

## 7. IMPACT ASSESSMENT & CONCLUSION

The City of Orange (City) has determined that the proposed project may have a significant impact related to Hydrology and Water Quality. The purpose of this report is to identify potential impacts related to water quality from project implementation on the project site and the surrounding area. This report also identifies project design features (PDF's) and mitigation measures to reduce any potentially significant water quality impacts.

This report illustrates the planning-level design concept and analysis for the proposed project that will be included in the Environmental Impact Report (EIR). A Notice of Preparation (NOP) has been prepared and distributed by the City (California Environmental Quality Act [CEQA] Lead Agency) and a Public Scoping Meeting was held in March, 2011 to solicit public and responsible agency feedback regarding content of the EIR document. This report is reflective of the NOP, Public Scoping Meeting Comments, and public and responsible agency materials submitted to the City. Thresholds specifically related to hydrology/hydraulics, erosion/scour and flood control (HWQ-C, D, G, H, I, J & P) are excluded from this report and are analyzed in the Rio Santiago Hydrologic Impact Assessment Report dated December 16, 2011.

The City has established the following thresholds of significance for the evaluation of the proposed project's potential water quality impacts including:

Threshold HWQ-A	Would the proposed project violate any water quality standards or waste discharge requirements?
Threshold HWQ-B	Would the proposed project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?
Threshold HWQ-E	Would the proposed project 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?
Threshold HWQ-F	Would the proposed project otherwise substantially degrade water quality?
Threshold HWQ-K	Would the proposed project potentially impact storm water runoff from construction activities?
Threshold HWQ-L	Would the proposed project Potentially impact storm water runoff from post-construction activities?
Threshold HWQ-M	Would the proposed project Result in a potential for discharge of storm water pollutants from areas of material storage, vehicle or equipment fueling, vehicle or equipment maintenance (including washing), waste handling, hazardous materials handling or

	storage, delivery areas, loading docks or other outdoor work areas?
Threshold HWQ-N	Would the proposed project result in the potential for discharge of storm water to affect the beneficial uses of the receiving waters?
Threshold HWQ-O	Would the proposed project create the potential for significant changes in the flow velocity or volume of storm water runoff to cause environmental harm?

Should the answers to these environmental factors prove to be a potentially significant impact, mitigation measures would be required to reduce those impacts to a less-than-significant threshold. The discussion below evaluates these water quality concerns with respect to the proposed project.

### 7.1 PROJECT DESIGN FEATURES

All Project Design Features (PDFs) associated with hydrology and water quality are noted below. Hydrology related PDF's including PDF HWQ-1 through PDF HWQ-8 are provided for context and are discussed more thoroughly in the *Rio Santiago Hydrologic Assessment Report*.

PDF HWQ-1	Proposed project will provide drainage collection (inlets) and drainage conveyance (storm drain pipe or street flow) to collect the runoff and convey it in a safe manor to Santiago Creek.
PDF HWQ-2	Proposed project drainage features will be sized in a manner to meet City of Orange and County of Orange requirements for flow conveyance and flood protection.
PDF HWQ-3	The proposed project will provide two storm drain system (Lines 'A' and 'B') consistent with storm drain routing alignments established in the hydrologic analysis.
PDF HWQ-4	The proposed project will provide a storage facility in the downstream areas of Planning Area B to provide controls of 2-year runoff volumes in excess of the existing 2-year condition for the entire development. The type of storage facility will be determined during final design and will be either a surface (basin) facility or an underground vault facility or combination thereof. The proposed facility will be sized to detain a minimum of 0.75-acre-feet of storm runoff and either infiltrate the volume or include an outlet to drain the facility within 48-hours after a rain event has ended or a combination thereof.
PDF HWQ-5	The proposed project will reduce Planning Area B/C peak flow rates to a level consistent with existing conditions. The proposed project will provide a mainline storm drain split flow device utilized to extract storm water to the volume control storage facility. The facility will be

sized and configured to reduce mainline runoff rates to pre-project levels downstream of the split flow structure. Final type selection and detailing of the split flow structure will occur during final design stages of the proposed project.

**PDF HWQ-6** The proposed project will delay Times of Concentration's at the Planning Area D outlet to Santiago Creek and will arrive slightly sooner at the Planning Area B/C outlet to Santiago Creek.

**PDF HWQ-7** The proposed project Lines 'A' and 'B' of the project storm drain system outlets will be located in the same general vicinity as existing surface flow outlets into Santiago Creek. Because confined flows in a drainage conduit outletting into a natural area tend to have erosive potential velocities and energy, scour reduction facilities or energy dissipation facilities or both will be provided at each outlet location in order to reduce local erosion potential to non-impactful levels.

**PDF HWQ-8** The proposed project will collect, route, and outlet project site tributary flows directly to Santiago Creek. The existing OCFCD Handy Creek Storm Channel traverses the project site and currently accepts 28.13-acres of project site watershed tributary via two sets of on-site inlets is a "deficient flood control facility and is not capable of conveying runoff from the 100-year storm event."

**PDF HWQ-9** The proposed project will prepare a SWPPP to include erosion and sediment control BMPs that would meet or exceed measures required by the Construction General Permit, as well as BMPs that control other potential construction-related pollutants. The SWPPP would be prepared and implemented at the project site and revised as necessary as administrative or physical conditions change, as required by, and in compliance with, the General Construction Permit.

**PDF HWQ-10** The proposed project will prepare a Water Quality Management Plan consistent with the 2011 County-wide Model WQMP and TGD which includes the LID hierarchy and implementation criteria, site design, source control and treatment control BMPs.

## 7.2 IMPACT ASSESSMENT

**THRESHOLD HWQ-A** Would the proposed project violate any water quality standards or waste discharge requirements?

### *Construction Impacts*

The potential impacts of construction activities on water quality focus primarily on sediments, turbidity, and pollutants that might be associated with sediments (e.g., phosphorus and legacy pesticides). Construction-related activities that are primarily responsible for sediment releases are related to exposing soils to potential mobilization by rainfall/runoff and wind. Such activities include removal of vegetation and existing structures from the site, grading of the site, and construction of new buildings, roadways, and landscaped areas. Environmental factors that affect erosion include topographic, soil, and rainfall characteristics. Non-sediment-related pollutants that are also of concern during construction include waste construction materials; chemicals, liquid products, and petroleum products used in building construction or the maintenance of heavy equipment; and concrete-related waste streams.

During construction activities, excavated soil would be exposed and there would be an increased potential for soil erosion compared to existing conditions. Additionally, during a storm event, soil erosion could occur at an accelerated rate. Clearing, grading, excavation, and construction activities associated with the proposed project could potentially impact water quality due to sheet erosion of exposed soils and subsequent deposition of particles and pollutants in drainage ways or introduction of construction-related pollutants. Grading activities and sediment stockpiles, in particular, can lead to exposed areas of loose soil that are susceptible to uncontrolled sheet flow. The use of materials such as fuels, solvents, and paints during construction also presents a potential risk to surface water quality due to an increased potential for pollutants entering the storm drain system. These impacts would be potentially significant and adverse.

The proposed project includes PDF HWQ-9 that would help to prevent these potential impacts during construction. The General Construction Permit (GCP) requires that the SWPPP include erosion and sediment control BMPs that would meet or exceed measures required by the General Permit, as well as BMPs that control other potential construction-related pollutants. The SWPPP would be prepared and implemented at the project site and revised as necessary as administrative or physical conditions change, as required by, and in compliance with, the GCP. The GCP requires the SWPPP to include a menu of BMPs to be selected and implemented (based on the Project's Risk Level) to address erosion and sediment control. Erosion control BMPs are designed to prevent erosion, whereas sediment controls are designed to trap sediment once it has been mobilized. The selected BMPs would meet the BAT/BCT standards required by the current applicable General Permit, would address pollutant source reduction, and would ensure that water quality standards are not exceeded in receiving waters due to construction activities. Details related to the estimated risk level (Risk Level 2), types of applicable sediment and erosion control BMPs along with the estimated acreage for sedimentation basins are provided in Section 5.1. The SWPPP would provide BMPs that are to be maintained for the duration of the construction as well as measures that are specific to each phase of construction. These BMPs include but are not limited to erosion controls, sediment controls, tracking controls, non-storm water management, materials and waste management, and good housekeeping practices.

The SWPPP would address site-specific conditions related to project construction, identify the sources of sediment and other pollutants that may affect the quality of storm water discharges, and describe and ensure the implementation and maintenance of BMPs to reduce or eliminate sediment, pollutants adhering to sediment, and other non-sediment pollutants in storm water as well as non-storm water discharges. Compliance with the GCP has been determined by the SWRCB to ensure that water quality standards (protection of beneficial uses and adherence to water quality objectives) are adequately protected during the construction period. Therefore, with the PDF HWQ-9 that requires adherence to local and state regulatory requirements for construction activities potential construction impacts related to storm water runoff quality during construction activities a less than significant impact would occur and no mitigation measures would be required.

Since the groundwater table is anticipated approximately 34 to 52 feet below ground surface, the project is not expected to have an impact on groundwater quality during its construction. Collection of surface water runoff during the construction phases will be detained and filtered as necessary before discharging off-site and is not anticipated to be infiltrated into the ground thereby minimizing groundwater impacts. No mitigation measures would be required.

### ***Post-Construction Impacts***

Several pollutants are commonly associated with storm water runoff, including sediment, nutrients, bacteria, oxygen-demanding substances, petroleum products, heavy metals, toxic chemicals, and floatables. The pollutants of concern for water quality are those pollutants that are anticipated (expected) or potentially could be generated by the proposed project, based on the past and proposed land uses. Potential and anticipated pollutants of concern associated with storm water or urban runoff during operation of the proposed project are listed in Table 10, *Anticipated and Potential Pollutants of Concern* of this report.

As discussed in detail in Section 5.2, *Post-Construction Activities* the proposed project includes site design, LID BMPs, source control, and treatment BMPs as necessary to reduce pollutants and treat runoff prior to exiting the project site. With implementation of the selected BMPs, or equivalent, as required by the City of Orange and its WQMP guidelines, water quality exceedances are not anticipated, and pollutants are not expected in project runoff that would adversely affect beneficial uses in Santiago Creek and Lower Santa Ana River. Therefore, with PDF HWQ-10 that requires the development and implementation of LID, site design, source control, and other BMPs through a project-specific WQMP a less than significant impact would occur and no mitigation measures would be required. Individual pollutant assessments are provided below:

- **Bacteria/Pathogens:** Based on the existing conditions, and land use/pollutant categories, the existing and proposed project may be a source of pathogens, especially during storm water runoff conditions. There are numerous potential natural and anthropogenic sources of bacteria indicators including birds, other wildlife, soils and plant material, domesticated animals and pets, and improper human waste disposal. Since natural sources of pathogens are difficult to control (such as wild animal waste), the focus of the source control measures for the project sites is on human-related (anthropogenic) and residential sources. In order to reduce the

proposed pathogen contributions from the project site, the following source control measures are recommended for implementation:

- Landscaping with efficient irrigation design at the project sites to control runoff and allowing for maximum localized retention opportunities;
- Proper monitoring and maintenance of landscaped areas to remove accumulated dead plant material and debris;
- Landscape maintenance activities that include the removal of animal feces and;
- Site design features and LID BMPs (e.g. bioretention with underdrain) further treat bacteria in storm water runoff via biotreatment.

The available data on the effectiveness of the biotreatment and treatment control BMPs for bacteria indicators shows good pollutant removals. The 2011 Model WQMP and Technical Guidance Document (TGD) rates biotreatment BMPs as having medium removal efficiencies for bacteria and organics (Table 4.2, TGD). More specifically, bioretention based BMPs typically reduce bacteria by 90% and proprietary biotreatment reduces bacteria in the range of 85-95% removal (2003 CA BMP Handbook & 2008 Filterra Pollutant Removal Overview respectively). Based on these source control, site design and biotreatment effectiveness, the pathogen runoff potential for the proposed project is less than significant.

- **Metals:** Copper, lead and zinc are the most common metals found in urban runoff and most commonly attached to solids and fine particulates. Other trace metals such as chromium, mercury and nickel are not usually detected in urban runoff or are measured at very low levels. The incorporation of the site design measures and LID BMPs throughout the individual drainage management areas will provide a means for the settling of metals attached to particulates as well as vegetative uptake of metals through biotreatment BMPs. Field data indicates pollutant removals in the range of 93-98% for bioretention based BMPs and 86% - 95% for Filterra with Bacteria media blend (2003 CA BMP Handbook & 2008 Filterra Pollutant Removal Overview respectively). Additional source control measures, such as street and parking lot sweeping, will also reduce the potential for metals to reach the storm drain system. As a result, it is anticipated that water quality standards will not be exceeded, and potential impacts from metals are less than significant.
- **Nutrients:** Nutrients, particularly nitrogen and phosphorous found within common fertilizers, can be of a concern based on the potential for over-application and over use. Similar to the source control measures for pesticides, using only native drought-tolerant species for landscaping purposes typically requires less fertilizers and irrigation and thereby reduces runoff potential. Low demand irrigation systems with slow release fertilizers are recommended to be used on-site to ensure minimal runoff from irrigation that has the potential to transport nutrients in runoff. Slow-release fertilizers are inorganic fertilizers that slowly release nutrients at a slower rate and are less susceptible to leaching and loss of fertilizer in runoff from rain events. In addition, source control measures such as landscape contractor training and provisions against

applying fertilizers proximate to expected rain events are also recommended. Further, filtration-based LID BMPs (e.g., rain gardens, bioretention with underdrains, etc.) can provide some removal rates although nutrient removal is challenging with commonly accepted LID BMPs based on the design necessity for internal water storage zones and anoxic conditions.

Through the proper implementation of source control design measures, native drought-tolerant landscaping, public education materials to new homeowners, and biotreatment BMPs, excessive nutrient loads from the project site are not anticipated or expected. Field data indicates nutrient pollutant removals in the range of 70% – 80% for phosphorous and 40% for nitrogen for bioretention based BMPs (2003 CA BMP Handbook). Filterra with Bacteria media blends field data indicates removal efficiencies of 73% for phosphorous and 43% for nitrogen (2008 Filterra Pollutant Removal Overview respectively). Nutrients will not be contained in Project runoff at levels that could adversely affect water quality or beneficial uses in downstream receiving waters and potential nutrient impacts are less than significant.

- **Oil and Grease:** Oil and grease limits are defined as a qualitative standard (e.g., no film on surface waters) due to the difficulties in setting single limit or composite sampling water quality standards. However, regional monitoring data collected from communities around Los Angeles County demonstrated that the majority of samples taken from open space contain non-detect levels of oil and grease (>80 percent) and that hydrocarbons intermittently observed in runoff from developed areas and when observed, the levels are relatively low. The Rio Santiago Project will implement several source control measures to reduce the amount of oil and grease in storm water from the project sites. Maintenance activities, vehicle and equipment fueling and waste handling that have the potential to introduce oil and grease related compounds will be strictly prohibited within residential areas and enforced through HOA measures. In addition, all low flow storm events will be routed through biotreatment BMPs which are highly effective at removing oils and grease from storm water. Field data indicates oil and grease removals in the range of 80% for bioretention based BMPs and greater than 85% for Filterra with Bacteria media blend (2003 CA BMP Handbook & 2008 Filterra Pollutant Removal Overview respectively). Based the incorporation of source control and LID BMPs, levels of oil and grease or other hydrocarbons such as PAHs that could adversely affect beneficial uses of the Project's receiving waters or exceed water quality standards are not anticipated. Impacts on water quality, as a result of the proposed project, are less than significant.
  
- **Oxygen Demanding Substances & Organic Compounds:** Oxygen-demanding substances include all organic materials and organic compounds, which consume oxygen as they decompose. Animal droppings, sewage overflows, fallen leaves, and grass clippings are a few examples of oxygen-demanding substances. The combination of site design features, source control measures and LID BMPs from each of the Planning Areas are aimed at reducing the potential for these types of substances from entering the storm drain system. Field data indicates organics removals in the range of 90% for bioretention based BMPs and the removal of greater than 50% of oxygen demanding substances for Filterra with Bacteria media blends (2003 CA BMP Handbook & 2008 Filterra Pollutant Removal Overview respectively). In certain cases, additional pretreatment

- devices (screens, filters, etc.) may be necessary upstream of the proposed biotreatment BMPs to reduce the potential for clogging. Upon implementation of these features, impacts of oxygen demanding substances are considered to be less than significant.
- **Pesticides:** Pesticides can be of a concern based on potential uses as well as previous uses in the past. Using only native drought-tolerant species for landscaping purposes minimizes the use of pesticides and uses less irrigation that could potentially runoff. Low demand irrigation systems should also be used on-site to ensure minimal runoff from irrigation that has the potential to transport pesticides in runoff. In addition, source control measures such as provisions against applying pesticides prior to expected rain events, and the use of properly certified pesticide workers for HOA landscaping are recommended. As a result of these and similar source control measures, it is anticipated that water quality standards for pesticides will not be exceeded, and potential pesticide impacts are less than significant.
  - **Sediment:** Sediments are typically characterized into two main categories: coarse sediment that includes large sand grains, pebbles, etc. and fine particulate sediments that include total suspended solids (TSS). Of concern to water quality are the fine particulate sediments that are more typically associated with sheet erosion. The majority of the land use changes will result in the conversion of undeveloped land with a higher rate of erosion to developed land with a much lower rate of erosion potential. However, during the construction of the individual Planning Areas, sediment has the potential to move off-site due to the exposed condition of the site. In order to reduce the amount of sediment discharged off-site due to construction activities, the individual Planning Areas will implement an effective combination of erosion and sediment control BMPs in conformance with the Construction General Permit (CGP). During the post-development condition, any sediment and TSS generated from the development areas will be collected in the proposed biotreatment LID features, which are considered highly effective for targeting pollutants typically associated with these impervious surfaces. Field data indicates sediment removals in the range of 90% for bioretention based BMPs and 86% - 95% for Filterra with Bacteria media blend (2003 CA BMP Handbook & 2008 Filterra Pollutant Removal Overview respectively). As a result, sediment impacts to water quality are considered less than significant.
  - **Trash & Debris:** Urban development can generate significant amounts of trash and debris if not properly managed. The individual projects will implement additional measures, such as source control measures and LID BMPs, to minimize the adverse impacts of trash and debris. Source control measures such as periodic sweeping, litter patrol, and storm drain stenciling will be effective in reducing the amount of trash and debris leaving the site. Site design and LID BMPs also possess high removal effectiveness for trash and debris. Field data indicates high trash and debris removal using bioretention based BMPs and field research of Filterra units identifies more than 95% capture/removal of trash from storm water runoff within the initial headspace of the system (2003 CA BMP Handbook & 2008 Filterra Pollutant Removal Overview



respectively). Based on these proposed features, impacts from trash and debris for the proposed project are less than significant.

- **Dry Weather Flow:** Although the previous discussions have focused on wet weather flows, dry weather flows are also important. Dry weather flows due to anthropogenic sources have the potential to impact local receiving water bodies. Dry weather flows are typically low in coarse sediment due to the low flow rates but pollutants associated with suspended solids such as phosphorous, trace metals, pesticides are typically found in low concentrations in dry weather flows. The proposed project is not expected to generate significant amounts of dry weather flows due to the drought tolerant landscaping, the use of efficient irrigation systems, the lack of high intensive water use activities on-site, and the use of integrated storm water landscaping features to collect, hold and treat these flows and eliminate dry flow discharges from the individual project sites (site design features and LID BMPs). Therefore, there are no significant impacts anticipated with respect to water quality as a result of dry weather flows.
- **Vector Control:** The use of integrated storm water landscaping (e.g., LID features) for storm water treatment may increase the potential for vector issues due to the potential for standing water in these features. The potential for mosquito breeding is considered a risk when ponding water exists greater than 72 hours. Thus, any site design features and LID BMPs will be designed to infiltrate and/or discharge from the facility within 48 hours, in accordance with City and OC DAMP requirements. In the event additional vector control is needed, a number of abatement measures will be used, including habitat reduction (reconfiguring of plant palettes), temporary flooding and drying (draining) of the ponds, trapping and killing pests, and biochemical pesticides (i.e., the bacteria *Bacillus sphaericus* [Bs] and *Bacillus thuringiensis israeliensis* [Bti]).

With respect to groundwater, PDF HWQ-10 that requires the development and implementation of site design BMPs, LID features and treatment control BMPs would not cause or contribute to impairments to groundwater quality. BMPs that utilize the process of infiltration, such as permeable pavement and infiltration trenches, require a depth of 10 ft or greater to groundwater to minimize impacts from storm water pollutants in accordance with the OC DAMP and 4<sup>th</sup> Term MS4 Permit. As discussed in Section 5.2.4, infiltration of runoff will be restricted throughout the majority of the project site due to the extensive excavation & replacement with compacted engineered fill to depths ranging 20 to 50 ft below ground surface. Since groundwater depths are approximately 34 to 52 feet below ground surface, BMPs placed below the engineered fill will not be able to meet the margin of safety required to implement infiltration type BMPs. In addition, infiltration will be restricted within 250 feet and upgradient of the existing Villa Park landfill site to protect groundwater quality. In addition, biotreatment BMPs within these areas will be lined to restrict infiltration.

#### THRESHOLD HWQ-B

Would the proposed project substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the

production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?

Under the existing conditions, infiltration potential is very minimal on-site due to the excessive silt pond deposits that occurred in the past, bedrock conditions in areas throughout the site and existing artificial compacted fill areas from previous grading operations. Under the proposed conditions, the majority of the site will be subject to silt pond removals and re-compaction of a clay-based fill to 90% compaction, similar to areas of the site that already have significant compacted fill areas. Upon completion of the required removal and compaction process, the majority of the site will have low infiltration potential similar to existing conditions. Implementation of the proposed project would not substantially deplete or interfere with groundwater recharge based on the existing conditions or result in a net deficit of the underlying aquifer or local groundwater table. The proposed project will not include any groundwater wells nor any other features to withdraw groundwater from the existing aquifer.

**THRESHOLD HWQ-E**

Would the project 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?

Proposed development will generate landform conditions requiring drainage. PDF-1 through PDF-8 will reduce the effect of the alteration of the existing drainage patterns so as to not exceed the capacity of existing or planned storm water drainage systems. The proposed project will potentially provide additional sources of polluted runoff during construction and operational phases. This potential impact is discussed below.

***Construction Impacts***

As discussed in detail above, during construction activities, excavated soil would be exposed, and there would be an increased potential for soil erosion during storm events compared to existing conditions. Grading activities and sediment stockpiles, in particular, can lead to exposed areas of loose soil that are susceptible to uncontrolled sheet flow. Raw materials and construction wastes are also potential sources of pollution that would previously not be on-site. These impacts would be potentially significant and adverse. However, implementation of PDF HWQ-9 would help to prevent these potential impacts during construction. Therefore, with the PDF HWQ-9 that requires adherence to local and state regulatory requirements for construction activities, a less than significant impact would occur and no mitigation measures would be required during construction.

***Post-Construction Impacts***

Due to the proposed change in land use, the amount of runoff will increase and additional pollutant sources will be introduced to the project site. As discussed in detail in Section 5.2, *Post-Construction Activities*, the proposed project includes PDF HWQ-10, which incorporates site design, source control, LID (i.e., bioretention) and other BMPs. For each Planning Area, LID features have been incorporated into the proposed land uses to provide water quality

treatment and flow attenuation. Implementation of these features will mitigate the anticipated changes in pollutant sources and provide protection to local receiving waters. Therefore, with PDF HWQ-10 that requires the development and implementation of LID, site design, source control, and other BMPs through a project-specific WQMP, a less than significant impact would occur and no mitigation measures would be required.

**THRESHOLD HWQ-F**                      Otherwise substantially degrade water quality?

The proposed project includes PDF HWQ-9 that would help to prevent potential impacts during construction through the development and implementation of site specific SWPPP. The SWPPP would include erosion and sediment control BMPs that would meet or exceed measures required by the Construction General Permit, as well as BMPs that control other potential construction-related pollutants. Additionally, the proposed project includes PDF HWQ-10 that requires compliance with the 2011 Countywide Model WQMP including site design, LID, source control and other BMPs. Within this report, each Planning Area has identified appropriate LID features to provide water quality treatment and flow attenuation. Through the implementation of these LID features, water quality exceedances are not anticipated, and pollutants are not expected in project runoff that would degrade water quality in the Santiago Creek (Reach 1) and Lower Santa Ana River (Reach 1 & 2). Therefore, with PDF HWQ-9 and PDF HWQ-10 that require substantial conformance with local and state regulatory requirements for construction and post-construction operations a less than significant impact would occur and no mitigation measures would be required.

**THRESHOLD HWQ-K**                      Potentially impact storm water runoff from construction activities?

The proposed project includes PDF HWQ-9 that would help to prevent potential impacts during construction. The General Construction Permit requires that the SWPPP include erosion and sediment control BMPs that would meet or exceed measures required by the Construction General Permit, as well as BMPs that control other potential construction-related pollutants. By obtaining coverage under the General Construction Permit, the proposed project will be required to develop and implement an effective combination of erosion and sediment control BMPs to mitigate and abate the erosive conditions created by the exposure of disturbed soil areas. BMPs will also be implemented to control construction waste and materials used on-site. Implementation of construction BMPs will provide the necessary protection measures to prevent contaminants from being entrained in storm water runoff, thereby achieving levels of storm water runoff quality deemed acceptable by local and state regulatory agencies. Therefore, with PDF HWQ-9 and that require substantial conformance with local and state regulatory requirements a less than significant impact would occur and no mitigation measures would be required.

**THRESHOLD HWQ-L**                      Potentially impact storm water runoff from post-construction activities?

The proposed project includes PDF HWQ-10 that requires compliance with the 2011 Countywide Model WQMP including site design, LID, source control and other BMPs. Within this report, each Planning Area has identified appropriate LID features to provide water quality treatment and flow attenuation from post-construction runoff. Through the implementation of these LID features, water quality exceedances are not anticipated, and pollutants are not expected in project runoff that would degrade water quality in the Santiago Creek (Reach 1) and Lower Santa Ana River (Reach 1 & 2). Therefore, with PDF HWQ-9 and PDF HWQ-10 that require substantial conformance with local and state regulatory requirements for construction and post-construction operations a less than significant impact would occur and no mitigation measures would be required.

**THRESHOLD HWQ-M**

Result in a potential for discharge of storm water pollutants from areas of material storage, vehicle or equipment fueling, vehicle or equipment maintenance (including washing), waste handling, hazardous materials handling or storage, delivery areas, loading docks or other outdoor work areas?

The proposed project includes PDF HWQ-9 that would help to prevent potential impacts during construction. The General Construction Permit requires that the SWPPP include non-storm water management and material management BMPs to control potential construction-related pollutants. The proposed project will be required to control the generation of pollutants from source areas such as those mentioned above, if they exist on-site. Non-structural and structural source control BMPs, in particular, will be required at material storage areas, vehicle or equipment fueling areas, vehicle or equipment maintenance (including washing) areas, trash enclosures, hazardous materials handling or storage areas, delivery areas, loading docks and other outdoor work areas. Therefore, with PDF HWQ-9 and PDF HWQ-10 that require substantial conformance with local and state regulatory requirements for construction and post-construction operations of the proposed project a less than significant impact would occur and no mitigation measures would be required.

**THRESHOLD HWQ-N**

Result in the potential for discharge of storm water to affect the beneficial uses of the receiving waters?

Storm water runoff discharged from the project site during construction and post-construction of proposed project will not detrimentally affect beneficial uses of downstream receiving waters, such as Santiago Creek and the Santa Ana River. The Santa Ana River, Reach 2 is listed as impaired for bacteria indicators on the 2010 303(d) list of impaired segments; however Santiago Creek is not listed as impaired. No TMDLs have been established for receiving water bodies.

The proposed project includes PDF HWQ-9 that would help to prevent potential impacts during construction. The General Construction Permit requires that the SWPPP include erosion and sediment control BMPs that would meet or exceed measures required by the Construction General Permit, as well as BMPs that control other potential construction-related pollutants. Additionally, the proposed project includes PDF HWQ-10 that requires compliance with the 2011 Countywide Model WQMP which requires the incorporation of site

design, LID, source control and other BMPs. With the incorporation of the LID features proposed for each of the Planning Areas, water quality exceedances are not anticipated, and pollutants are not expected in project runoff that would degrade water quality in the Santiago Creek (Reach 1) and Lower Santa Ana River (Reach 1 & 2).

The storm water runoff from the proposed project is not anticipated to cause or contribute to any water quality exceedances within downstream receiving waters. The development of a site-specific SWPPP and WQMP, through State and local regulatory requirements, will ensure that construction and post-construction BMPs will be appropriately implemented to protect beneficial uses. Therefore, with PDF HWQ-9 and PDF HWQ-10 that require substantial conformance with local and state regulatory requirements for construction and post-construction operations of the proposed project, a less than significant impact would occur and no mitigation measures would be required.

**THRESHOLD HWQ-O** Create the potential for significant changes in the flow velocity or volume of storm water runoff to cause environmental harm?

The proposed project will not significantly increase the peak flow rate or volume of storm water runoff to result in environmental harm. As discussed in Section 6, *Hydrologic Conditions of Concern (HCOCs)* the project will incorporate on-site LID features to provide retention and infiltration for increased runoff from the development areas. In addition, detention basins will be utilized to control the rate of discharge of the excess runoff volume associated with the 2-year hydrology analysis due to the increase of impervious surfaces as compared to existing conditions. The rate of flows discharged from the site will also be managed from the detention facility in a manner that matches existing flow conditions. Therefore, excess peak flow velocity and volumes associated with the 2-year storm for the proposed project would be controlled and discharged in a manner designed to protect Santiago Creek from scour and erosion above the existing conditions.

**THRESHOLD HWQ-P** Create significant increases in erosion of the project site or surrounding areas?

### ***Construction Impacts***

During construction of the proposed project, approximately 68 acres of the 110-acre property will be disturbed, thereby creating erosive conditions on-site that may affect water quality. The proposed project includes PDF HWQ-9 that would help to prevent potential impacts during construction, the General Construction Permit requires that the SWPPP include erosion and sediment control BMPs that would meet or exceed measures required by the Construction General Permit, as well as BMPs that control other potential construction-related pollutants. Minimum sediment basin sizing has been identified to control runoff from the maximum expected disturbance area noted above. Therefore, with PDF HWQ-9 a less than significant impact would occur and no mitigation measures would be required.

### ***Post-Construction Impacts***

Under post-development conditions, there will not be significant increases in erosion of the project site that would affect water quality. A hydrology study was prepared for the proposed

project to analyze any potential impacts on Santiago Creek in terms of erosion and/or sedimentation. PDF HWQ-10 provides that for those areas with erosion potential, such as open space/landscaped areas, erosion will be controlled through the implementation of site design, source control, and treatment control BMPs, as specified in the project-specific WQMP. Therefore, with PDF HWQ-10 a less than significant impact would occur and no mitigation measures would be required.