

4.6 HYDROLOGY AND WATER QUALITY

The analysis presented in this section assesses impacts to surface water and groundwater quality; stormwater flows and drainage; and flooding resulting from construction and operation of the proposed project. The impact analysis is based on the February 2011 *Conceptual Hydrology and Hydraulic Report* for the project site (Hydrology Report; Civil Design & Drafting 2011), a peer review of that analysis, the project's grading and drainage plans, and additional information. The City's Public Works Department also reviewed and accepted the Hydrology Report.

4.6.1 Existing Conditions

4.6.1.1 Project Area

The project site is surrounded by the Glen Annie Golf Course to the north and east, El Encanto Creek to the west, and Cathedral Oaks Road to the south. Within the vicinity of the project are residential and recreational uses, including a multifamily residential development to the west and single-family residences located off of Cathedral Oaks Road to the south.

The Goleta Groundwater Basin (Basin) underlies the City of Goleta. The Basin is approximately 8 miles long and 3 miles wide, encompassing approximately 9,210 acres (DWR 2004; Goleta Water District 2005). There is a combined total of about 30,000 to 60,000 acre-feet of operational storage (Goleta Water District 2005).

There are no impaired water bodies on or adjacent to the site as designated by the State Water Resources Control Board (SWRCB) or the Regional Water Quality Control Board (RWQCB) under Section 303(d) of the Clean Water Act (CWA) (codified at 33 U.S.C. §§ 1251, *et seq.*). However, Glen Annie Canyon, approximately one-half mile east of the project site, is listed as an impaired water body. The causes of impairment for this water body are chloride, *Enterococcus* bacteria, *Escherichia coli* (*E. coli*), fecal coliform, nitrate, sodium, and unknown toxics. Total maximum daily loads (TMDLs) are currently needed for all causes of impairment.

4.6.1.2 Project Site

The approximately 14-acre project site is currently improved with a 2,015-square-foot residence, 726 square-foot garage, and 1,152-square-foot barn. El Encanto Creek borders the project site on its western side for approximately 630 feet, although the Creek's bed and banks are just to the west of the property. The U.S. Geological Survey (USGS) has mapped the creek as having intermittent flow. Pursuant to the City of Goleta General Plan/Coastal Land Use Plan (GP/CLUP) Conservation Element Policy CE 2.2, the Streamside Protection Area (SPA) associated with El Encanto Creek extends approximately 100 feet onto the Shelby property. East of the creek on the western side of the property is an area that is primarily bare ground used for storage of firewood and woodchips. Nonnative annual grassland dominates the center of the project site. Soils on site consist of Diablo clay, which is considered well-drained and formed from shale and mudstone.

The property slopes from north to south at an average grade of approximately 7.8 percent. The existing elevation on the property ranges from 145 feet above mean sea level along Cathedral Oaks Road northward to the northeast corner of the property at an elevation of 252 feet above mean sea level. Currently, stormwater runoff leaving the site generally drains southerly as an

overland flow. The overland flow has an existing flow path across the site to Cathedral Oaks Road at the south part of the property that splits into westerly and easterly directions. In the westerly direction, the flow discharges into El Encanto Creek at the southwest corner of the property. In the easterly direction, the flow continues through the street system, which also eventually terminates in El Encanto Creek.

Per the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM), the project site is outside of Zone X and therefore not considered subject to a 500-year flood event. Furthermore, there is no floodway or floodplain mapped for El Encanto Creek in the vicinity of the project site.

4.6.2 Regulatory Framework

4.6.2.1 Federal

Clean Water Act

The primary goals of the CWA (33 U.S.C. §§ 1251, *et seq.*) are to restore and maintain the chemical, physical, and biological integrity of the nation's waters and to make all surface waters fishable and swimmable. CWA forms the basic national framework for the management of water quality and the control of pollution discharges. The CWA provides the legal framework for several water quality regulations, including the National Pollutant Discharge Elimination System (NPDES), effluent limitations, water quality standards, pretreatment standards, antidegradation policy, nonpoint-source discharge programs, and wetlands protection. The United States Environmental Protection Agency (USEPA) has delegated the responsibility for administration of portions of the CWA to state and regional agencies. Therefore, the primary regulations resulting from the CWA are discussed below.

Federal Anti-Degradation Policy

The federal Anti-Degradation Policy requires states to develop statewide antidegradation policies and identify methods for implementing them (40 Code of Federal Regulations [CFR] §131.12). These policies and implementation methods will, at a minimum, protect and maintain (1) existing instream uses; (2) existing water quality where the quality of waters exceeds levels necessary to support existing beneficial uses, unless the state finds that allowing lower water quality is necessary to accommodate economic and social development in the area; and (3) water quality in waters considered an outstanding national resource. State permitting actions must be consistent with the federal Anti-Degradation Policy.

4.6.2.2 State

Porter-Cologne Water Quality Control Act (California Water Code)

The State of California is authorized to administer federal law or state-enacted laws regulating water pollution within the state. The Porter-Cologne Water Quality Control Act (Water Code §§ 13000, *et seq.*) includes regulations to address requirements of the CWA. These regulations include NPDES permitting, dredge and fill programs, and civil and administrative penalties. The Porter-Cologne Act is broad in scope and addresses issues relating to the conservation, control, and utilization of the water resources of the state. Additionally, the Porter-Cologne Act states that the quality of all the waters of the state (including groundwater and surface water) must be protected for the use and enjoyment of the people of the state.

The State Water Resources Control Board (SWRCB) and the nine Regional Water Quality Control Boards (RWQCB) are agencies within the umbrella structure of the California Environmental Protection Agency (CalEPA). The SWRCB has the principal responsibility for the development and implementation of California water quality policy and must develop programmatic water quality control procedures to be implemented by the RWQCBs. The Central Coast Regional Water Quality Control Board (CCRWQCB) is the region that regulates water quality in the City of Goleta. The CCRWQCB adopted a Revised Water Quality Control Plan (Basin Plan) on September 8, 1994. The Basin Plan designates beneficial uses and establishes water quality objectives for groundwater and surface water within the Central Coast Region. It has been amended but not updated since 1994.

Water Code § 13050 defines what is considered pollution, contamination, or nuisance. Briefly defined, pollution means an alteration of water quality such that it unreasonably affects the beneficial uses of water (which may be for drinking, agricultural supply, or industrial uses). Contamination means an impairment of water quality to the degree that it creates a hazard to the public health. Nuisance is defined as anything that is injurious to health, is offensive to the senses, or is an obstruction to property use, and affects a considerable number of people.

Discharge Permits

The SWRCB has issued a statewide NPDES General Permit for stormwater discharges associated with construction activities (known as the Construction General Permit [SWRCB Order No. 2009-0009-DWQ, as amended by 2010-0014-DWQ and 2012-0006-DWQ]). Any project that disturbs an area larger than 1 acre requires a Notice of Intent (NOI) to discharge under the Construction General Permit. The Construction General Permit includes measures to eliminate or reduce pollutant discharges through implementation of a Stormwater Pollution Prevention Plan (SWPPP), which describes the implementation and maintenance of best management practices (BMPs) to reduce or eliminate pollutants in stormwater discharges and authorized non-stormwater discharges from a site during construction. The Construction General Permit contains receiving water limitations that require stormwater discharges to not cause or contribute to a violation of any applicable water quality standard. The permit also requires implementation of programs for visual inspections and sampling for specified constituents (e.g., nonvisible pollutants). Any construction activities at the project site would be covered under the Construction General Permit.

The CCRWQCB issues combined NPDES Permits under the CWA and California Water Code to all point-source dischargers of waste to surface waters. To ensure protection of water quality, NPDES Permits may contain effluent limitations for pollutants of concern, pollutant monitoring frequencies, reporting requirements, schedules of compliance (when necessary), mandates for operating conditions, BMPs, and administrative requirements. NPDES Permits apply to publicly owned treatment works (POTWs) discharges, industrial wastewater discharges, and municipal, industrial, and construction site stormwater discharges.

State Anti-Degradation Policy

The SWRCB adopted Resolution No. 68-16 (October 28, 1968), "Statement of Policy with Respect to Maintaining High Quality Waters in California" (more commonly referred to as the state Anti-Degradation Policy), which restricts the degradation of surface waters of the state and protects bodies of water where the existing water quality is higher than necessary for the protection of present and anticipated designated beneficial uses. This state policy is generally consistent with the subsequently adopted federal Anti-Degradation Policy, discussed above.

State policy differs from federal policy in that it applies to: 1) all waters, including surface waters and groundwater; 2) water quality lowerings since 1968; 3) all uses, both existing and potential uses, instream and offstream; and 4) only high quality (i.e., Tier 2) waters. The State policy is implemented by the CCRWQCB.

CCRWQCB Post-Construction Stormwater Management Requirements

The CCRWQCB adopted Resolution No. R3-2013-0032 (July 12, 2013), which implements post-construction requirements for management of stormwater discharges from development projects within the Central Coast region (Central Coast PCRs). Specifically, projects must comply with four categories of performance requirements: 1) site design and runoff reduction, 2) water quality treatment, 3) runoff retention, and 4) peak flow management. Within the City, the Central Coast PCRs will apply to private development projects that have not received the first discretionary approval of project design by March 6, 2014. The Central Coast PCRs are summarized in Table 4.6-1 below.

**TABLE 4.6-1
SUMMARY OF POST-CONSTRUCTION REQUIREMENTS –
CENTRAL COAST REGIONAL WATER QUALITY CONTROL BOARD**

Type of Project	Requirements
Tier 1 Projects, including single-family homes that are not part of a larger plan of development (SFHs), that create or replace 2,500 square feet or more of impervious surface.	Implement LID Measures: <ul style="list-style-type: none"> • Limit disturbance of natural drainage features. • Limit clearing, grading, and soil compaction. • Minimize impervious surfaces. • Minimize runoff by dispersing runoff to landscape or using permeable pavements.
Tier 2 <ul style="list-style-type: none"> • Projects, other than SFHs, that create or replace 5,000 SF or more net impervious surface*. • SFHs that create or replace 15,000 SF or more of net impervious surface*. 	Tier 1 requirements, plus: <ul style="list-style-type: none"> • Treat runoff with an approved and appropriately sized LID treatment system prior to discharge from the site.
Tier 3 <ul style="list-style-type: none"> • Projects, other than SFHs, that create or replace 15,000 SF or more of impervious surface. • SFHs that create or replace 15,000 SF or more of net impervious surface.* 	Tier 2 requirements, plus: <ul style="list-style-type: none"> • Prevent offsite discharge from events up to the 95th percentile rainfall event using Stormwater Control Measures.
Tier 4 Projects that create or replace 22,500 square feet of impervious surface.	Tier 3 requirements, plus: <ul style="list-style-type: none"> • Control peak flows to not exceed pre-project flows for the 2-year through 10-year events.
* Net impervious surface equals new and replaced impervious area minus the total pre-project-to-post-project reduction in impervious area (if any).	
<i>Source:</i> County of Santa Barbara Project Clean Water 2014.	

4.6.2.3 Local

County of Santa Barbara

Project Clean Water (PCW) is the County of Santa Barbara's stormwater quality program initiated in 1998 to improve water quality in local creeks and the ocean by implementing many of the aspects of NPDES BMPs. This program also includes watershed planning and restoration, pilot treatment control BMPs, and monitoring. PCW is managed and staffed by the Santa Barbara County Water Agency (Public Works Department) and the Environmental Health Services Division (EHS) of the Public Health Department.

City of Goleta Stormwater Management Guidance Document

Planning, implementation, and enforcement related to stormwater management during construction and post-construction activities on proposed and active development sites are governed by the City of Goleta Stormwater Management Guidance Document (Guidance Document) (City of Goleta 2014). The Goleta SWMP was created pursuant to SWRCB General Permit No. CAS000004 for NPDES Phase II.

The Guidance Document outlines the means by which the City will (1) protect the health of the recreational public and the environment, (2) meet CWA mandates through compliance with Phase II NPDES Permit requirements and applicable regulations, and (3) foster increased public involvement and awareness. Water quality monitoring has been conducted to define pollutants in many watersheds, resulting in identification of bacteria, nutrients, pesticides, sediment, and heavy metals as pollutants of concern in certain drainages. Storm drains may empty into drainages after already passed through natural open space, residential, agricultural, commercial, and industrial land uses.

The purpose of the Guidance Document is to implement and enforce a program designed to reduce the discharge of pollutants to the maximum extent practicable (MEP) to protect water quality. According to the General Permit, the MEP standard is an ever-evolving, flexible, and advancing concept that considers technical and economic feasibility. Since knowledge about controlling urban runoff continues to evolve, so does the mitigation, which constitutes MEP. Reducing the discharge of stormwater pollutants to the MEP in order to protect beneficial uses requires review and improvement, which includes seeking new opportunities. To do this, the City must conduct and document an evaluation and assessment of each relevant element of its program and revise, as necessary, activities, control measures, BMPs, and measurable goals to meet the MEP.

City of Goleta Stormwater Management and Discharge Control Ordinance

The City's Stormwater Management And Discharge Control regulations (Goleta Municipal Code, Chapter 13.04) implements the CWA and Porter-Cologne Act "by reducing pollutants and non-stormwater discharges to the maximum extent practicable by prohibiting non-stormwater discharges into the storm drain system and improving stormwater management." It includes regulations regarding point and nonpoint source discharges of pollutants, and also codifies the City's implementation and enforcement of the Central Coast PCRs.

City of Goleta Floodplain Management Ordinance

The City's Floodplain Management Ordinance (Goleta Municipal Code, Chapter 15) allows structural development within the 100-year floodplain if the finished floor elevation is raised at least 2 feet above the base flood elevation.

City of Goleta General Plan/Coastal Land Use Plan (GP/CLUP)

The GP/CLUP contains policies in the Conservation Element regarding protection of water quality, including Policy CE 2, Protection of Creeks and Riparian Areas; Policy CE 3, Protection of Wetlands; and Policy CE 10, Watershed Management and Water Quality.

4.6.3 Project Impacts and Mitigation

4.6.3.1 Thresholds of Significance

The City's Initial Study Checklist (CEQA Guidelines, Appendix G) and the City's *Environmental Thresholds and Guidelines Manual* (Thresholds Manual) specify the following significance thresholds; these thresholds have been organized according to the topics addressed in this section.

Surface and Groundwater Quality

A significant impact to surface and groundwater water quality could occur if construction or operation of the project would:

- a. Violate any water quality standards or waste discharge requirements.
- b. Discharge pollutants that exceed the water quality standards set forth in the applicable NPDES Permit, the RWQCB's Basin Plan, or otherwise impair the beneficial uses of a receiving water body.
- c. Result in a discharge of pollutants into an impaired water body that has been designated as such by the SWRCB or the RWQCB under Section 303(d) of the Federal Water Pollution Prevention and Control Act (i.e., the Clean Water Act).
- d. Result in a discharge of pollutants of concern to a receiving water body, as identified by the RWQCB.
- e. 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).
- f. Be located within an urbanized area of the City and project construction would disturb one (1) or more acres of land.
- g. Result in the removal or reduction of riparian vegetation or other vegetation (excluding non-native vegetation removed for restoration projects) from the buffer zone of any streams, creeks, or wetlands.
- h. Otherwise substantially degrade water quality.

Stormwater Flows and Drainage

A significant impact to stormwater flows and drainage could occur if construction or operation of the project would:

- i. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site.
- j. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would increase flooding on- or off-site.
- k. Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff.
- l. Result in channelization or relocation of a natural drainage channel.
- m. Increase the amount of impervious surfaces by 25 percent or more.

Flooding

A significant impact to stormwater flows and flooding could occur if construction or operation of the project would:

- n. Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map.
- o. Place within a 100-year flood hazard area structures which would impede or redirect flood flows.
- p. Expose people or structures to a significant risk of loss, injury, or death involving flooding, including flooding as a result of the failure of a levee or dam.
- q. Result in inundation by seiche, tsunami, or mudflow.

Items a, e, i, j, k, n, o, p, and q are from the Initial Study Checklist; the remaining items are from the Thresholds Manual.

4.6.3.2 Project Impacts

The project would include construction and operation of 60 single-family residential units. Additional facilities include interior project streets, private driveways and walkways, landscaped areas, underground utilities, and drainage structures necessary to convey surface water across the property. A more detailed discussion of the project elements can be found in Chapter 2, Project Description. Impacts related to surface water and groundwater quality, stormwater flows and drainage, and flooding are described below.

Impact HYD-1. Surface Water and Groundwater Quality

Short-term (Construction-related) Impacts

Potential impacts to water quality from construction-related activities would occur due to vegetation removal and use of construction materials on the site. The project would involve site disturbance during grading and the construction of residences, sidewalks, roadways, patios, landscaping, and associated facilities. Construction would involve grading of approximately 27,500 cubic yards of cut and 23,500 cubic yards of fill. This grading activity would involve vegetation removal and expose soil to erosion and potential for sedimentation of surface water

bodies such as the adjacent El Encanto Creek. Also, during onsite grading and building construction, hazardous materials such as fuels, paints, solvents, and concrete additives could be used. These hazardous materials require proper management and disposal. Improper management of any resultant hazardous wastes could increase the opportunity for hazardous materials releases into surface water runoff and potentially infiltrate the underlying groundwater. The project would substantially increase the potential for urban pollutants such as petroleum products and landscape chemicals to be introduced into the stormwater flow discharged into El Encanto Creek, the receiving waters of Devereux Slough, and the ocean, thereby potentially degrading water quality and affecting aquatic, estuarine, and marine habitats.

Impacts would be minimized during all phases of project construction through compliance with the Construction General Permit. This permit requires the development and implementation of a SWPPP, which must 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. Erosion control BMPs are designed to prevent erosion, whereas sediment controls are designed to trap sediment once it has been mobilized. A SWPPP would be developed as required by, and in compliance with, the Construction General Permit and City ordinances. Interim BMPs to control erosion and sedimentation and keep pollutants from reaching drainage facilities during construction would also be implemented. These BMPs would ensure effective control of not only sediment discharge, but also of pollutants associated with sediments, including but not limited to nutrients, heavy metals, and certain pesticides or herbicides.

Though the project would disturb more than 1 acre of land within an urbanized area of the City, construction BMPs for erosion, sedimentation, and construction waste control would be implemented and would result in a less than significant water quality impact. However, until final plans are reviewed for adequacy of BMPs, impacts to surface and groundwater quality as a result of construction activities are considered potentially significant.

Long-term (Operational) Impacts

For post-construction impacts, the primary source of pollutants would be oil, grease, and other materials deposited on the paved surfaces of internal roads, driveways, and parking areas. The discharge of liquid contaminants accumulating in leaking, uncovered, or corroded trash enclosures could also serve as a source of pollutants. In addition, runoff from landscaped areas may contain pesticides, herbicides, fertilizers, and other chemical compounds. If unaddressed, pollutants from the project could be discharged into receiving waters.

El Encanto Creek and its riparian corridor are just offsite along the western property boundary. GP/CLUP Conservation Element Subpolicy CE 2.2, Streamside Protection Areas, requires a 100-foot buffer along both sides of El Encanto Creek. This buffer is intended to preserve the SPA in a natural state in order to protect the associated riparian habitats and ecosystems. Under certain circumstances, Subpolicy CE 2.2 allows for the reduction of the 100-foot SPA as long as a 25-foot minimum is maintained. Although the creek and its riparian corridor are not within the site boundaries, the 100-foot SPA buffer does extend into the western portion of the project site. Construction and operation of the project would result in an encroachment into the 100-foot SPA buffer. The proposed detention/retention basin, vegetated bioswale, children's tot lot, a walking path, small portions of two residential properties, and a portion of the internal road system would be placed within the 100-foot buffer. The two residential properties and the internal road system would be at least 50 feet from El Encanto Creek, which exceeds the 25-foot minimum buffer required by Subpolicy CE 2.2. The detention/retention basin, vegetated

bioswale, children's tot lot, and the walking path are proposed to extend within the 25-foot minimum.

Though an encroachment into the buffer zone could have the potential to cause significant impacts, the detention basin, vegetated bioswale, children's tot lot, and the walking path are considered compatible land uses and activities allowed in SPAs, per GP/CLUP Subpolicy CE 2.3, Allowable Uses and Activities in SPAs. Subpolicy CE 2.3e allows for the construction and maintenance of foot trails, bicycle paths, and similar low-impact facilities for public access. Subpolicy CE 2.3f allows for resource restoration and enhancement projects. The detention basin and vegetated bioswale would capture stormwater for filtration, infiltration, and sediment dropout. The walking path, which would be surfaced in decomposed granite (DG), would further protect water quality by allowing surface runoff to filter through the permeable surface. Therefore, the encroachment into the SPA would result in less than significant impacts to surface and groundwater quality.

The project would include various measures to address the potential for pollutant discharges into water bodies during project operations. These components are intended to reduce surface water quality pollutants with practicable methods of stormwater quality treatment and hydromodification control. Stormwater curb extensions and permeable paved parking areas and driveways would provide a way to capture street stormwater runoff for treatment, filtration, and sediment dropout. The vegetated bioswale in the open space area and along Cathedral Oaks Road, as well as depressed biofiltration/collection areas, would capture additional stormwater for filtration, infiltration, and sediment dropout.

Though the project would disturb more than 1 acre of land within an urbanized area of the City, post-construction BMPs to protect sensitive riparian or wetland resources, reduce the quantity of runoff, and treat runoff generated by the project to pre-project levels would be implemented and would result in a less than significant water quality impact. However, until final plans are reviewed for adequacy of BMPs, impacts to surface and groundwater quality as a result of operational activities are considered potentially significant.

Impact HYD-2. Stormwater Flows and Drainage

The project has the potential to increase the volume and alter the drainage pattern of stormwater runoff from the pre-development condition. The project is categorized as a Tier 4 project under the Central Coast PCRs. Requirements for Tier 4 projects include the retention of stormwater runoff from rain events up to the 95th percentile event (which for the project site is equivalent to 2.43 inches of rainfall within a 24-hour period). Implementation of LID measures and control of peak flows are also required.

Figure 4.6-1 illustrates the project's proposed hydrology plan. In summary, offsite flow from the area north of the project draining southerly onto the project site would be intercepted by a concrete "V" swale and directed westerly and easterly along the project's northern boundary to discharge back onto the property originating the flow. Onsite flow would be conveyed in the proposed internal street system to a series of catch basins on the western and eastern sides of the project. The catch basins on the western side of the project would convey the stormwater through storm drain pipes to a detention/retention basin at the southwest corner of the property, with outlets that are connected into the project's irrigation system to recycle runoff. Any volumes in the detention/retention basin from storm events exceeding the 95th percentile would be discharged into a storm drain that flows to El Encanto Creek.

The catch basins on the eastern side of the project would be at the project site's eastern entrance just north of Cathedral Oaks Road. These catch basins would convey the stormwater from the eastern side of the project site to an underground detention/retention system consisting of a series of 60-inch pipes, with outlets that are connected to pumps that recycle runoff into the project's irrigation system.

In addition, the project incorporates a number of LID measures. Permeable paving would be installed in curbside parking areas and driveways. A series of curb extensions will create landscaped areas that capture and treat runoff ("rain gardens"). Finally, a vegetated bioswale will be installed to convey and treat runoff as it is conveyed to the detention/retention basin in the southwest corner of the property.

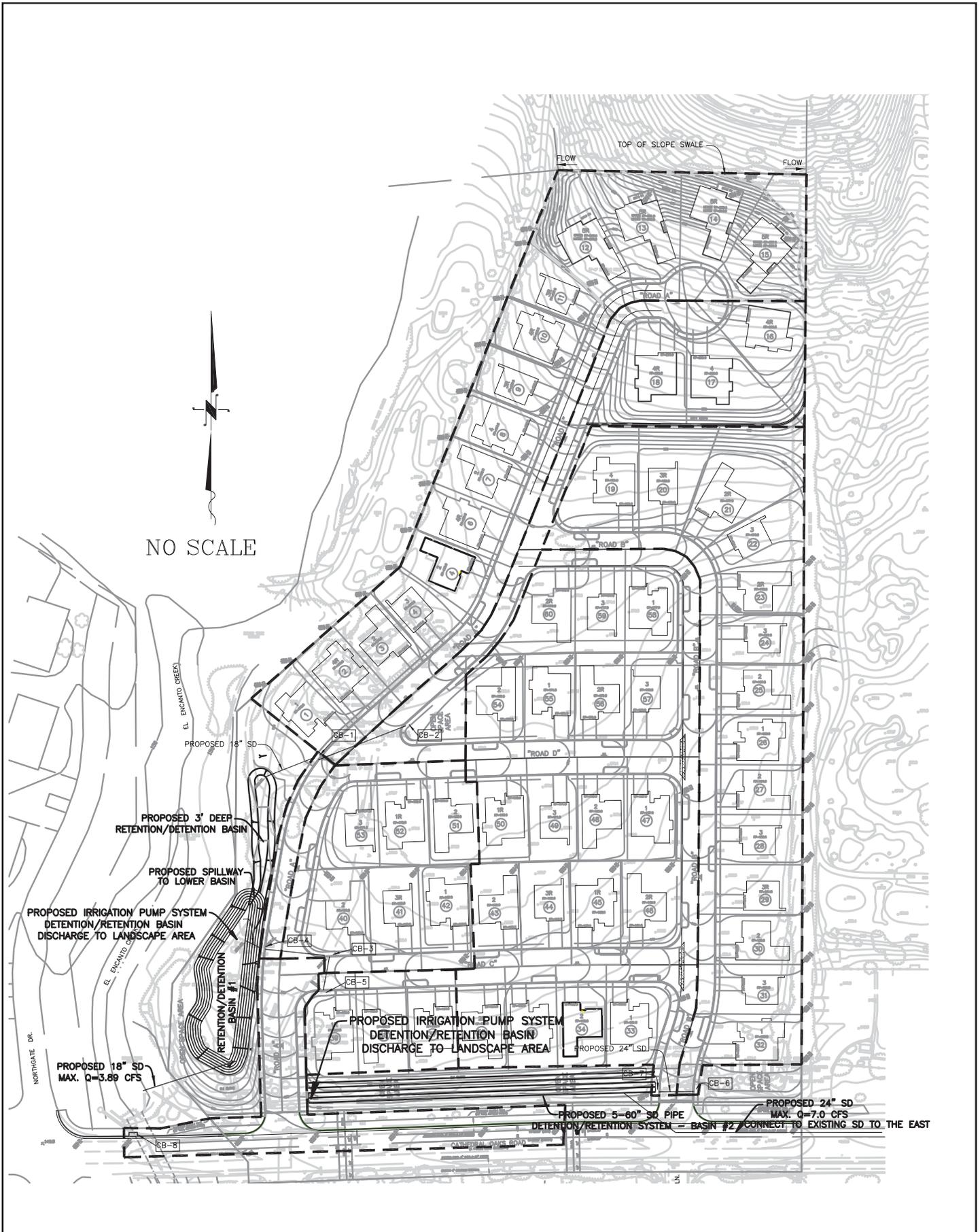
The 95th percentile storm event would generate 64,932 cubic feet of runoff from the project site. Table 4.6-2 summarizes the capacity of volumes retained by the project's stormwater control measures.

**TABLE 4.6-2
POST-CONSTRUCTION STORMWATER MANAGEMENT MEASURES**

Retention Measure	Quantity/Size	Volume Retained (cubic feet)
Curbside rain gardens	Total 30 @ 210 cubic feet each	6,300
Landscape area rain gardens	Total 60 @ 100 cubic feet each	6,000
Recycling runoff to irrigation system	3- to 60-inch pipe @ 400 feet each	23,550
Detention/Retention Basin 1 (southwest corner)	4,500 square-foot area	27,000
Detention/Retention Basin 2 (southern boundary)	1,500 square-foot area	4,500
Total Volume Retained		67,350
95th Percentile Stormwater Runoff Volume		64,932
% of Runoff Volume Mitigated		>100%
Source: Amendment to Hydrology Report (Civil Design & Drafting 2014).		

Table 4.6-3 summarizes the peak flows from the project site under pre-development conditions and post-development conditions (with implementation of the project's post-construction stormwater management measures, including detention basins).

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Source: Civil Design & Drafting, Inc.



Figure 4.6-1
Hydrology Plan
Shelby Residential Project EIR

**TABLE 4.6-3
PRE-PROJECT AND POST-PROJECT PEAK FLOWS
(WITH POST-CONSTRUCTION MEASURES/DETENTION BASINS)**

Storm Event	Pre-development Runoff (cfs)	Post-Development Runoff (cfs)	Decrease in Runoff (cfs)
West Basin			
2-year	1.41	0.32	1.17
5-year	2.39	1.59	0.80
10-year	3.06	3.06	0.00
25-year	3.89	3.89	0.00
50-year	4.51	3.89	0.62
100-year	5.10	3.89	1.21
East Basin			
2-year	2.55	2.55	0.00
5-year	4.29	4.29	0.00
10-year	5.48	5.48	0.00
25-year	6.95	6.95	0.00
50-year	8.03	6.95	1.08
100-year	9.07	6.95	2.12

As stated above, the project is designed with post-construction stormwater management measures to retain runoff volumes from the 95th percentile storm event. The project is also designed so that peak flows of runoff do not exceed the project site's pre-development condition. As a result, the project would comply with the Central Coast PCRs and would not create or contribute to runoff water that would exceed the capacity of existing or planned stormwater drainage systems.

However, if the final design details, related installation, and/or long-term maintenance of onsite drainage control systems are not adequate, stormwater detention and treatment before discharge would be insufficient, and substantial flooding or erosion on or off site, channelization of El Encanto Creek, or other impacts to stormwater flows and drainage could occur, which would be a significant impact.

Impact HYD-3. Flooding

The project site is outside of the 100-year floodplain and is therefore not subject to inundation from 100-year floodwaters. There are no levees or dams upstream of the project site to the top of the area's watershed that would threaten the project in the event of a dam or levee failure. The entirety of the site lies outside the City's Potential Tsunami Run-Up Area as mapped by the City's GP/CLUP. Therefore, there would be no impacts to people and property associated with flooding, the failure of an upstream levee and/or dam, or inundation as a result of a tsunami.

4.6.4 Cumulative Impacts

As described above, project runoff would be conveyed to El Encanto Creek. Short-term construction activity impacts (e.g., sedimentation from grading, contaminated runoff from washing of construction equipment, vehicles, and materials) and impacts from long-term operations on site (landscaping chemicals, oil and grease in runoff from the parking areas) would result in potentially significant short-term and long-term water quality impacts to the nearby El Encanto Creek from the potential for conveyance of degraded stormwater runoff from the site into the creek. The project would result in a potentially significant contribution to cumulative water quality degradation.

The increased volume of stormwater and the change in drainage patterns would result in less than significant short-term and long-term impacts to stormwater flows and drainage, as the proposed detention basin system is designed with the capacity to contain the post-development project runoff excess and to discharge a runoff volume that is equal to the predevelopment runoff volume from the site, representing no net change. Furthermore, rerouting such runoff through the drainage system instead of directly to El Encanto Creek would not result in any new environmental effect above baseline levels. Therefore, the project would result in a less-than-significant contribution to cumulative stormwater runoff and drainage impacts.

Because the project site is outside 100-year floodplains, levee or dam inundation areas, and tsunami run-up areas, the project would not contribute to a significant flood exposure impact.

4.6.5 Mitigation Measures

MM HYD-1. Stormwater Pollution Prevention Plan

The permittee must prepare a Stormwater Pollution Prevention Plan (SWPPP) covering all phases of grading/construction operations.

Plan Requirements: The SWPPP must be prepared by a licensed civil engineer or Qualified SWPPP Developer (QSD) and include, at a minimum, the following:

- a. Temporary berms and sedimentation traps (such as silt fencing, straw bales, and gravel bags) must be placed at the base of all cut/fill slopes and soil stockpile areas where potential erosion may occur and must be maintained to ensure effectiveness. The sedimentation basins and traps must be cleaned periodically, and the silt must be removed and disposed of in a location approved by the City.
- b. Nonpaved areas must be revegetated or restored (i.e., geotextile binding fabrics) immediately after grading and installation of utilities to minimize erosion and to reestablish soil structure and fertility. Revegetation must include noninvasive, drought-resistant, fast-growing vegetation that will quickly stabilize exposed ground surfaces. Alternative materials rather than reseeding (e.g., gravel) may be used, subject to review and approval by the Planning and Environmental Review Director, or designee, and the Public Works Director, or designee.
- c. Runoff must not be directed across exposed slopes; all surface runoff must be conveyed in accordance with the approved drainage plans.
- d. Energy dissipaters or similar devices must be installed at the end of drainpipe outlets to minimize erosion during storm events.

- e. Grading must occur during the dry season (April 15 to November 1), unless a City-approved erosion control plan is in place and all erosion control measures are in effect. Erosion control measures must be identified on an erosion control plan and must prevent runoff, erosion, and siltation. All exposed graded surfaces must be reseeded with groundcover vegetation to minimize erosion. Graded surfaces must be reseeded within 4 weeks of grading completion, with the exception of surfaces graded for the placement of structures; these surfaces must be reseeded if structural development does not commence within 4 weeks of grading completion.
- f. Site grading must be completed such that permanent drainage away from foundations and slabs is provided and so that water does not pond near structures or pavements.

Timing: The Stormwater Pollution Prevention Plan must be submitted to the Planning and Environmental Review Director, or designee, and the Public Works Director, or designee, for review and approval before issuance of any grading permit. Best management practices must be installed before grading commences and be maintained throughout the grading/construction period, as applicable.

Monitoring: The Planning and Environmental Review Director, or designee, must verify that the Stormwater Pollution Prevention Plan has been implemented per the approved plan before grading commences. The Planning and Environmental Review Director, or designee, must inspect the site periodically to verify compliance with the SWPPP throughout the grading/construction period.

MM HYD-2a. Final Drainage/Stormwater Quality Protection Plan

The permittee must prepare a final drainage/stormwater quality protection plan consistent with the City's Stormwater Management Guidance Document and CCRWQCB Post-Construction Stormwater Management Requirements.

Plan Requirements: The final drainage/stormwater quality protection plan must be prepared by a licensed civil engineer. The plan must include, without limitation, the following:

- a. A final drainage analysis that provides final calculations on pre-/post-development stormwater runoff volumes, peak flows, effective impervious area, required storage capacity, and specifications of all elements of the drainage control system.
- b. Catch basin filter inserts capable of capturing sediment, trash, debris, and petroleum products from low-flow (first flush) stormwater runoff will be installed in each stormwater inlet/catch basin to be connected to the storm drain system serving the project site. Catch basin filter inserts must be specified for installation in all project stormwater inlets/catch basins shown on the final grading/drainage plan.
- c. Regular maintenance and cleaning must be performed on catch basins and detention basins.
- d. Routine cleaning must be performed on streets, parking lots, and storm drains.
- e. All storm drain inlets must be stenciled to discourage dumping by informing the public that water flows to the ocean.
- f. An integrated pest management program must be developed for landscaped areas of the project, emphasizing the use of biological, physical, and cultural controls, rather than chemical controls.

- g. Educational flyers must be provided to residents regarding proper disposal of hazardous water and automotive waste.
- h. Trash storage/material storage areas for maintenance of common areas must be provided that are covered by a roof and protected from surface runoff.
- i. Drainage improvements associated with the project must route as much roof, parking areas, and surface drainage as possible through onsite landscaped areas and bioswale before drainage enters the drop inlets.

Timing: The final drainage/stormwater quality protection plan must be submitted to the Planning and Environmental Review Director, or designee, and Public Works Director, or designee, for review and approval before issuance of any grading permit. All best management practices must be installed as identified on the final drainage/stormwater quality protection plan and grading/drainage plan before issuance of any Certificate of Occupancy.

Monitoring: The Planning and Environmental Review Director, or designee, and Public Works Director, or designee, must verify implementation per approved plans before the City issues any Certificate of Occupancy.

MM HYD-2b. Maintenance Agreement

The permittee must prepare and perform all tasks pursuant to a maintenance agreement that addresses maintenance requirements for all improvements associated with stormwater quality protection/best management practices described in the final drainage/stormwater quality protection plan.

Plan Requirements: At a minimum, the maintenance agreement must include requirements that all inline storm drain filters must be inspected, repaired, and cleaned per manufacturer specifications and before September 30 of each year. Additional inspections, repairs, and maintenance must be performed after storm events, as needed, throughout the rainy season (November 1 to April 15) and/or per manufacturer specifications. Any necessary major repairs must be completed prior to the next rainy season. Before September 30 of each year, the permittee, or designee, must submit to the Public Works Director, or designee, for review and approval a report summarizing all inspections, repairs, and maintenance work done during the previous year. The maintenance agreement must be in a form approved by the City Attorney.

Timing: The permittee must submit the required maintenance agreement to the Public Works Director, or designee, for review, approval, and execution before issuance of any Certificate of Occupancy.

Monitoring: The Public Works Director, or designee, must periodically verify compliance with the provisions of the agreement and respond to instances of noncompliance with the agreement.

4.6.6 Residual Impacts

With implementation of the above mitigation measures, residual project-specific and cumulative impacts on hydrology and water quality are considered less than significant.