval of grading permits for any project site in order to reduce sedimentation and erosion. The SWPPP shall include the adoption of erosion and sediment control practices such as desilting basins and construction site chemical control management measures.

Additionally, prior to the issuance of a grading permit, project applicants must submit, and the Director of Community Development or designee must have approved, a Water Quality Management Plan (WQMP). The WQMP must identify the Best Management Practices (BMPs) that will be used on the site to control predictable pollutant runoff after the site is occupied. Ongoing operations after construction would be subject to the Countywide Municipal NPDES Stormwater Permit, for which the City is a Co-Permittee. This WQMP shall identify, at a minimum, the routine, structural, and non-structural measures specified in the Countywide NPDES DAMP Appendix which they are applicable to a project, the assignment of long-term maintenance responsibilities (specifying the developer, parcel owner, maintenance association, lessee, etc.), and shall reference the location(s) of structural BMPs.

Also in accordance with standard City project permitting and approval procedures, Notices of Intent (NOI) for coverage of projects under the General Construction Activity Storm Water Runoff Permit will be submitted to the State Water Resources Control Board prior to issuance of grading permits in the project area. This requirement will be met to the satisfaction of the Director of Community Development of any disturbance of one acre or more of soil in the project area. Also in force during the period of construction would be the General Dewatering NPDES permit of the Santa Ana RWQCB, as well as the provisions of the Countywide Permit.

The Mitigation Measures will be implemented in accordance with local and State regulatory requirements. As future projects are planned and designed in the project area, specific BMPs and other water quality control methods will be utilized to reduce water quality degradation in the Newport Bay watershed. Future projects in the proposed project area will acknowledge and implement those additional requirements that may be imposed by RWQCB in the future. Compliance with these measures shall be verified by the Community Development Department.

H/WQ2 Prior to issuance of a grading permit, evidence (e.g., in the form of a construction management plan) shall be provided that demonstrates that all stormwater runoff and dewatering discharges from the project area shall be managed to the maximum extent practicable or treated as appropriate to comply with water quality requirements identified in the Santa Ana Regional Water quality Control Board Basin Plan, including Total Maximum Daily Load (TMDL) Implementation Plan adopted for this watershed.

5.6.2.6 Level of Significance Before Additional Mitigation

With implementation of the same regulatory requirements, mitigation measures and standard conditions of approval that are already included in the 2011 Approved Project, the 2012 Modified Project's impacts on water quality, including Impacts 5.6.2-1 and 5.6.2-2 discussed above would be less than significant.

5.6.2.7 Additional Mitigation for the 2012 Modified Project

No additional mitigation measures are required because the 2012 Modified Project's impacts on water quality would be less than significant prior to any additional mitigation.

5.6.2.8 Level of Significance After Additional Mitigation

All of the 2012 Modified Project's impacts on water quality would be less than significant upon implementation of regulatory requirements, the standard conditions of approval, and the mitigation measures already in place under the 2011 Approved Project.