Appendix G
Updated Water Quality Technical Report

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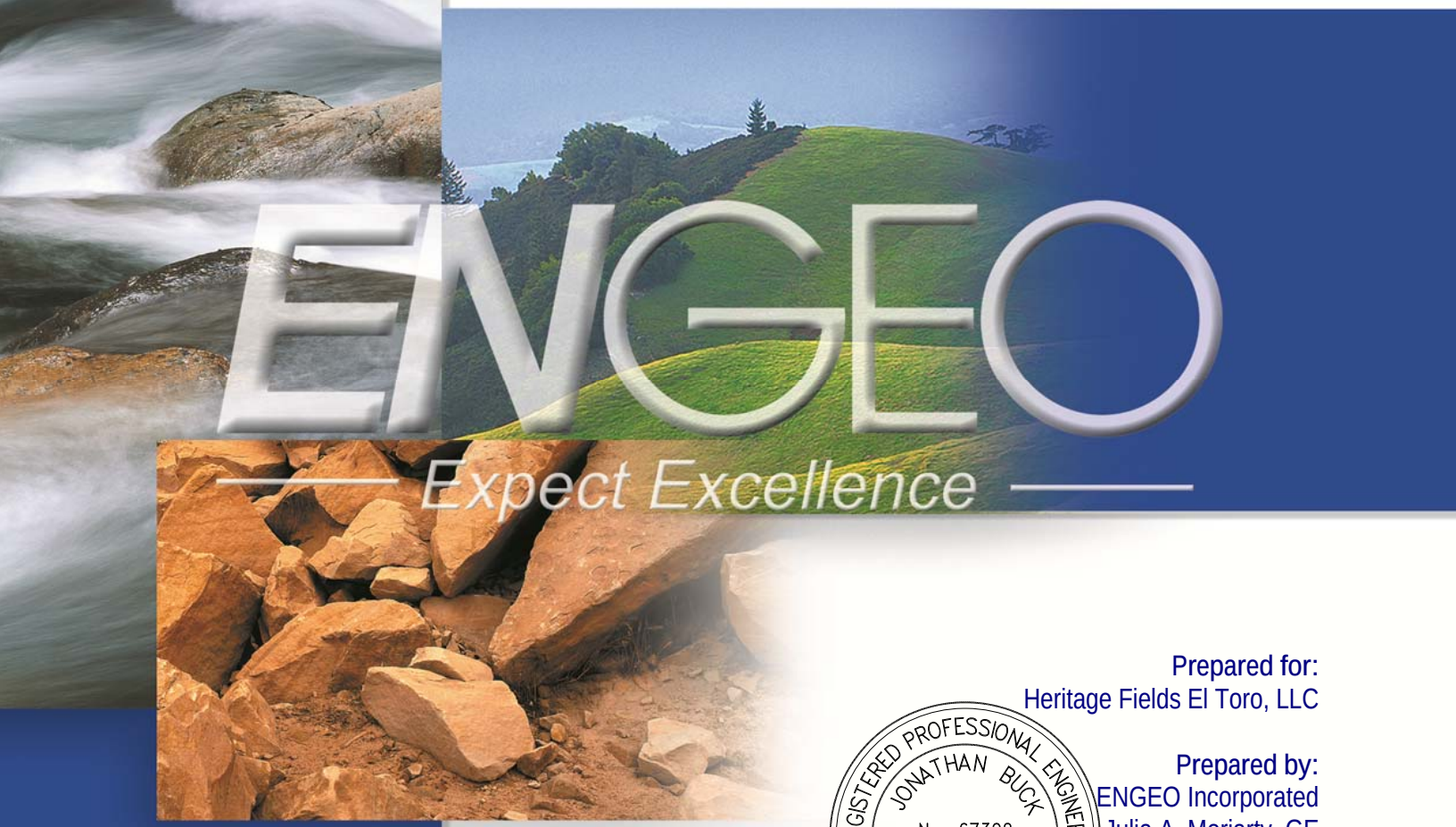
PROJECT WATER QUALITY TECHNICAL REPORT

GREAT PARK NEIGHBORHOODS - TTOD
IRVINE, CALIFORNIA



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1.0 INTRODUCTION

This document analyzes the water quality impacts of the 2012 Modified Project as compared to those of the 2011 Approved Project, as both projects are defined below and in the Second Supplemental Environmental Impact Report (SSEIR), based on current regulations and compliance with California Environmental Quality Act (CEQA) requirements. This document follows the framework for addressing water quality issues presented in the 2003 Orange County Stormwater Program document entitled *Drainage Area Management Plan* (Orange County DAMP)[1], including Section 7, Exhibit 7.I *Guidance for Preparing and Reviewing CEQA Initial Studies and Environment Impact Report (EIR)*[2] for post-construction stormwater management facilities.

Based on the guidelines set forth by the Orange County Stormwater Program, a project that consists of 10 or more residential units is considered to be a "priority project" and therefore subject to Municipal Separate Storm Sewer (MS4) discharge requirements. Based on this criterion, both the 2011 Approved Project and 2012 Modified Project discussed in this report are considered to be "priority projects" for purposes of MS4 compliance.

This document also compares the 2011 Approved Project to the 2012 Modified Project with respect to the overall objectives for addressing water quality issues presented in the following Approved Conceptual Project Water Quality Management Plan (Approved Conceptual Project WQMP) for the overall project site:

- RBF Consulting, April 20, 2009, Update and Clarification August 11, 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 (Approved Conceptual Project WQMP)

2.0 PROJECT DESCRIPTIONS

2.1 2011 APPROVED PROJECT

2.1.1 Description

The 2011 Approved Project refers to the development currently approved within Existing Planning Areas 30 and 51 and as analyzed in the 2011 Certified EIR (consisting of the 2003 OCGP EIR, the 8 addenda, and the 2011 SEIR that was certified by the City on August 30, 2011). The term "Proposed Project Site" refers to and encompasses; (1) the Heritage Fields Development, also known as the Great Park Neighborhoods, consisting of nine existing Development Districts[3]; (2) an 11-acre parcel currently owned by the Transportation Corridor Agencies (TCA) located adjacent to the SR-133 Freeway between Trabuco Road and Irvine Boulevard(the "TCA Property"); (3) Lot D, Lot E, and Lot F as depicted on 2nd Amended

[1] http://www.ocwatersheds.com/DAMP_MapPlan.aspx
[2] http://www.ocwatersheds.com/Documents/2003_DAMP_Exhibit_7_I_CEQA_Guidance.pdf
[3] Development District 9 will be merged into Development District 6 as part of the 2012 Modified Project, reducing the number of Development Districts to eight.

Vesting Tentative Tract Map 17008 currently zoned 3.2 Transit Oriented Development within Districts 2 and 3 (together, the "City Parcels"); and (4) 132 acres owned by the City, referred to as the Wildlife Corridor, together with a portion of the Great Park known as the "Sports Park District," all of which are located within the areas designated as Existing “Planning Area (PA) 30” and Existing “PA 51”.

2.1.2 Site Imperviousness

The 2011 Approved Project achieves a total net reduction of roughly 15 percent in the Regional watershed area[4] imperviousness as compared to the former Marine Corps Air Station, El Toro (MCAS) condition resulting in a percent imperviousness of roughly 41 percent for the Regional watershed area.

2.1.3 Incorporated Mitigation Measures

The 2011 Approved Project incorporates mitigation measures H/WQ-1 and H/WQ-2 recommended in the 2011 Certified EIR and adopted by the City of Irvine in the Mitigation Monitoring Program for the 2011 Approved Project.

Mitigation measure H/WQ-1 requires compliance with the City’s standard conditions of approval requiring preparation of a Storm Water Pollution Prevention Plan (SWPPP) prior to the approval of grading permits for any project site in order to reduce sedimentation and erosion. The SWPPP must be prepared in accordance with current State Water Resources Control Board (SWRCB) NPDES General Construction Permit[5] and must include the adoption of erosion and sediment control practices such as desilting basins and construction site chemical control management measures.

Mitigation measure H/WQ-2 requires demonstration that all stormwater run-off and dewatering discharges from the Proposed Project Site be managed to the maximum extent practicable (MEP) or treated as appropriate to comply with the water quality requirements identified in the Water Quality Control Plan for the Santa Ana River Basin (Santa Ana Basin Plan)[6], including the Total Maximum Daily Load (TMDL) Implementation Plan adopted for this watershed.

In addition, mitigation measures H/WQ-1 and H/WQ-2 require that Water Quality Management Plan(s) be submitted and approved prior to the issuance of a grading permit. This plan must identify the Best Management Practices (BMPs) that will be used on the Proposed Project Site to control predictable pollutant runoff after the site is occupied. The Water Quality Management Plan must identify, at a minimum, the routine structural and non-structural measures specified in the Orange County DAMP Appendix, which details implementation of BMPs whenever they are

[4] The term "Regional watershed area" refers to the Regional watersheds that may be affected by the Proposed Project Site, including the Marshburn, Bee Canyon, Agua Chinon, Borrego Canyon, Serrano Creek and San Diego Creek Watersheds.
[5] SWRCB, NPDES General Permit for Stormwater Discharges Associated with Construction and Land Disturbance Activities, Order 2009-0009-DWQ; http://www.swrcb.ca.gov/water_issues/programs/stormwater/construction.shtml.
[6] Santa Ana River Basin (8), Water Quality Control Plan, January 24, 1995, Updated February 2008; http://www.waterboards.ca.gov/santaana/water_issues/programs/basin_plan/index.shtm

applicable to a development project, the assignment of long-term maintenance responsibilities, and reference the location(s) of structural BMPs.

The City of Irvine determined that, with the implementation of mitigation measures H/WQ-1 and H/WQ-2, the 2011 Approved Project's water quality impacts during and post construction would be less than significant.

2.1.4 Implementation of Incorporated Mitigation Measures

To implement mitigation measures H/WQ-1 and H/WQ-2, the Approved Conceptual Project WQMP for the 2011 Approved Project was prepared in conformance with the Orange County DAMP[7] standards. The Approved Conceptual Project WQMP was prepared based on the 2011 Approved Project's site imperviousness, land use types, and downstream receiving water characteristics, and incorporates the project design features (or BMPs) needed to reduce the predicted discharge of pollutants of concern resulting from the 2011 Approved Project to the maximum extent practicable after the project has been developed. Table 2.1.4-1 below lists the pollutants of concern identified in the Approved Conceptual Project WQMP for the 2011 Approved Project.

TABLE 2.1.4-1
2011 Approved Project Pollutants of Concern

Land Use	Pollutants of Concern
Agriculture and Parks	Pesticides, Nutrients, Bacteria
Multi use lands with Educational, Exposition Center, Research and Development, Commercial and Industrial uses	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 Approved Conceptual Project WQMP, the 2011 Approved Project incorporates the source control, site design and treatment control BMP measures generally described below.

Site Design BMPs

In general, Site Design BMPs decrease the amount of potential runoff where practical to mimic pre-development hydrology to the maximum extent practicable. For the Approved Project, the incorporation of project BMPs will further increase infiltration and reduce site runoff versus the former MCAS condition, as site imperviousness will be reduced as part of the development. The

[7] County of Orange, The Cities of Orange County and The Orange County Flood Control District, Drainage Area Management Plan, July 1, 2003 (Orange County DAMP).

2011 Approved Project incorporates the following site design BMPs as part of its Approved Conceptual Project 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 Measures

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 2.1.4-2 lists potential source control BMPs for the 2011 Approved Project:

TABLE 2.1.4-2
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

	BMPs	Residential	Commercial	Industrial	Recreational
	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.

Treatment Control BMPs

In general, 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 prior to downstream discharge. Potential treatment control BMPs considered for the 2011 Approved Project by the Approved Conceptual Project WQMP are listed in the following Table 2.1.4-3:

TABLE 2.1.4-3
Treatment Control BMPs

BMPs Considered	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 August 2011.

As its main treatment control BMP, and as shown in Exhibit 6-2 (Figure 1 attached) of the 2011 Approved Project Conceptual Project WQMP (RBF, April 20, 2009, Update and Clarification August 11, 2011) for the overall project (Great Park Neighborhoods and Great Park), new water quality facility sites, in addition to existing NTS Site 18 (Marshburn Retarding Basin) are proposed. The actual number and locations of sites will be determined as development district land plans are further refined.

The water quality sites for the overall project (Great Park Neighborhoods and Great Park) will be designed in accordance with the current Irvine Ranch Water District's (IRWD) Natural

Treatment System (NTS) Design Guidelines (IRWD, 2005 and Addenda)[8] and IRWD will accept the facilities as Natural Treatment System sites. In addition, a bioretention facility has been constructed in District 8 in accordance with an agreement between the developer and IRWD. If IRWD or City wishes to substitute other facilities with bioretention, IRWD and City will work with the developer to consider and implement a mutually agreeable alternative.

The water quality facilities are designed to capture 80 percent of the average annual runoff from the developed areas of the 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).

The water quality facility designs meet 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 onsite detention and infiltration, when feasible, of stormwater during rainfall events in a manner intended to mimic pre-development hydrologic conditions throughout the 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 pre-development condition, the effects of hydrograph modification to downstream receiving waters due to implementation of the 2011 Approved Project are considered to be negligible and less than significant.

Ownership and maintenance of post-construction BMPs will remain under control of the project applicant or its successor until such a time an entity acceptable to the applicant, IRWD, and the City agrees to undertake maintenance responsibilities.

2.2 2012 MODIFIED PROJECT

2.2.1 Description

The term "Proposed Project Site" refers to and encompasses; (1) the Heritage Fields Development, also known as the Great Park Neighborhoods, consisting of nine existing Development Districts[9]; (2) an 11-acre parcel currently owned by the Transportation Corridor Agencies (TCA) located adjacent to the SR-133 Freeway between Trabuco Road and Irvine Boulevard (the "TCA Property"); (3) Lot D, Lot E, and Lot F as depicted on 2nd Amended Vesting Tentative Tract Map 17008 currently zoned 3.2 Transit Oriented Development within Districts 2 and 3 (together, the "City Parcels"); and (4) 132 acres owned by the City, referred to

[8] IRWD, November 2005, Amended May 2012, San Diego Creek Watershed, NTS Design Guidelines, prepared by Geosyntec Consultants.; http://www.irwd.com/environment/natural-treatment-system.html

[9] Development District 9 will be merged into Development District 6 as part of the 2012 Modified Project, reducing the number of Development Districts to eight.

as the Wildlife Corridor, together with a portion of the Great Park known as the "Sports Park District," all of which are located within the areas designated as Existing “Planning Area (PA) 30” and Existing “PA 51” in the City's General Plan, northeast of the freeway junction of Interstate 5 (I-5) and Interstate 405 (I-405), within the City.

Existing PA 51 is generally bounded by the Eastern Transportation Corridor to the west, the Foothill Transportation Corridor to the north, the Southern California Regional Rail Authority (“SCRRA”) rail lines to the south, and Irvine Boulevard and the stormwater channel near Alton Parkway to the north. Existing PA 51 abuts Existing PA 30 and PA 32 to the south, PA 35 (Irvine Spectrum 2) and the City of Lake Forest to the east, and PAs 9 and 40 to the west. Existing PA 30 is generally bounded by I-5 to the south, the SCRRA rail lines to the north, and the Irvine Spectrum to the east and west (Irvine Spectrum 2- PA 35 and Irvine Spectrum 3 - PA 32).

The 2012 Modified Project changes the 2011 Approved Project as follows:

- Combines Existing PAs 30 and 51 and the approximately 11 acres between the current western boundary of Existing PA 51 and SR-133 between Trabuco Road and Irvine Boulevard currently owned by Transportation Corridor Agency (TCA), into a single PA, Combined PA 51.

- Rezones property in Districts 2, 3, and 6 from 3.2 Transit Oriented Development, 4.3 Vehicle Related Commercial, and 5.4 B General Industrial to 8.1 Trails and Transit Oriented Development.

- Rezones 13 acres in District 6 (formerly District 9) from its current 1.1 Agriculture zoning to 1.4 Preservation.

- Rezones the City Parcels from 3.2 Transit Oriented Development to 8.1 Trails and Transit Oriented District.

- Relocates the 132-acre Wildlife Corridor within District 5 adjacent to the Borrego Canyon Wash.

- Zones the approximately 11 acres between the current western boundary of Existing PA 51 and SR-133 between Trabuco Road and Irvine Boulevard, currently owned by TCA to 8.1 TTOD.

- Amends the Master Plan of Arterial Highways to eliminate the extension of Rockfield Boulevard from the eastern project boundary to Marine Way once the Orange County Transportation Authority (OCTA) has approved this proposed amendment to the countywide Master Plan of Arterial Highways.

- Amends the General Plan and Zoning Ordinance to allow the following:
  - 3,412 multi-use residential units within Combined PA 51, in addition to the 4,894 units already allocated in Districts 1 North, 1 South, 4, 7, and 8.

- Modify non-residential uses to allow:
  - 3,364,000 square feet of Medical and Science
  - 1,318,200 square feet of Multi-Use. The Modified Project includes an option to convert up to 535,000 square feet of the proposed Multi-Use intensity to residential intensity for up to an additional 889 dwelling units within District 6 and Lot 48 of 2nd Amended VTTM 17008, subject to a vehicle trip limit.
  - 220,000 square feet of Community Commercial

- Grants, pursuant to State law, up to 1,194 additional DB units (35% of 3,412) plus any additional Density Bonus (DB) units associated with the optional conversion and granted pursuant to State law.

- Encourages Accessory Retail within Combined PA 51, as defined in the City of Irvine Zoning Code.

The 2012 Modified Project consists of 4,606 dwelling units (3,412 base units and 1,194 DB units). The 2012 Modified Project also includes the option to convert up to 535,000 square feet of Multi-Use to up to 889 base units and 311 DB units, granted pursuant to State law. These are in addition to the already approved 4,894 dwelling units.

The 2012 Modified Project includes two options for the "Main Street" development along Trabuco Road east of "O" Street. Option 1, which was studied in the 2011 SEIR, includes Community Commercial and Multi-Use north of Trabuco Road with Residential south of Trabuco in District 1 South. Option 2 will study Residential north of Trabuco Road with Community Commercial, Multi-Use, and Residential south of Trabuco Road in District 1 South. Both options will include a 2,600-student high school in District 5.

The 2012 Modified Project also includes implementation of recreational facilities in the previously approved Sports Park District of the Orange County Great Park (Great Park).

The 2012 Modified Project incorporates the Mitigation Measures recommended by the 2011 Certified EIR and adopted by the City in the Mitigation Monitoring and Reporting Program. It also incorporates the Project Design Features described below.

2.2.2 Site Imperviousness

When land is developed, components often replace existing pervious surfaces such as open space areas, which infiltrate and retain a certain portion of rainfall during storm events. When these pervious surfaces are replaced by impervious surfaces, rainfall occurring in those areas is immediately transformed into site runoff during rainstorm events, which increases the total volume of site runoff. Percent imperviousness is thus defined as the ratio of impervious area to total project site area and is an indicator of the potential impact of land development on downstream watercourses.

The estimated overall site imperviousness for the 2012 Modified Project, based on the Approved Conceptual Project Water Quality Management Plan (RBF, April 20, 2009, Update and Clarification August 11, 2011) for the 2011 Approved Project and modified in the Hydrology

Study prepared for the 2012 Modified Project (RBF, June 2012), is summarized in the following Table 2.2.2-1.

TABLE 2.2.2-1
2012 Modified Project Site Imperviousness

Node	Tributary Watershed	Tributary Area (Ac)	Average Ap*		Peak Flow Rate, Q (cfs)		
		Master Plan	Master Plan	Revised	Master Plan	Revised	Delta (cfs)
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

*Ap is defined as the ratio of pervious area to total area for each watershed. (RBF, June 2012).

Table 2.2.2-1 demonstrates that the 2012 Modified Project would slightly increase site imperviousness for certain watershed areas, and slightly decrease site imperviousness along the Agua Chinon watershed, as compared to the 2011 Approved Project. The increase is attributed primarily to the 2012 Modified Project's modifications to residential and non-residential use types that result in more imperviousness; however, other reductions in site imperviousness result from the proposed removal of the large Marine Corps Air Station runways in portions of Existing PA 51, which reductions are also achieved by the 2011 Approved Project and will lower the overall imperviousness of the Approved Project site below the former MCAS condition.

Table 2.2.2-2 prepared by RBF for the 2012 Modified Project's Water Quality Master Plan summarizes the decreases in imperviousness from the existing condition achieved by the 2011 Approved Project and the 2012 Modified Project as follows:

TABLE 2.2.2-2
Comparison of Site Imperviousness for
Existing Site, 2011 Approved Project and 2012 Modified Project

Watershed	Existing Condition (Impervious %)	2011 Approved Project (Impervious %)	2012 Modified Project (Impervious %)
Marshburn	49	32	32
Bee Canyon	88	56	56
Agua Chinon	56	25	24
Borrego Canyon	55	29	31
Serrano Creek	49	55	55
San Diego Creek	58	61	61
Total	**55**	**41**	**41**

In summary, the minor modifications in land uses proposed by the 2012 Modified Project when compared to the land uses approved in the 2011 Approved Project, achieve approximately the

same proposed watershed imperviousness overall for the site based on the refinement of district land plans.

2.2.3 Implementation of Mitigation Measures Incorporated Into the 2012 Modified Project

Like the 2011 Approved Project, the 2012 Modified Project incorporates mitigation measures H/WQ-1 and H/WQ-2, as implemented by the Approved Conceptual Project WQMP (RBF, April 20, 2009, Update and Clarification August 11, 2011). The Approved Conceptual Project Water Quality Management Plan prepared by RBF Consulting (April 20, 2009, Update and Clarification August 11, 2011) describes mitigation measures H/WQ-1 and H/WQ-2 on a programmatic level for the 2012 Modified Project, and has the same water quality BMPs utilized in the 2011 Approved Project for Development Districts 1, 4, 7 and 8. Further refinements to these Districts, plus the remaining Development Districts will require WQMP Updates or new WQMPs to be prepared.

Site Design BMPs, Structural and Non-Structural Source Control BMPs, and Treatment Control BMPs as described in the Approved Conceptual Project WQMP (April 20, 2009, Update and Clarification August 11, 2011) for the 2011 Approved Project would be substantially the same for the 2012 Modified Project and remain consistent. Since the facilities are only needed for water quality, not flood control, some modifications to the location of and minor modification to the size of the Water Quality Facilities may be required based on alterations to land use layout and refinements as reflected in later proposed VTTMs.

Based on subsequent land plan refinements, Table 2.1.4-5 for the 2011 Approved Project SEIR has been modified by combining select water quality facilities. Table 2.2.3-1 presents the modified Water Quality Facility layout as the primary water quality treatment in Development Districts 1, 4, 7 and 8. Figure 2 incorporates these adjustments and presents an updated Water Quality Facility plan for the overall development and the 2012 Modified Project. These Water Quality sites may be further refined as to location and footprint as the VTTM grading plans and district-specific WQMPs are finalized for the 2012 Modified Project.

TABLE 2.2.3-1
Modified Water Quality Facility Sites for Districts 1, 4, 7 and 8

Water Quality Facility (Development District, Location)	Approximate Tributary Area (acres)	Receiving Water
DD8 – Marshburn Retarding Basin (Existing)	121	Marshburn Channel
DD8 – SW Corner	46	Marshburn Channel
DD1N (Facility 1A/1B/1C) – West Edge	542.5 (262.4, 61.8, 218.3)	Marshburn Channel
DD1N (Facility 3)– SW Corner	75.6	Marshburn Channel
DD1S (Facility 2)– SW Corner	105	Marshburn Channel
DD7 – SW Corner	95	Agua Chinon Channel
DD7 – SE Corner	173	Agua Chinon Channel

Source: RBF, 2011 (2011 Approved Project) and H&A 2013

Figures 1 and 2 (attached) depict the proposed water quality facility locations (plus existing Marshburn Retarding Basin) for the overall project (Great Park Neighborhoods and Great Park) as presented in the Approved Conceptual Project WQMP (RBF, Update and Clarification 2011) or as refined thereafter to be incorporated into the 2012 Modified Project. The actual number and locations of sites will be determined as development district land plans are further refined. Similar to the 2011 Approved Project, the water quality sites for the overall project (Great Park Neighborhoods and Great Park) will be designed in accordance with the current Irvine Ranch Water District's (IRWD) Natural Treatment System (NTS) Design Guidelines (IRWD, 2005 and Addenda)[10] and IRWD will accept the facilities as Natural Treatment System sites. In addition, a bioretention facility has been constructed in District 8 in accordance with an agreement between the developer and IRWD. If IRWD or City wishes to substitute other facilities with bioretention, IRWD and City will work with the developer to consider and implement a mutually agreeable alternative.

The water quality facility refinements described in in the Approved Conceptual Project WQMP incorporate the Design Guidelines provided in the IRWD, NTS Master Plan (2005 and Addenda) for San Diego Creek Watershed. The design and sizing of these facilities are also consistent with the Orange County DAMP[11] standards to reduce downstream impacts related to water quality to less than significant levels.

Similar to the 2011 Approved Project, the 2012 Modified Project's future District WQMPs will establish water quality sizing criteria based on an 80 percent capture volume, which is determined by the net imperviousness of the tributary watershed the runoff from which the facility is intended to treat, and a water quality design storm based on historic Orange County rainfall data. These water quality facilities cleanse storm water through settlement of particles and direct infiltration in areas where the underlying strata is permeable; in addition, they 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). The designs will meet the applicable standard for treatment of post-construction stormwater flows as defined by the Orange County MS4 permit since the basins promote onsite detention and infiltration, when feasible, of stormwater during rainfall events in a manner intended to mimic existing hydrologic conditions throughout the site, as well as at points of discharge. These combined elements would reduce geomorphic impacts associated with changes in flow, duration or volume, of existing downstream watercourse hydrographs, known as watershed "hydromodification" (hydrograph modification).

Ownership, and maintenance of post-construction BMPs will remain under control of the project applicant or its successor until such a time as an entity acceptable to the applicant, IRWD, and the City agrees to undertake maintenance responsibilities.

[10] IRWD, November 2005, Amended May 2012, San Diego Creek Watershed, NTS Design Guidelines, prepared by Geosyntec Consultants; http://www.irwd.com/environment/natural-treatment-system.html
[11] 2003 Orange County DAMP.

3.0 WATER QUALITY SETTING

3.1 RECEIVING WATERS

3.1.1 Identification of Project Receiving Waters

The Proposed Project Site drains into the San Diego Creek Watershed, which covers roughly 112 square miles within Orange County. This watershed includes foothills of the Santa Ana Mountains on the northeast, as well as portions of the Tustin Plain and the San Joaquin Hills. San Diego Creek, the main waterway in the watershed, extends mostly east to west and drains into Upper Newport Bay.

A large portion of the Proposed Project Site drains in a southwest direction, either directly through a series of channels (Marshburn, Bee Canyon, Agua Chinon, Borrego Canyon, Serrano Creek, and San Diego Creek), existing storm drain facilities, or a combination thereof. Runoff from the Proposed Project Site discharges into existing County of Orange Flood Control facilities in San Diego Creek, which ultimately conveys runoff to the Upper Newport Bay.

3.1.2 Sensitivity of Project Receiving Waters

The city of Irvine is located in the Santa Ana River Basin, Region 8, in the Upper Santa Ana Watershed. The 1995 Water Quality Control Plan for the Santa Ana River Basin[12] (Santa Ana Basin Plan) adopted by the Santa Ana Regional Water Quality Control Board (Santa Ana RWQCB), governs the Proposed Project Site. The Santa Ana 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 Santa Ana Basin Plan, the beneficial uses[13] for the San Diego Creek Drainage include water recreation, warm freshwater habitat, wildlife habitat and intermittent groundwater recharge, and the beneficial uses for Newport Bay include navigation, contact and non-contact water recreation, commercial and sport fishing, preservation of biological habitats of special significance, wildlife habitat, threatened or endangered species, spawning, reproduction and development of wildlife, marine habitat, shellfish harvesting and estuarine habitat.

Table 3.1.2-1, below, lists the Clean Water Act Section 303(d) water quality segment waterways downstream of the Proposed Project Site where water quality objectives must be addressed by a TMDL, and those bodies' impairments. Table 3.1.2-2 reports the status of the TMDLs for the Proposed Project Site's receiving waters (San Diego Creek and Newport Bay) per the Orange County Stormwater Program and the Santa Ana Basin Plan as of 2010.[14] Once a water body has been placed on the 303(d) list of impaired waters, a Total Maximum Daily Load (TMDL) must be developed to address each pollutant causing the impairment.

[12] Santa Ana River Basin (8), Water Quality Control Plan ("Basin Plan"), January 24, 1995, Updated February 2008; http://www.waterboards.ca.gov/santaana/water_issues/programs/basin_plan/index.shtml.
[13] Beneficial uses are the ways that water from a particular source can be used for the benefit of people and/or wild-life, as established in the Basin Plan.
[14] 2010 Clean Water Act Section 303(d) List of Water Quality Limited Segments (most recent list)

TABLE 3.1.2-1
Impaired Proposed Project Site Receiving Water Bodies and TMDLs

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	Metals	RB TMDL	Data Collection*
	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 Jain Peng, Orange County Stormwater Program, April 24, 2012.
**Added by USEPA in 2011 after reviewing California's list.

TABLE 3.1.2-2
TMDL Status - Newport Bay and San Diego Creek

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)[15] 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.

[15] Waste Load Allocation (WLA) is defined as the portion of a receiving water's loading capacity that is allocated to one of its existing or future point sources of pollution (e.g., permitted waste treatment facilities)

Watershed	Pollutant of Concern	TMDL Status
	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.		

3.2 NATIONAL POLLUTANT DISCHARGE ELIMINATION SYSTEM

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

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 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 EPA has

recently focused on integrating the NPDES program further into watershed planning and permitting.[16]

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 greater than or equal to one acre in size. The City of Irvine Community Development Department is the local enforcing agency of the MS4 NPDES permit.[17]

The Orange County MS4 Permit requires the installation of post-construction BMPs for new development and sets standards for the implementation of these requirements. 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 Santa Ana RWQCB. 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 in size so that downstream receiving waters are not adversely impacted. To comply with these requirements, new developments are required to install stormwater runoff water quality 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 water 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 the Orange County DAMP in July 2003[18], pursuant to NPDES regulations. The Orange County DAMP requires a project's engineer to prepare a Water Quality Management Plan that demonstrates that the project's BMPs will meet the aforementioned waste discharge requirements.

[16] EPA, http://www.epa.gov/npdes/pubs/101pape.pdf, September 2004.
[17] State of California, California Regional Water Quality Control Board, Santa Ana Region, Order No. R8-2009-0030, NPDES No. CAS618030, as Amended by Order No. R8-2010-0062, 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 Storm Water Runoff Orange County.
[18] Orange County DAMP.

Although the 2012 Modified Project would not discharge directly into an impaired water body, runoff from the Proposed Project Site will discharge 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, indicator bacteria and unknown toxicity, as discussed above. In turn, Reach 2 is upstream of Reach 1 of San Diego Creek, which is listed as impaired for fecal coliform, selenium and Toxaphene, and has established TMDL requirements for metals, nutrients, pesticides and siltation. Stormwater runoff will also discharge to Serrano Creek, which is impaired for Ammonia, Indicator Bacteria and pH.

3.3 STORMWATER POLLUTION PREVENTION PLANS

Pursuant to the CWA, on September 2, 2009, the State Water Resources Control Board (SWRCB) issued a statewide general NPDES Permit (Order No. 2009-0009 DWQ)[19] for stormwater discharges from construction sites (NPDES No. CAS000002) that became fully effective on July 1, 2010. Under this Statewide General Construction Activity 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 either to obtain individual NPDES permits for construction storm water discharges or to be covered by the General Permit. Coverage by the 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 General Construction Activity 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 State Construction General Permit. 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 risk level, "Best Management Practices" (BMPs) must be implemented that are designed to reduce potential impacts to surface water quality through construction and the 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 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 303d listed impaired water body) risks yields additional BMP measures.

[19] SWRCB, http://www.swrcb.ca.gov/water_issues/programs/stormwater/construction.shtml.

- 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 preserve existing vegetation, tracking, and soil stabilization within 14 days after completion. 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 (such as if stormwater discharges directly or indirectly into a 303d listed impaired water body) risks that yields 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's 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.

3.4 HYDROMODIFICATION (INCREASE IN IMPERVIOUSNESS)

Changes to the hydrologic regime resulting from any development project may include:

- Increased run-off volume and velocity
- Reduced infiltration
- Increased flow frequency, duration, and peaks
- Faster time to reach peak flow

A change to the hydrologic regime of a project site would be a hydrologic condition of concern if the change would have a significant impact on downstream erosion as compared to the former MCAS condition or on stream habitat, alone or as part of a cumulative impact from development in the watershed. Increasing site imperviousness would reduce onsite infiltration and increase run-off velocities, which would alter existing discharges into downstream receiving waters during frequent storm events. These changes could exacerbate erosion of downstream channels and adversely affect stream habitat in certain waters (often termed hydromodification), which would be a hydrologic condition of concern.

The Orange County DAMP considers hydromodification due to increase in site imperviousness as a potential water quality impact which needs to be addressed as a component of post-construction stormwater management plans for new development projects. However, for both the 2011 Approved Project and the 2012 Modified Project, site imperviousness is decreased from the former MCAS condition, which reduces impacts regarding hydromodification to less than significant as shown on Table 2.2.2-2.

3.5 POTENTIAL POLLUTANTS OF CONCERN

New development and significant redevelopment can be expected to generate potential pollutants of concern in stormwater discharges. The Orange County DAMP lists anticipated and potential pollutants generated by all of the land use types included in the 2011 Approved Project and the 2012 Modified Project, as excerpted in the following Table 3.5-1:

TABLE 3.5-1
Anticipated and Potential Pollutants of Concern Generated by Land Use Type

Priority Project Categories	Sediments	Nutrients	Heavy Metals	Organic Compounds	Trash & Debris	Oxygen Demanding Substances	Oil & Grease	Bacteria & Viruses	Pesticides
Detached Residential Development	A	A			A	A	A	A	A
Attached Residential Development	A	A			A	P(1)	P(2)	P	A
Institutional/Commercial/ Industrial Development (>100.000 ft^2)	P(1)	P(1)		P(2)	A	P(5)	A	P(3)	P(5)
Automotive Repair Shops			A	A(4,5)	A		A		
Restaurants					A	A	A	A	
Hillside Development (>5,000 ft^2 in SDRWQCB)	A	A			A	A	A		A
Hillside Development (>10,000 ft^2 in SDRWQCB)	A	A			A	A	A		A
Parking Lots	P(1)	P(1)	A		A	P(1)	A		P(1)
Streets, Highways & Freeways	A	P(1)	A	A(4)	A	P(5)	A		

Source: 2003 OC Stormwater Program DAMP
Where: A = anticipated; P = Potential
(1) A potential pollutant if landscaping exists onsite;
(2) A potential pollutant if the project includes uncovered parking areas;
(3) A potential pollutant if land use involves food or animal waste products;
(4) Including petroleum hydrocarbons;
(5) Including solvents.

4.0 METHODOLOGY

4.1 BASELINE

This report compares the water quality impacts of the 2012 Modified Project to those of the 2011 Approved Project. For purposes of comparison, the following factors are considered.

1. The land uses proposed in the 2012 Modified Project as compared to those included in the 2011 Approved Project. The pollutants of concern for the two projects could potentially be different and result in different impacts if the 2012 Modified Project's proposed land uses were different from those included in the 2011 Approved Project.

2. The site imperviousness for the 2012 Modified Project as compared to the site imperviousness for the 2011 Approved Project. The 2012 Modified Project could potentially result in different impacts relating to the timing and volume of site runoff discharges to downstream watercourses (hydromodification) if its site imperviousness were greater than that of the 2011 Approved Project.

5.0 RESULTS AND SUMMARY OF WATER QUALITY IMPACT COMPARISON – APPROVED PROJECT TO MODIFIED PROJECT

5.1 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 demonstrates 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 into Combined PA 51 previously included in PA 9, 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.

5.2 POST-CONSTRUCTION WATER QUALITY IMPACTS

According to the Orange County Stormwater Program DAMP[20] 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 the same general land uses, both are consistent with the Approved Conceptual Project WQMP (RBF, April 20, 2009, Update and Clarification August 11, 2011), 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 as noted in Table 3.5-1. 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). The addition of the High School and the implementation of the recreational facilities in the Sports Park do not affect the overall impacts. Therefore, the 2012 Modified Project's and the 2011 Approved Project's water quality impacts are the same and, are less than significant.

5.3 POST-CONSTRUCTION HYDROMODIFICATION 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 site imperviousness significantly increased as compared to both the 2011 Approved Project and the former MCAS condition[21].

In terms of site imperviousness, the Approved Conceptual Project WQMP for the 2011 Approved Project states that the overall 2011 Approved Project site imperviousness is approximately 70 percent. As described in the Preliminary District WQMPs[22] and the Approved Conceptual Project WQMP (RBF, April 20, 2009, Update and Clarification August 11, 2011), and presented in this document on Table 2.2.2-2, the overall 2012 Modified Project site imperviousness is approximately the same or slightly reduced in several districts. This slight reduction is attributed primarily to the more refined land plan, including the addition of the High School and the implementation of the recreational facilities in the Sports Park. It also includes other reductions in net site imperviousness achieved by the proposed removal of the large Marine Corps Air Station runways in portions of Existing PA 51 located outside the development district footprints, which are also achieved by the 2011 Approved Project.

Since both the 2012 Modified Project and 2011 Approved Project are consistent with the post-construction water quality BMPs in the Approved Conceptual Project WQMP and incorporate features that minimize impervious surfaces and maximize open space and landscape buffers, coupled with the 2012 Modified Project's reduction in site imperviousness as compared

[20] Orange County DAMP.
[21] Orange County DAMP.
[22] RBF and Hunsaker, 2011, District WQMP

to the former MCAS condition, this will result in the 2012 Modified Project having less than significant impacts associated with downstream hydromodification.

5.4 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[23] standards, which is required of all new development and redevelopment projects, and by incorporating post-construction water quality Best Management Practices (BMPs) consistent with the BMPs described in the Approved Conceptual Project WQMP (RBF, August 2009 Update and Clarification August 2011), 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[24] 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.

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.

[23] Orange County DAMP.
[24] Santa Ana River Basin (8), Water Quality Control Plan, January 24, 1995, Updated February 2008; http://www.waterboards.ca.gov/santaana/water_issues/programs/basin_plan/index.shtm

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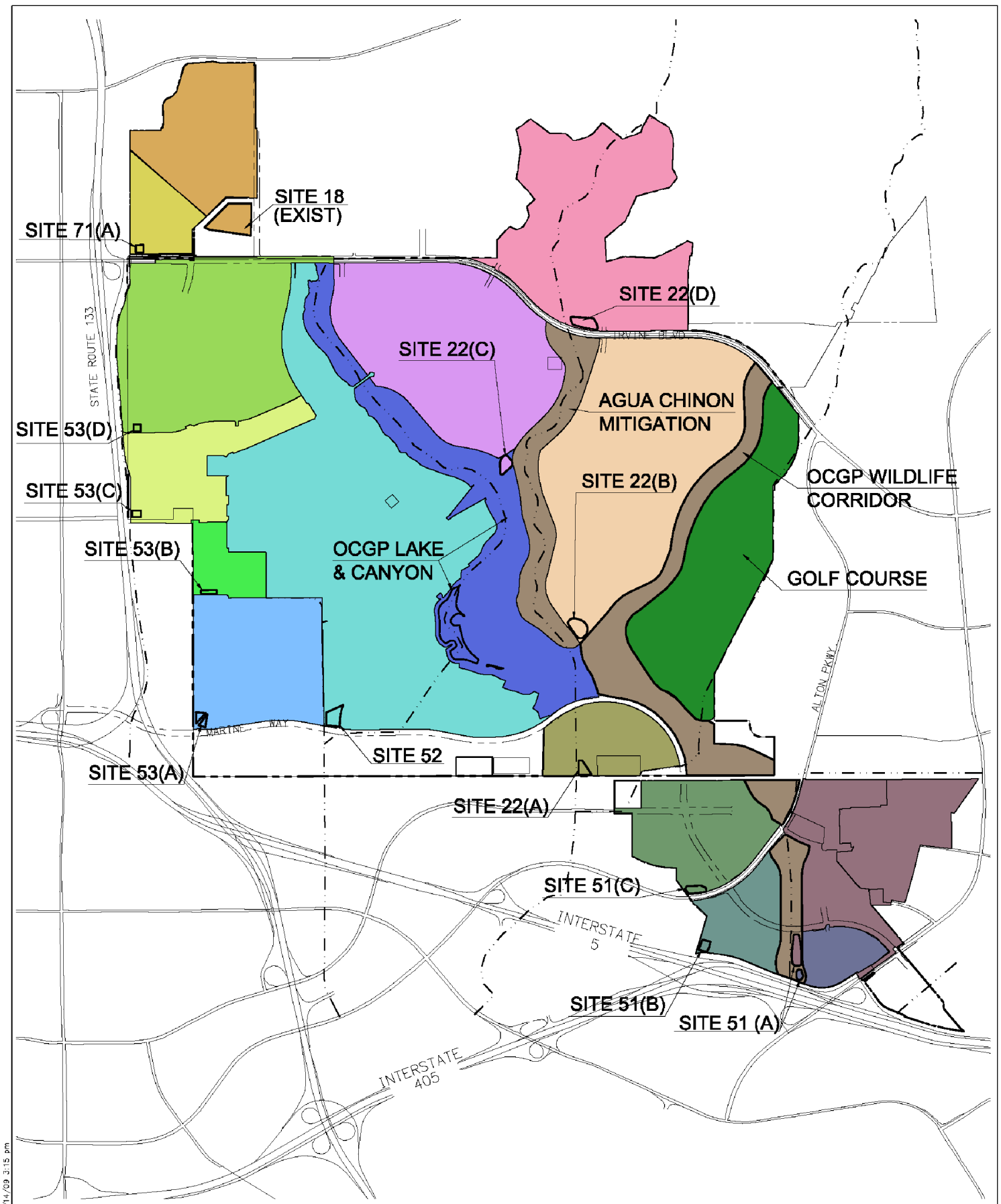

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GREAT PARK NEIGHBORHOODS AND ORANGE COUNTY GREAT PARK

PROPOSED I.R.W.D. N.T.S. LOCATIONS

DATE 04/09

FIGURE 6-2

N

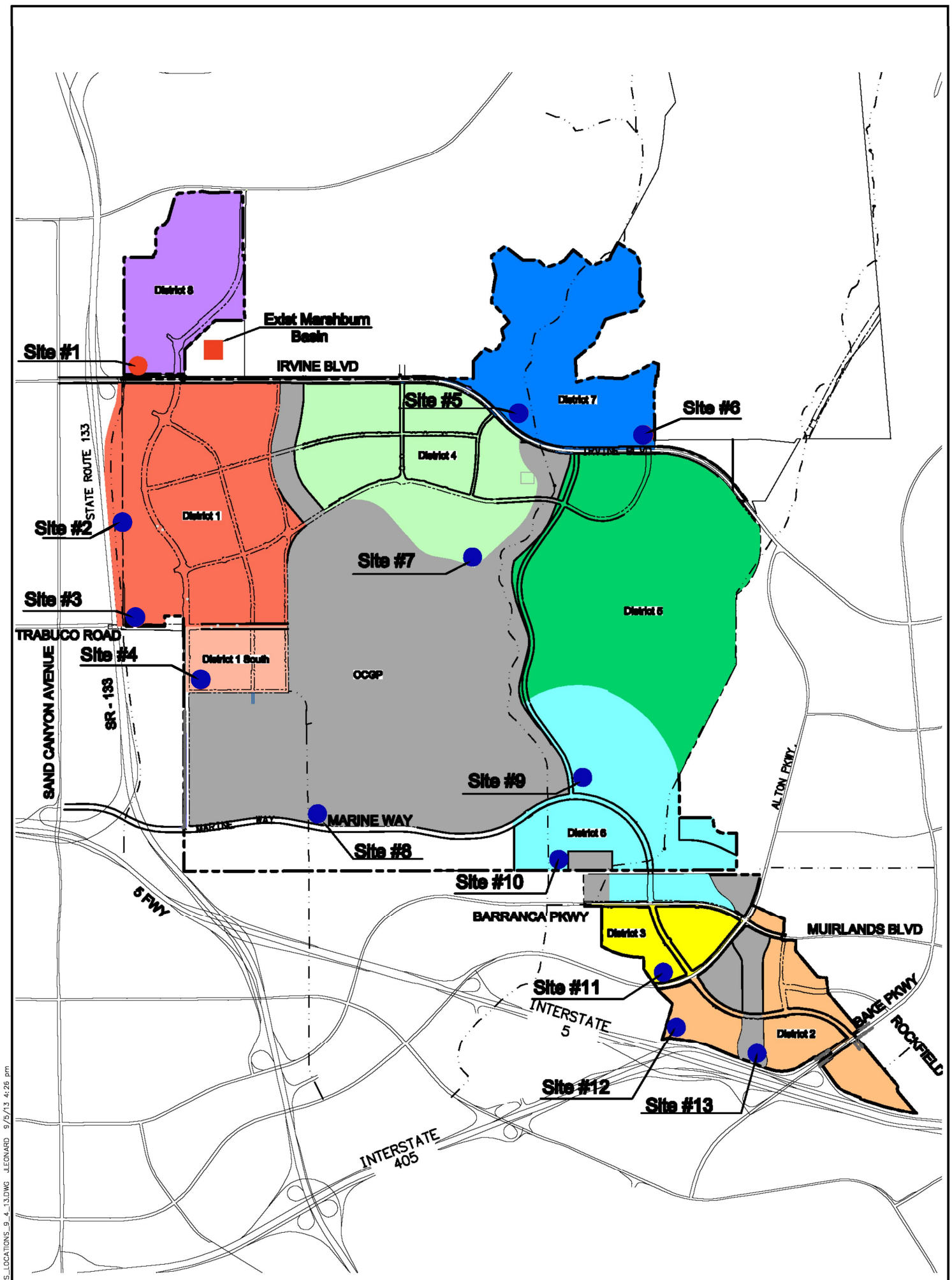
BASE MAP SOURCE: RBF CONSULTING, 2009 UPDATE AND CLARIFICATION 2011

ENGEO Expect Excellence

WATER QUALITY FACILITY SITE PLAN
2011 APPROVED CONCEPTUAL PROJECT WQMP
GREAT PARK NEIGHBORHOODS - TTOD
IRVINE, CALIFORNIA

PROJECT NO.: 8506.000.002		FIGURE NO. 1
SCALE: NO SCALE		
DRAWN BY: SRP	CHECKED BY: JAM	

ORIGINAL FIGURE PRINTED IN COLOR



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Legend:

- Approved Water Quality Facility Site (Bioretention)
- Future Water Quality Facility Site (NTS Facility)*

*Actual number and location of sites to be determined as land plans are further refined

- Existing Marshburn Basin

GREAT PARK NEIGHBORHOODS AND ORANGE COUNTY GREAT PARK

2012 Modified Project
Proposed Water Quality Facility Locations

DATE 09/05/13

FIGURE 2

N

BASE MAP SOURCE: RBF CONSULTING, 2013

ENGEO Expect Excellence

WATER QUALITY FACILITY SITE PLAN
2012 MODIFIED PROJECT
GREAT PARK NEIGHBORHOODS - TTOD
IRVINE, CALIFORNIA

PROJECT NO.: 8506.000.002
SCALE: NO SCALE
DRAWN BY: SRP CHECKED BY: JAM

FIGURE NO 2

ORIGINAL FIGURE PRINTED IN COLOR