4.9 Hydrology and Water Quality

This section describes the existing hydrology and water quality conditions of the project site and vicinity, identifies associated regulatory requirements, evaluates potential impacts, and identifies project design features (as presented in the proposed project technical studies, Appendices 4.9-1 through 4.9-6) related to implementation of the San Diego Station University (SDSU) Mission Valley Master Plan Project (proposed project).

Methods for Analysis

Potential impacts related to water quality and hydrology are evaluated based on the anticipated changes in topography, land cover, drainage infrastructure, and water pollutant sources associated with the proposed project. The assessment considers the sensitivity of the surrounding environment and downstream waters to project-related impacts, as well as the effectiveness of standard industry practice with regard to hydrology and hydraulics, including required compliance with applicable permits, laws, and regulations. Accordingly, this section provides a review of the proposed project's regulatory context, development standards pertaining to water quality, and their applicability to campus improvements. Drainage designs, stormwater runoff calculations, and the selection/sizing of low impact design features included herein is based on the following reports:

- Water Quality Technical Report (Appendix 4.9-1), prepared by Geosyntec;
- Hydrology Technical Report (Appendix 4.9-2), prepared by Geosyntec;
- Drainage Study For SDSU Mission Valley Campus (Onsite Improvements) (Appendix 4.9-3), prepared by Rick Engineering;
- Water Quality Report For SDSU Mission Valley Campus (Onsite Improvements) (Appendix 4.9-4), prepared by Rick Engineering;
- Hydraulic Analyses for SDSU Mission Valley Campus (Appendix 4.9-5), prepared by Chang Consultants; and
- SDSU Mission Valley Campus Project Construction Excavation Impacts on Groundwater Storage Memorandum (Appendix 4.9-6), prepared by Geosyntec.

This section is supported by data, publications, and resources provided by public agencies such as the U.S. Geological Survey, the State Water Resources Control Board (SWRCB), the San Diego Regional Water Quality Control Board (RWQCB), and the City of San Diego (City) ~~Stormwater~~ Storm Water Division.

The analysis contained in this section is based on design information provided by SDSU. As the engineering and design of the proposed project proceed to final stages, the project engineer will perform the calculations necessary to refine the location, design, and size of stormwater and water quality features, if necessary, to remain compliant with applicable stormwater standards. While exact details regarding the stormwater drainage design may be further refined as the design process moves forward, the project's proposed uses, overall footprint, and stormwater discharge locations will not change. Therefore, the conclusions reached in this report would be unaffected by any changes in stormwater drainage design specifics.

Summary of Notice of Preparation Comments

A Notice of Preparation (NOP) was circulated from January 19, 2019, to February 19, 2019. A total of 150 letters were received during this comment period. Comments received related to hydrology and water quality included a request for evaluation of the effects on surface flows of the San Diego River from construction activities and operational

uses such as chemistry labs; evaluation of effects on groundwater quality and storage due to construction excavation and past contamination at the Mission Valley Terminal; and Pueblo water rights.

4.9.1 Existing Conditions

4.9.1.1 Environmental Setting

The proposed project is located at 9449 Friars Road, in the City of San Diego, California. The proposed project is situated south of Friars Road, west of Interstate (I) 15, north of the San Diego River and I-8, and east of the existing Fenton Marketplace shopping center. The project site is approximately 5.25 miles from downtown San Diego and approximately 2.75 miles west of the existing SDSU main campus. The project site is surrounded by major roadways, interstate freeways, existing development, and two surface water features. Existing higher-density, multifamily residential land uses are located to the northwest, southwest, and east of the project site, across I-15. The San Diego River, which flows east to west, is located along the south border of the project site (Figure 4.9-1, Existing Hydrology Features). South of the San Diego River are additional office uses and I-8. To the north of Friars Road is San Diego Fire-Rescue Department Fire Station 45, undeveloped hillsides, and single-family residences, which are located atop the mesa. Fenton Marketplace is located west of the project site and consists of large commercial and retail uses and office uses. Murphy Canyon Creek, a partially earthen and concrete-lined channel that conveys flow into the San Diego River, is within the eastern boundary of the project site. Multifamily residential uses dominate the landscape to the east of the project site, east of I-15.

4.9.1.2 Climate

The climate of San Diego County (County) is characterized by warm, dry summers and mild, wet winters. The average rainfall is about 10 to 13 inches per year, most of which falls between November and March. The average mean temperature for the area is approximately 65° Fahrenheit (°F) in the coastal zone and 57°F in the surrounding foothills (San Diego RWQCB 2016). The proposed project is located in a Mediterranean climate region with seasonally influenced precipitation. Seasons consist of hot, dry summers and cooler, wetter winters, although San Diego is more arid than most areas with a similar climate classification (Appendix 4.9-1). Global climate change is expected to cause a future warming trend in southern California even under moderate emissions scenarios; however, there is no clear trend in annual precipitation. Current climate projections suggest an increase in extreme events in the San Diego region in the future with 16% fewer rainy days and 8% more rainfall during the biggest rainstorms (San Diego Foundation 2014; Appendix 4.9-1).

4.9.1.3 Watershed Hydrology

The U.S. Geological Survey Watershed Boundary Dataset delineates watersheds according to hydrologic units, which are nested within one another according to the scale of interest. The U.S. Geoglocial Survey identifies hydrologic units by name and by hydrologic unit code (HUC). For example, at a statewide scale, hydrologic units consist of large regions and sub-regions draining to a common outlet. At a statewide scale, the proposed project is within the 11,100-square-mile "Southern California Coastal" subregion (HUC 1807), which identifies areas that eventually drain to the Pacific Ocean versus those that drain to the interior deserts of California. At the highest level of detail for the Watershed Boundary Dataset, the proposed project would be located within the San Diego River Watershed Management Area (WMA), which encompasses approximately 434 square miles. The proposed project's receiving waters include the San Diego River and Murphy Canyon Creek (Figure 4.9-1, Existing Hydrology Features). Streams within the watershed

include 55 miles of the San Diego River, Boulder Creek, Cedar Creek, Conejos Creek, Chocolate Creek, Los Coches Creek, San Vicente Creek, Foster Creek, and several unnamed tributaries (Appendix 4.9-1).

The San Diego River watershed contains the Lower San Diego, San Vicente, El Capitan, and Boulder Creek Hydrologic Areas. The project site is located in the Mission San Diego Hydrologic Subarea in the lower San Diego Hydrologic Area within the San Diego River Hydrologic Unit. The San Diego River headwaters are located 50 miles east of the project site in the Cuyamaca Mountains. River flows into the Pacific Ocean 5 miles west of the project site in the Ocean Beach community of the City of San Diego (Appendix 4.9-1).

Murphy Canyon Creek is tributary to the San Diego River at the proposed project location. The creek originates in multiple headwaters in the foothills, southeast of Marine Corps Air Station Miramar and discharges to the San Diego River at the southeast corner of the project site. Murphy Canyon Creek is a partially earthen and concrete-lined channel with intermittent segments above and below ground. The creek is a narrow channel west of I-15 and becomes a covered, lined channel for approximately 0.5 miles as it approaches the Kinder Morgan Energy Partners (KMEP) Mission Valley Terminal (MVT). The creek provides wetland and riparian vegetation along its banks with minimal vegetation along the creek bed (Appendix 4.9-1).

4.9.1.4 Topography and Drainage

The project site is characterized by a gentle to moderate slope toward the San Diego River, south of the proposed project. Existing site elevations range from approximately 75 feet above mean sea level (AMSL) on the northeast side of the project site to 55 feet AMSL along the margin of the San Diego River at the southern edge of the project site. The steepest slopes occur at the northeast portion of the project site (Figure 4.9-1, Existing Hydrology Features).

The project site currently consists of the San Diego County Credit Union (SDCCU) Stadium and associated parking lot. The parking lot covers most of the approximately ~~172~~173-acre site. There are currently eight major outfalls from the project site, including six that discharge south into the San Diego River and two that discharge east into the Murphy Canyon Channel. However, only four of those outfalls, including Drainage Systems A, B, C, and D (Figure 4.9-2, Existing Drainage System), would be affected by the proposed project. The site is approximately 90% impervious and includes the Stadium, buildings, and surrounding parking lot (Appendices 4.9-1 and 4.9-2).

Drainage systems A and C collect runoff from and drain the parking lot area, while drainage system B drains the Stadium. Drainage system D drains the practice fields and building area in the southwest corner of the site. Minor areas of off-site run-on from the adjacent road and hillside discharge onto the parking lot on the north and west sides of the site. The area surrounding the Stadium is predominantly asphalt parking lot. Inside the Stadium the turf is assumed to be lined, and therefore all precipitation is collected in drainage system B rather than infiltrating into the ground.

Prior to discharging, the existing storm drains penetrate through an 84- to 96-inch-diameter sanitary sewer main paralleling the north bank of the San Diego River. Drainage systems A, B, and C discharge into the San Diego River via 36-inch reinforced concrete pipes. The storm drain lines are reduced to 34-inch steel pipes to pass through the sewer main and are cased in polyethylene to prevent comingling of sewer and stormwater flows. Because of this design, the outfalls cannot be modified. Drainage system D discharges into an earthen channel that discharges into the San Diego River (Appendix 4.9-2).

4.9.1.5 Flood Hazards

Portions of the project site are located within a Federal Emergency Management Agency (FEMA) 100-year and 500-year floodplain, as shown on Flood Insurance Rate Map Panels 06073C1636H, 06073C1638H, and 06073C1636H, dated May 16, 2012 (FEMA 2012), with a designation of "Zone A" along the eastern perimeter adjacent to Murphy Canyon Creek and "Zone AE" along the southern perimeter adjacent to the San Diego River (Figure 4.9-3, Existing Flood Zones). SDCCU Stadium was constructed on fill above the 100-year floodplain on a raised earthen mound, while the parking lot was constructed within the 100-year floodplain. Flooding of the project site has been observed during winter events and occasionally in the summer during monsoonal moisture from equatorial tropical storms. Currently, Murphy Canyon Creek in the project area is contained in a flood control channel, and a berm exists between the channel and the parking lot. However, during moderate storm events, water overtops the berm and floods the existing parking area (City of San Diego 2015).

4.9.1.6 Water Quality

The Water Quality Control Plan for the San Diego Basin (Basin Plan; San Diego RWQCB 2016, as amended) lists beneficial uses of major water bodies within the region. San Diego River and Murphy Canyon Creek are inland surface water bodies with designated beneficial uses in the Basin Plan. Existing beneficial uses for both water bodies are summarized in Table 4.9-1, and descriptions of the beneficial use categories are as follows:

- AGR: Agricultural supply waters used for farming, horticulture, or ranching.
- COLD: Freshwater Habitat that support cold water ecosystems including the preservation or enhancement of aquatic habitats, vegetation, fish or wildlife, and invertebrates.
- IND: Industrial activities that do not depend primarily on water quality.
- MUN: Community, military, or individual water supply systems including, but not limited to, drinking water supply.
- PROC: Industrial process supplies that includes the use of water for industrial activities that depend primarily on water quality.
- RARE: Waters that support habitats necessary, at least in part, for the survival and successful maintenance of plant or animal species established under state or federal law as rare, threatened, or endangered.
- REC1: Water contact recreation involving body contact with water and ingestion is reasonably possible.
- REC2: Non-contact water recreation for activities in proximity to water, but not involving body contact.
- WARM: Warm freshwater habitat to support water ecosystems.
- WILD: Wildlife habitat water that support terrestrial or wetland ecosystems.

Table 4.9-1. Basin Plan Beneficial Uses

Water Body	Beneficial Uses									
	MUN	*AGR*	*IND*	*PROC*	*REC1*	*REC2*	*WARM*	*COLD*	*WILD*	*RARE*
San Diego River	X	X	X	X	X	X	X	X	X	X
Murphy Canyon Creek		X	X		X	X	X		X	X

Source: Table 2-2 of the Water Quality Control Plan for the San Diego Basin (Basin Plan) (San Diego RWQCB 2016, as amended).

Water quality data was collected along the lower San Diego River, from 2004 through 2018, for several pollutants of concern including conventional parameters, nutrients, metals, pathogen indicators, and municipal supply

constituents. The selected general constituents examined include dissolved oxygen (DO), turbidity, total dissolved solids (TDS), total suspended solids (TSS), and oil and grease. DO is a measure of the amount of gaseous oxygen dissolved in the water. Turbidity is a measure of suspended matter that interferes with the passage of light through the water or in which visual depth is restricted. TDS measures the dissolved cations and anions in water, primarily inorganic salts (calcium, magnesium, potassium, sodium, chlorides, and sulfates). High TDS levels can impair agricultural, municipal supply, and groundwater recharge beneficial uses. TSS measures the particulate matter suspended in water. Oil and grease is a measure of fats, oils, waxes, and other related constituents in water.

The data collected along the lower San Diego River in the vicinity of the facility indicate that the lower San Diego River may not currently be meeting water quality standards for DO over the study period (2004~~-2018~~2015) during the dry season. The Basin Plan objective states that the annual mean DO concentration should not be less than 7 miligrams per liter (mg/L) more than 10% over the time. All of the DO measurements collected were less than 7 mg/L; however, only six measurements were collected over the 11-year span. Water quality data for turbidity indicate that the Basin Plan standard of 20 Nephelometric Turbidity Units (NTU) is being met along the lower San Diego River for the wet season and the dry season. Average turbidity measures during the wet season and the dry season are 4.63 NTU and 3.72 NTU, respectively. The Basin Plan does not identify a numeric standard for TSS, and the available TSS data does not indicate that TSS is a cause of "nuisance or adverse effects to beneficial waters." Oil and grease data were collected on four occasions between 2013 and 2014 at the San Diego River ~~TWAS~~ Temporary Watershed Assessment Station ~~station~~ upstream of the project site. All oil and grease results were below the reporting limit, indicating that concentrations are not at levels that would "cause nuisance or which otherwise adversely affect beneficial uses" (Appendix 4.9-1).

Wastewater collection and treatment services are provided by the Wastewater Branch of the City of San Diego Public Utilities Department (City of San Diego 2015). The City's wastewater facilities include the Point Loma Wastewater Treatment Plant, the North City Water Reclamation Plant, the South Bay Water Reclamation Plant, and the Metro Biosolids Center. The current wastewater system serves the existing SDCCU Stadium demand (City of San Diego 2015). Seven 6-inch and 8-inch laterals exit the SDCCU Stadium. An 8-inch vitrified clay pipe that was constructed in 1966 circles the outside of SDCCU Stadium collecting wastewater from these seven locations (City of San Diego 2015). This pipe feeds into an 18-inch connector pipeline on the western side of ~~Ttadium~~the Stadium, which in turn connects to an 8-inch connector line that resides northwest of the Stadium. The 8-inch line connects to another 18-inch line along the western side of the Stadium. The capacity of the 18-inch line is approximately 4.3 million gallons per day and connects to an 84-inch trunk. The 84-inch trunk sewer, North Mission Valley Interceptor, runs easterly along the southern property line (Figure 4.9-2, Existing Drainage System), and connects to a 108-inch North Metro Interceptor that directs wastewater to Pump Station Number 2, where it is then pumped to the Point Loma Wastewater Treatment Plant for treatment (City of San Diego 2015). Please also refer to Section 4.17, Utilities and Service Systems, for further information.

4.9.1.7 Groundwater

All major watersheds in the San Diego region contain groundwater basins, which are defined as a hydrogeologic unit containing one large aquifer, as well as several connected and interrelated aquifers. The San Diego River WMA contains three groundwater basins: Mission Valley, San Diego River Valley, and El Cajon Valley. The proposed project site overlies the Mission Valley Groundwater Basin. Groundwater resources are limited in the downstream portions of the San Diego River WMA because of high concentrations of TDS and groundwater contamination in the Mission Valley groundwater basin (City of San Diego 2015). The Mission Valley groundwater aquifer is described in Table 4.9-2.

Table 4.9-2. Mission Valley Groundwater Aquifer

Aquifer	Description	Thickness
Shallow Alluvium	Quaternary age medium to coarse-grained sand and gravel	Approximately 80–100 feet
San Diego Formation	Thick accumulation of older, semi-consolidated alluvial sediments	Generally less than 100 feet

Source: DWR 2004.

The Mission Valley Groundwater Basin is a narrow alluvial aquifer extending horizontally along the San Diego River from the bottom of Mission Gorge downstream to the river's tidal estuary beginning approximately at I-5 (City of San Diego 2018). Currently no significant withdrawals are conducted due to the petroleum plume from the KMEP MVT (City of San Diego 2015). In June 2016, the City of San Diego and KMEP signed a settlement agreement specifying conditions and arrangements for future development of the Stadium area and Mission Valley groundwater (City of San Diego, 2018).

The Basin Plan designates existing or potential beneficial uses (as shown in Table 4.9-3 below) for the Mission Valley groundwater basin beneath the project site and specifies groundwater quality objectives in the Basin Plan.

Table 4.9-3. Existing Beneficial Uses of Project Groundwater Basin

Groundwater	Hydrologic Unit Basin Number	Beneficial Uses					
		MUN	*AGR*	*IND*	*PROC*	*FRESH*	*GWR*
Lower San Diego Hydrologic Area	7.10						
Mission San Diego Hydrologic Subarea[1]	7.11	○	•	•	•		

Notes:
- ○ Potential Beneficial Use
- • Existing Beneficial Use

1 These beneficial uses do not apply west of the eastern boundary of the I-5 right-of-way, and the area is excepted from sources of drinking water policy. The beneficial uses for the remainder of the hydrologic area are as shown.

Group Delta Consultants performed a geotechnical investigation at the site consisting of 32 borings and several Cone Penetration Tests (Appendices 4.6-1 and 4.6-2). Three of the shallow borings (B-19, B-29, and B-32) were converted to infiltration test holes (I-1, I-2, and I-3). Groundwater was encountered at depths ranging from about 7 to 9 feet below ground surface (where measured) within the borings at the River Park area of the site (Appendix 4.9-1). In addition, groundwater was measured in the vicinity of the SDCCU Stadium at elevations ranging from 37 to 49 feet AMSL (Appendix 4.9-6), corresponding to a maximum depth of about 38 feet below ground surface.

4.9.2 Relevant Plans, Policies, and Ordinances

Federal

Clean Water Act

The Clean Water Act (CWA), as amended by the Water Quality Act of 1987, is the major federal legislation governing water quality (33 U.S.C. 1251 et seq.). The objective of the CWA is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." The CWA establishes basic guidelines for regulating discharges of both point and non-point sources of pollutants into the waters of the United States. The CWA requires that states

adopt water quality standards to protect public health, enhance the quality of water resources, and ensure implementation of the CWA. Relevant sections of the CWA are as follows:

- Sections 303 and 304 provide for water quality standards, criteria, and guidelines. Under Section 303(d) of the CWA, the State of California is required to develop a list of impaired water bodies that do not meet water quality standards and objectives. California is required to establish total maximum daily loads (TMDLs) for each pollutant/stressor. A TMDL defines how much of a specific pollutant/stressor a given water body can tolerate and still meet relevant water quality standards. Once a water body is placed on the Section 303(d) List of Water Quality Limited Segments, it remains on the list until a TMDL is adopted and the water quality standards are attained, or there is sufficient data to demonstrate that water quality standards have been met, and delisting from the Section 303(d) list should take place.
- Section 401 (Water Quality Certification) requires an applicant for any federal permit that proposes an activity that may result in a discharge to waters of the United States to obtain certification from the state that the discharge will comply with other provisions of the CWA. This process is known as the Water Quality Certification/Waste Discharge Requirements process.
- Section 402 (National Pollutant Discharge Elimination System) establishes the National Pollutant Discharge Elimination System (NPDES), a permitting system for the discharge of any pollutant (except for dredged or fill material) into waters of the United States. This permit program is administered by the SWRCB and the nine RWQCBs, which have several programs that implement individual and general permits related to construction activities, stormwater runoff quality, and various kinds of non-stormwater discharges.
- Section 404 (Discharge of Dredged or Fill Material into Waters of the United States) establishes a permit program for the discharge of dredged or fill material into waters of the United States. This permit program is jointly administered by the U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency (EPA).

Numerous agencies have responsibilities for administration and enforcement of the CWA. At the federal level this includes the EPA, the U.S. Army Corps of Engineers, the Bureau of Reclamation, and the major federal land management agencies such as the U.S. Forest Service and the Bureau of Land Management. At the state level, with the exception of tribal lands, the California Environmental Protection Agency and its sub-agencies, including the SWRCB, have been delegated primary responsibility for administering and enforcing the certain provisions of the CWA in California. At the local level, the San Diego RWQCB, municipalities, and special districts have implementation and enforcement responsibilities under the CWA.

CWA Section 303(d) - TMDLs

When designated beneficial uses of a particular receiving water body are being compromised by water quality, Section 303(d) of the CWA requires identifying and listing that water body as "impaired." Once a water body has been deemed impaired, a TMDL must be developed for the impairing pollutant(s). A TMDL is an estimate of the total load of pollutants from point, non-point, and natural sources that a water body may receive without exceeding applicable water quality standards (with a "factor of safety" included). Once established, the TMDL allocates the loads among current and future pollutant sources to the water body. Water quality impairments at the project site and downstream of the project site were considered when selecting the pollutants of concern for the water quality impact analysis in this section.

The proposed project's runoff will discharge into the San Diego River. The San Diego River (Lower) is currently listed on the 2014/2016 303(d) list for indicator bacteria, benthic community effects, cadmium, DO, TDS, nitrogen, phosphorus, and toxicity. The San Diego River (Lower) is designated a Category 5 reach, which means there are

water segments where standards are not met and a TMDL is required, but not yet completed, for at least one of the pollutants being listed for this segment. Table 4.9-4 lists the water quality impairments for the San Diego River (Lower) from the 2014/2016 CWA Section 303(d) list.

Table 4.9-4. 2014/2016 CWA Section 303(d) Listings for the San Diego River (Lower)

Pollutant	TMDL Completion	Potential Sources
Indicator Bacteria	2011	Unknown sources
Benthic Community Effects	2025	Hydromodification Illicit Connections/illegal hook-ups/ dry weather flows Unknown non-point source Unknown point source Urban runoff/storm sewers
Cadmium	2029	Unknown sources
Dissolved Oxygen	2019	Unknown sources
Total Dissolved Solids	2019	Unknown sources
Total Nitrogen as N	2029	Unknown sources
Total Phosphorus	2019	Unknown sources
Toxicity	2025	Unknown sources

Revised TMDL for Indicator Bacteria

Indicator bacteria is a common impairment for water bodies of the San Diego Region, including the Lower San Diego River. Indicator bacteria such as fecal coliform and enterococcus originate in the intestines of warm-blooded animals. Sources of such bacteria include leaking sewer pipes, wildlife, pet wastes, municipal wastewater treatment plants, and homeless encampments, among other sources. When present in surface water, indicator bacteria may cause gastrointestinal illnesses.

In February of 2010, the San Diego RWQCB adopted Resolution No. R9-2010-0001, an amendment incorporating Revised Bacterial TMDLs Project I into the San Diego Basin Plan. After being approved by the SWRCB, the Office of Administrative Law, and the SEPA, this TMDL Basin Plan Amendment became fully effective in April 2011.

Bacteria TMDLs have been established under the TMDL Basin Plan Amendment for the lower 6 miles of the San Diego River, among 20 other water bodies listed on the 2002 Clean Water Act Section 303(d) List of Water Quality Limited Segments. Bacteria densities in the waters of the Lower San Diego River unreasonably impair and/or threaten to impair the water quality needed to support the beneficial use of waters designated for Contact Recreation (REC-1). Different REC-1 Water Quality Objectives were used as the basis for wet weather and dry weather allowable load because the bacteria transport mechanisms to receiving waters are different under wet and dry weather conditions. Wet weather days are defined as days with rainfall events of 0.2 inches or greater and the following 72 hours. Table 4.9-5 below summarizes the total allowable loads for fecal coliform, total coliform, and enterococcus in the Lower San Diego River. These TMDLs also apply to the Pacific Ocean Shoreline.

Table 4.9-5. TMDLs for San Diego River (Lower)

Indicator Bacteria	Wet Weather: Total Allowable Load or TMDL (billion MPN/year)	Dry Weather: Total Allowable Load or TMDL (billion MPN/year)
Fecal Coliform	4,680,838	1,506
Total Coliform	66,105,222	7,529
Enterococcus[1]	6,590,966	248
	6,595,208	N/A

Notes:
TMDL = total maximum daily load; MPN/year = Most Probable Number per year.
1 The Wet Weather TMDL is calculated using an enterococcus numeric target of 61 MPN/mL that is conservatively protective of the REC-1 "designated beach" usage frequency for freshwater creeks and downstream beaches. If the usage frequency of the freshwater creeks can be established as "moderately to lightly used" in the Basin Plan, alternative TMDLs calculated using an enterococcus numeric target of 104 MPN/mL may be used, for a TMDL of 6,595,208 billion MPN/year.

Federal Antidegradation Policy

The federal Antidegradation Policy (40 CFR 131.12) is designed to protect water quality and water resources. The policy requires states to develop statewide antidegradation policies and identify methods for implementing them. State antidegradation policies and implementation measures must include the following provisions: (1) existing instream uses and the water quality necessary to protect those uses shall be maintained and protected; (2) where existing water quality is better than necessary to support fishing and swimming conditions, that quality shall be maintained and protected unless the state finds that allowing lower water quality is necessary for important local economic or social development; and (3) where high-quality waters constitute an outstanding national resource, such as waters of national and state parks, wildlife refuges, and waters of exceptional recreational or ecological significance, that water quality shall be maintained and protected. State permitting actions must be consistent with the federal Antidegradation Policy.

California Toxics Rule

The California Toxics Rule (CTR) is a federal regulation issued by the EPA providing water quality criteria for potentially toxic constituents in receiving waters with human health or aquatic life designated uses in the State of California (EPA 2000). The EPA adopted the CTR in 2000 to create legally applicable water quality criteria for priority toxic pollutants for inland surface waters, enclosed bays, and estuaries to protect human health and the environment for all purposes and programs under the CWA. The CTR aquatic life criterion were derived using a CWA Section 304(a) method that produces an estimate of the highest concentration of a substance in water which does not present a significant risk to the aquatic organisms in the water and their uses (EPA 2000). The CTR water quality criteria provide a reasonable and adequate amount of protection with only a small possibility of substantial overprotection or under protection. In this document, the CTR criteria are used as one type of benchmark to evaluate the potential impacts of the proposed project on water quality of the receiving waters.

The CTR's numerical aquatic life criteria are expressed as short-term (acute) and long-term (chronic) averages, rather than one number, in order that the criterion more accurately reflect toxicological and practical realities (EPA 2000). Due to the intermittent nature of stormwater runoff, especially in Southern California, the acute criteria are considered to be more applicable to stormwater conditions than chronic criteria and therefore are used in assessing project impacts. Acute criteria represent the highest concentration of a pollutant to which aquatic life can be exposed for a short period of time (1 hour) without deleterious effects; chronic criteria equal the highest concentration to which aquatic life can be exposed for an extended period of time (four days) without deleterious effects.

State

Porter-Cologne Water Quality Control Act

The Porter–Cologne Water Quality Control Act (codified in the California Water Code, Section 13000 et seq.) is the primary water quality control law for California. Whereas the CWA applies to all waters of the United States, the Porter–Cologne Act applies to waters of the state,[1] which includes isolated wetlands and groundwater in addition to federal waters. The Porter-Cologne Act grants the SWRCB and the nine RWQCBs power to protect water quality and is the primary vehicle for implementation of California's responsibilities under the federal CWA. The Porter-Cologne Act also grants the SWRCB and the nine RWQCBs authority and responsibility to adopt plans and policies, to regulate discharges of waste to surface and groundwater, to regulate waste disposal sites, and to require cleanup of discharges of hazardous materials and other pollutants. Further, the Porter–Cologne Act establishes reporting requirements for unintended discharges of any hazardous substance, sewage, or oil or petroleum product.

The act requires a "Report of Waste Discharge" for any discharge of waste (liquid, solid, or otherwise) to land or surface waters that may impair a beneficial use of surface or groundwater of the state. California Water Code Section 13260 subdivision (a) requires that any person discharging waste or proposing to discharge waste, other than to a community sewer system, that could affect the quality of the waters of the state, to file a Report of Waste Discharge with the applicable RWQCB. For discharges directly to surface water (waters of the United States), an NPDES permit is required, which is issued under both state and federal law; for other types of discharges, such as waste discharges to land (e.g., spoils disposal and storage), erosion from soil disturbance, or discharges to waters of the state (such as groundwater and isolated wetlands), Waste Discharge Requirements (WDRs) are required and are issued exclusively under state law. WDRs typically require many of the same Best Management Practices (BMPs) and pollution control technologies as required by NPDES-derived permits.

California Antidegradation Policy

The California Antidegradation Policy, otherwise known as the Statement of Policy with Respect to Maintaining High Quality Water in California, was adopted by the SWRCB (State Board Resolution No. 68-16) in 1968. Unlike the federal Antidegradation Policy, the California Anti-Degradation Policy applies to all waters of the state, not just surface waters. The policy requires that, with limited exceptions, whenever the existing quality of a water body is better than the quality established in individual Basin Plans (see description below), such high quality must be maintained, and discharges to that water body must not unreasonably affect any present or anticipated beneficial use of the water resource.

Water Quality Control Plan for the San Diego Basin

The California legislature has assigned the primary responsibility to administer and enforce statutes for the protection and enhancement of water quality, including the Porter–Cologne Act and portions of the CWA, to the SWRCB and its nine RWQCBs. The San Diego RWQCB implements the Water Quality Control Plan for the San Diego Basin (Basin Plan), which designates beneficial uses, establishes water quality objectives, and contains implementation programs and policies to achieve those objectives for all waters addressed through the plan (California Water Code Sections 13240–13247). The Porter–Cologne Act also provides the RWQCBs with authority to include within their Basin Plan water discharge prohibitions applicable to particular conditions, areas,

[1] "Waters of the state" are defined in the Porter–Cologne Act as "any surface water or groundwater, including saline waters, within the boundaries of the state" (California Water Code, Section 13050(e)).

or types of waste. The Basin Plan is continually updated to include amendments related to implementation of TMDLs, revisions of programs and policies within the San Diego RWQCB region, and changes to beneficial use designations and associated water quality objectives. The Basin Plan is the guiding document that establishes water quality standards for the region.

The Basin Plan for each region provides quantitative and narrative criteria for a range of water quality constituents applicable to certain receiving water bodies and groundwater basins within the San Diego Basin. Specific criteria are provided for the larger, designated water bodies within the region, as well as general criteria or guidelines for ocean waters, bays, and estuaries; inland surface waters; and groundwaters. In general, the narrative criteria require that degradation of water quality not occur due to increases in pollutant loads that will adversely impact the designated beneficial uses of a water body.

Statewide Trash Control Requirements

On April 7, 2015, the SWRCB adopted statewide requirements, referred to as the Trash Amendments, for the implementation of trash controls in priority land uses.[2] The Trash Amendments do the following: (1) establish a narrative water quality objective for trash, (2) establish corresponding applicability, (3) establish a prohibition on the discharge of trash, (4) provide implementation requirements for permitted stormwater and other discharges, (5) set a time schedule for compliance, and (6) provide a framework for monitoring and reporting requirements (SWRCB 2015).

Two compliance tracks are offered, and each municipality may select either compliance track at its discretion. Track 1 requires municipalities to install and maintain full trash capture systems[3] in storm drains that receive runoff from priority land uses (which include commercial development). Track 2 requires the municipality to implement a plan with a combination of full capture systems, multi-benefit projects, institutional controls, and/or other treatment controls to achieve full capture system equivalency. Any new development within the Municipal Separate Storm Sewer System (MS4) permittee's jurisdiction must be built to immediately comply with the compliance track selected by the municipality.

Upon reissuance or amendment, SWRCB and RWQCB MS4 permits will contain trash control implementation requirements and compliance milestones to demonstrate progress towards 100% compliance with the Trash Amendments. The General Permits for Stormwater Discharges Associated with Industrial and Construction Activities will also contain the prohibition of trash in stormwater and non-stormwater discharges when those permits are reissued.

Construction General Permit

For stormwater discharges associated with construction activity in the State of California, the SWRCB has adopted the General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Construction General Permit [CGP]) to avoid and minimize water quality impacts attributable to such activities. The CGP applies to all projects in which construction activity disturbs 1 acre or more of soil. Construction activity subject

[2] On April 7, 2015, the SWRCB adopted (1) an Amendment to the Water Quality Control Plan for the Ocean Waters of California (Ocean Plan) to Control Trash and Part 1 Trash Provisions of the Water Quality Control Plan for Inland Surface Waters, Enclosed Bays, and Estuaries of California, collectively referred to as the "Trash Amendments," and (2) approval of the Final Staff Report, including the Substitute Environmental Documentation. Priority land uses include commercial areas.

[3] Full capture systems for storm drains are defined in the Trash Amendments as treatment controls (either a single device or a series of devices) that traps all particles that are 5 millimeters or greater, and has a design treatment capacity that is either: (a) of not less than the peak flow rate, Q, resulting from a 1-year, 1-hour, storm in the subdrainage area, or (b) appropriately sized to and designed to carry at least the same flows as the corresponding storm drain.

to this permit includes clearing, grading, and disturbances to the ground, such as stockpiling and excavation. The CGP requires the development and implementation of a Stormwater Pollution Prevention Plan (SWPPP), which would specify water quality BMPs designed to reduce or eliminate pollutants in stormwater discharges and authorized non-stormwater discharges from the construction site. Routine inspection of all BMPs is required under the provisions of the CGP, and the SWPPP must be prepared and implemented by qualified individuals as defined by the SWRCB.

To receive coverage under the CGP, a project applicant must submit a Notice of Intent and permit registration documents to the SWRCB. Permit registration documents include completing a construction site risk assessment to determine appropriate coverage level; detailed site maps showing disturbance area, drainage area, and BMP types/locations; the SWPPP; and where applicable, post-construction water balance calculations and active treatment systems design documentation.

Phase II Small MS4 Permit

To enable efficient permitting under both the CWA and the Porter–Cologne Act, the SWRCB and the RWQCBs administer permit programs that group similar types of activities with similar threats to water quality. These "general permit" programs include the Phase II Small MS4 Permit,[4] the CGP, and other general permits for low-threat discharges. SDSU is considered a non-traditional permittee under the Small (Phase II) MS4 Permit. The surrounding municipalities (i.e., the City of San Diego) and California Department of Transportation are subject to a separate Phase I MS4 Permits (Order No. R9-2013-0001, as amended and Water Quality Order No. 2012-0011-DWQ, as amended, respectively).

The Small MS4 Permit consists of several program elements: Program Management, Public Involvement/Participation, Illicit Discharge Detection and Elimination, Construction Site Storm Water Runoff Control, Pollution Prevention/Good Housekeeping for Permittee Operations, Post Construction Storm Water Management for New Development and Re-development, Water Quality Monitoring Requirements, Program Effectiveness Assessment, and Annual Reporting. Besides requiring implementation of construction site BMPs and performance criteria and design guidelines for development within the Small MS4s service area, the Small MS4 Permit also requires operators to map their outfalls, properly maintain the storm drain system, educate the public on pollution prevention, and monitor and report on the quality of MS4 discharges to receiving waters so that the effectiveness of the program can be evaluated. Collectively, the program elements are designed to ensure discharges from the storm drain system do not contain pollutant loads at levels that violate water quality standards and Basin Plan objectives and policies (such as a TMDL for a CWA Section 303(d) impaired water body). Implementation of the program elements are the responsibility of the Small MS4 operator, in this case, SDSU.

Of particular relevance to the proposed project is that the Small MS4 Permit requires Regulated Projects[5] to implement post-construction measures in the form of site design, source control, stormwater treatment measures,

[4] A Small MS4 is defined as a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, man-made channels, or storm drains) that serve populations of less than 100,000 persons.

[5] Regulated Projects are defined in Section E.12.c of Water Quality Order 2013-0001-DWQ, and include all projects that create and/or replace 5,000 square feet or more of impervious surface, not including detached single-family home projects that are not part of a larger plan of development, interior remodels, routine maintenance or repair within the existing footprint, or linear underground/overhead projects.

and baseline hydromodification management measures to reduce the discharge of pollutants in storm-water to the maximum extent practicable. Examples include:

- **Source Control Measures:** Source control measures seek to avoid introduction of water quality pollution/degradation in the first instance. Source control strategies include things like covering refuse/trash areas, properly managing outdoor storage of equipment/materials, minimizing use of pesticides and fertilizers in landscaping, using sumps or special area drains to send non-stormwater discharges to the sewer, ensuring regular grounds maintenance, etc.
- **Site Design Measures:** Site design measures require early assessment and evaluation of how site conditions, such as soils, vegetation, and flow paths will influence the placement of buildings and paved surfaces. The evaluation is used to meet the goals of capturing and treating runoff and maximizing opportunities to mimic natural hydrology. Options for site design measures include preserving trees, buffering natural water features, disconnecting impervious surfaces, and using green roofs or porous pavement.
- **Treatment Control Measures:** Treatment control measures retain, treat and/or infiltrate the site runoff produced under normal circumstances, controlling both the quality and quantity of stormwater released to the stormwater conveyance system and natural receiving waters. In most situations, this means implementing structural BMPs (e.g., infiltration, bioretention and/or rainfall harvest and re-use) to address the volume and rate of runoff produced by 85th percentile storm6 (i.e., design capture volume). The Small MS4 Permit requires regulated projects to prioritize stormwater capture (e.g., infiltration and/or harvest and re-use) unless site conditions (e.g., low-permeability soils) make it infeasible
- **Hydromodification Measures:** Hydromodification measures are required for projects that create or replace 1 or more acres of impervious surfacing so that post-project runoff shall not exceed the estimated pre-project flow rate for the 2-year, 24-hour storm. If the project creates or replaces less than 1 acre of impervious surfaces, and the project demonstrates that post-project flows from the site are less than pre-project flows, then no hydromodification measures from Section E.12.e.(ii)(f) from the Phase II Small MS4 General Permit are required.
- **Operation and Maintenance Requirements:** The Small MS4 Permit requires that maintenance agreements stay in place with each property to ensure permanent treatment control measures developed on site are properly maintained and/or repaired in accordance with the stormwater quality control plan.

The aforementioned site design, treatment control, and hydromodification measures are often collectively referred to as “Low Impact Development” standards (or LID design). The proposed project meets the criteria as a Regulated Project and, thus, is required to comply with the stormwater management requirements of the Small MS4 Permit.

The Small MS4 Permit is administered by the SWRCB, while other general WDRs are administered by the San Diego RWQCB. Point source discharges or other activities that threaten water quality that are not covered under a general permit must seek individual NPDES permits and/or WDRs, depending on the type, location, and destination of the discharge. For these type of discharges, the initial step in the process is to submit a “Report of Waste Discharge” to the San Diego RWQCB, which then determines the appropriate permitting pathway.

SDSU Stormwater Management Plan

Pursuant to Phase II stormwater regulations promulgated under the federal CWA, in 2005 SDSU completed preparation of a Stormwater Management Plan (SWMP). The purpose of the SWMP is to (1) identify pollutant

6 The 85th percentile storm represents a value of rainfall, in inches, such that 85% of the observed 24-hour rainfall totals within the historical record will be less than that value.

sources potentially affecting the quality and quantity of stormwater discharges, (2) provide BMPs for municipal and small construction activities implemented by SDSU staff and contractors, and (3) provide measureable goals for implementation of the SWMP to reduce the discharge of the identified pollutants into the storm drain system and associated waterways.

The goal of the SWMP is to reduce the discharge of pollutants to the maximum extent practicable, as defined by the EPA, and to identify activities or structural improvements that help reduce the quantity and improve the quality of the stormwater runoff. BMPs, which include treatment controls, operating procedures, and practices to control site runoff, have been developed for the SWMP to reduce the discharge of pollutants to the storm drain system to the maximum extent practicable. The BMPs described in the SWMP are to be implemented by SDSU employees and outside contractors. Whenever employees or contractors perform work on the campus, steps outlined in each relevant BMP, or other proven technique that reaches the same goal, must be used in order to ensure compliance with stormwater discharge regulations.

The SWMP addresses both construction and post-construction activities. Construction projects that encompass an area greater than 1 acre must submit a site-specific SWPPP to the San Diego RWQCB. Post-construction stormwater management controls include permanent structural and non-structural BMPs (such as conservation of natural and permeable areas, permeable pavers, rooftop runoff infiltration galleries, and mechanical storm drain filters) that remain in place after the proposed project is completed and prevent pollution from the new development in the long-run.

California Green Building Standards Code (CALGreen)

The 2016 California Green Building Standards Code (CALGreen) as Part 11 of the California Building Standards Code (Title 24), became effective on January 1, 2017. CALGreen measures are designed to improve public health, safety, and general welfare by utilizing design and construction methods that reduce the negative environmental impact of development and encourage sustainable construction practices.

CALGreen provides mandatory direction to developers of all new construction and renovations of residential and nonresidential structures with regard to all aspects of design and construction, including but not limited to site drainage design, stormwater management, and water use efficiency. Required measures are accompanied by a set of voluntary standards that are designed to encourage developers and cities to aim for a higher standard of development.

Under CALGreen, all residential and nonresidential sites are required to be planned and developed to keep surface water from entering buildings and to incorporate efficient outdoor water use measures. Construction plans are required to show appropriate grading and surface water management methods such as swales, water collection and disposal systems, French drains, water retention gardens, and other water measures that keep surface water away from buildings and aid in groundwater recharge. Plans should also include outdoor water use plans that utilize weather or soil moisture-controlled irrigation systems. In addition to the above requirements, nonresidential structures are also required to develop an irrigation water budget for landscapes greater than 2,500 square feet that conforms to the local water efficient landscape ordinance or to the California Department of Water Resources (DWR) Model Water Efficient Landscape Ordinance where no local ordinance is applicable.

Dewatering General Permit

The San Diego RWQCB issued a General Waste Discharge Requirements for Groundwater Extraction Discharges to Surface Waters within the San Diego Region (Order No. R9-2015-0013, NPDES No. CAG919003) (effective October 1, 2015). The General Order regulates groundwater extraction discharges to surface water including construction

dewatering, foundation drains, and groundwater extraction related to groundwater remediation cleanup projects. The General Order does not cover groundwater extraction discharges to land due to construction dewatering, which is regulated under a statewide general order, Statewide General Waste Discharge Requirements for Discharges to Land with a Low Threat to Water Quality (No. 2003-003-DWQ).

The General Order states for groundwater extraction discharges to surface waters, pollutant concentrations in the discharge shall not cause, have a reasonable potential to cause, or contribute to an excursion above any applicable water quality criterion established by the EPA pursuant to CWA Section 303 or adopted by the SWRCB or RWQCBs. In no case shall waste be discharged to areas designated as being of special biological significance. Pollutant concentrations in the discharge must comply with the specifications in the General Order. Effluent limitations for groundwater extraction waste discharges vary based on the receiving water type; the four categories are: freshwater inland surface waters, saltwater inland surface waters, bays and estuaries including San Diego Bay, and the surf zone of the Pacific Ocean. As part of obtaining the Notice of Intent, dischargers must include an initial sampling and monitoring report.

Lake or Streambed Alteration Agreement

The California Department of Fish and Wildlife (CDFW) is responsible for conserving, protecting, and managing California's fish, wildlife, and native plant resources. To meet this responsibility, the law requires the proponent of a project that may impact a river, stream, or lake to notify the CDFW before beginning the proposed project. This includes rivers or streams that flow at least periodically or permanently through a bed or channel with banks that support fish or other aquatic life and watercourses having a surface or subsurface flow that support or have supported riparian vegetation.

Section 1602 of the Fish and Game Code requires any person who proposes a project that will substantially divert or obstruct the natural flow or substantially change the bed, channel, or bank of any river, stream, or lake, or use materials from a streambed, to notify the CDFW before beginning the proposed project. Similarly, under Fish and Game Code Section 1602, before any state or local governmental agency or public utility begins a construction project that will: 1) divert, obstruct, or change the natural flow or the bed, channel, or bank of any river, stream, or lake; 2) use materials from a streambed; or 3) result in the disposal or deposition of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into any river, stream, or lake, it must first notify the CDFW of the proposed project. If the CDFW determines that the proposed project may adversely affect existing fish and wildlife resources, a Lake or Streambed Alteration Agreement is required.

Sustainable Groundwater Management Act

The Sustainable Groundwater Management Act (SGMA) was signed into law in 2014, from a three-bill legislative package, composed of Assembly Bill 1739 (Dickinson), Senate Bill 1168 (Pavley), and Senate Bill 1319 (Pavley). Its purpose is to ensure better local and regional management of groundwater use. The SGMA empowers local agencies to form groundwater sustainability agencies to manage basins sustainably and requires those groundwater sustainability agencies to adopt groundwater sustainability plans for crucial groundwater basins in California. The SGMA requires governments and water agencies of high and medium priority basins to halt overdraft and bring groundwater basins into balanced levels of pumping and recharge. Under the SGMA, these basins should reach sustainability within 20 years of implementing their sustainability plans. For critically over-drafted basins, that will be 2040. For the remaining high and medium priority basins, 2042 is the deadline.

Local

Because SDSU is a component of the California State University (CSU), which is a state agency, the proposed project is not subject to local government planning and land use plans, policies, or regulations. The proposed project would be subject to state and federal agency planning documents described above, but would not be subject to regional or local planning documents such as the City's General Plan, Mission Valley Community Plan, or City municipal zoning code. However, for informational purposes, SDSU has considered the following regulations and plans.

City of San Diego Storm Water Runoff Control and Drainage Regulations

The City of San Diego Storm Water Runoff Control and Drainage Regulations are enforced through issuance of permits for projects under its jurisdictional control. The City's Storm Water Standards Manual is intended to help a project applicant, in coordination with City ~~stormwater program~~ Storm Water Division staff, develop a stormwater quality management plan for a development project (public or private) that complies with local and MS4 Permit requirements (City of San Diego 2016a). As a state agency, CSU/SDSU is not subject to local planning regulations, including those issued by the City of San Diego. Additionally, because SDSU would not obtain building or grading permits from the City, the guidance is not applicable to the proposed project. It should be noted, however, that permits through the Development Services Department may be necessary for any work that is to be done within the City's public right-of-way, such as the replacement of existing corrugated metal pipes.

As CSU/SDSU seeks to conform with local regulations whenever it is feasible to do so, compliance with the water quality and stormwater standards for state-sponsored projects, such as those on the SDSU campus—particularly with respect to the general permit for Small MS4s described above—achieve a similar result to compliance with local development standards.

San Diego River Watershed Management Area Water Quality Improvement Plan

The MS4 Permit requires development of water quality improvement plans (WQIPs) that guide the co-permittees' jurisdictional runoff management programs toward achieving improved water quality in MS4 discharges and receiving waters. A San Diego River WQIP was developed by the Cities of El Cajon, La Mesa, San Diego, and Santee; the County of San Diego; and the California Department of Transportation (Project Clean Water 2019). The San Diego River WQIP assesses the impacts of storm drain discharges on receiving water quality and identifies a list of priority water quality conditions for the watershed. The highest priority water quality condition identified for the San Diego River watershed is bacteria, in both dry and wet weather conditions. Other priority water quality conditions are nitrogen and phosphorus, TDS, eutrophic conditions, and an index of biological integrity in dry weather conditions. Implementation of the WQIP furthers the CWA's objectives to protect, preserve, enhance, and restore the water quality and designated beneficial uses of waters of the state. The requirement sets forth a collaborative and adaptive planning and management process that identifies the highest priority water quality conditions within a WMA and implements strategies through the jurisdictional runoff management programs of the respective jurisdictions.

Model Water Efficient Landscape Ordinance

The City adopted the DWR Model Water Efficient Landscape Ordinance (MWELO; effective September 2009), which became effective in the City in June 2010. Codified in the California Code of Regulations, Title 23 (Waters) Division 2, the DWR Model Ordinance establishes a structure for planning, designing, installing, maintaining, and managing water-efficient landscapes in new construction and remodel projects, in accordance with the Water Conservation in Landscaping Act of 2006. In 2015, Executive Order B-29-15 tasked DWR with revising the 2010 updated MWELO

to increase water efficiency standards for new and retrofitted landscapes through encouraging the use of more efficient irrigation systems, graywater usage, and on-site stormwater capture, and by limiting the portion of landscapes that can be covered in turf.

MWELO requires plans for on-site water management practices and waste prevention strategies that include a calculated annual "Maximum Applied Water Allowance," geared to reduce water use and maximize on-site efficiency. The ordinance is applicable to:

- New construction projects with an aggregate landscape area equal to or greater than 500 square feet requiring a building or landscape permit, plan check, or design review.
- Rehabilitated landscape projects with an aggregate landscape area equal to or greater than 2,500 square feet requiring a building or landscape permit, plan check, or design review.
- Existing landscapes (following a local agency or water purveyor audit).
- Cemeteries (in a limited capacity).

Prior to construction, the ordinance requires property owners and developers to submit a Landscape Documentation Package to their local agency that includes general project information, a water efficient landscape worksheet, soil management report, landscape design plan, irrigation design plan, and a grading plan. Following construction, property owners and developers are required to submit a certificate of completion and additional maintenance forms if there have been changes to the original plans.

Pueblo Water Rights

A Pueblo Right is the "paramount" right of an American City as a successor of a Spanish or Mexican pueblo to the use of water naturally occurring within the old pueblo limits for the use of the inhabitants of a City (*City of Los Angeles v. Pomeroy* (1899) 124 Cal. 597). Furthermore, the Pueblo Right is superior to every other right, including riparian and appropriative rights, and cannot be lost (City of San Diego, 2015b).

A Pueblo Right attaches to the use of all surface and groundwaters of the streams that flowed through an original pueblo, including their tributaries, from their source to their mouth (*City of San Diego v Cuyamaca Water Co.* (1930) 29 Cal. 152). The City of San Diego's Pueblo Rights attaches to the waters of the San Diego River system, including percolating groundwater that is interconnected with the San Diego River (City of San Diego, 2015b).

For any source of water to which its Pueblo right attached, the City of San Diego is entitled to take "to the extent of the needs of its inhabitants." (*Feliz v. Los Angeles* (1881) 58 Cal. 73). As a Pueblo water rights holder, the City of San Diego has the highest priority right to use as much of the native flow of the San Diego River as is reasonably necessary to meet the City's present and future needs (City of San Diego, 2015b).

The SDSU Mission Valley Campus Master Plan project does not propose to divert water from the San Diego River or pump groundwater. Accordingly, it is not expected to affect the City's Pueblo Rights.

4.9.3 Significance Criteria

The significance criteria used to evaluate the project impacts to hydrology and water quality are based on Appendix G of the California Environmental Quality Act (CEQA) Guidelines. According to Appendix G of the CEQA Guidelines, a significant impact related to hydrology and water quality would occur if the project would:

1. Violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality.
2. Substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin.
3. Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:
    a. result in substantial erosion or siltation on or off site;
    b. substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or off site;
    c. 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; or
    d. impede or redirect flood flows
4. In flood hazard, tsunami, or seiche zones, risk release of pollutants due to project inundation.
5. Conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

4.9.4 Impacts Analysis

Would the project violate any water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality?

Construction

Grading would include approximately 913,000 cubic yards of cut and 1,062,000 cubic yards of fill, which would require off-site import to balance the grading quantities.

The analysis of potential impacts of construction activities, construction materials, and non-stormwater runoff on water quality during the demolition and construction phase focuses primarily on sediment (TSS and turbidity) and certain non-sediment-related pollutants. Construction-related activities that primarily result in sediment releases are related to exposing previously stabilized soils to potential mobilization by rainfall/runoff and wind. Such activities include removal of vegetation from the site, grading of the site, and trenching for infrastructure improvements. Environmental factors that affect erosion include topographic, soil, and rainfall characteristics. Erosion and sedimentation affects water quality and interfers with photosynthesis; oxygen exchange; and the respiration, growth, and reproduction of aquatic species. Additionally, other pollutants, such as nutrients, trace metals, and hydrocarbons, can attach to sediment and be transported downstream, which could contribute to degradation of water quality.

Non-sediment-related pollutants that are also of concern during construction relate to construction materials and non-stormwater flows and include construction materials (e.g., paint, stucco); chemicals, liquid products, and

petroleum products used in building construction or the maintenance of heavy equipment; ~~and~~ concrete-related pollutants are also of concern during construction; and existing environmental contamination.

Demolition and construction impacts from project development would be minimized through compliance with the SWRCB's CGP, which is the NPDES General Permit for Storm Water Associated with Construction Activities (Order No. 2009-0009-DWQ, NPDES No. CAS000002). Because the proposed project is greater than 1 acre in size, the applicant would be required to submit a Notice of Intent to the Stae Water Resources Control Board in order to obtain approval to complete demolition and construction activities under the CGP. This permit requires the discharger to perform a risk assessment for the proposed development (with differing requirements based upon the determined level) and to prepare and implement a SWPPP. A Construction Site Monitoring Program that identifies monitoring and sampling requirements during construction is a required component of the SWPPP. The SWPPP is also required to include construction-phase BMPs to be implemented. Typical BMPs that would be implemented during demolition, grading, and construction of the proposed project that would minimize degradation of surface water quality include the following.

Erosion Control

- Physical soil stabilization through hydraulic mulch, soil binders, straw mulch, bonded and stabilized fiber matrices, compost blankets, and erosion control blankets.
- Contain and securely protect stockpiled materials from wind and rain at all times, unless actively being used.
- Soil roughening of graded areas to slow runoff, enhance infiltration, and reduce erosion.
- Vegetative stabilization through temporary seeding and mulching to establish interim vegetation.
- Wind erosion (dust) control through the application of water or other dust palliatives as necessary to prevent and alleviate dust nuisance.

Sediment Control

- Perimeter protection to prevent sediment discharges (e.g., silt fences, fiber rolls, gravel bag berms, sand bag barriers, and compost socks).
- Storm drain inlet protection.
- Sediment capture and drainage control through sediment traps and sediment basins.
- Velocity reduction through check dams, sediment basins, and outlet protection/velocity dissipation devices.
- Reduction in off-site sediment tracking through stabilized construction entrance/exit, construction road stabilization, and/or entrance/exit tire wash.
- Slope interruption at prescribed intervals (e.g., fiber rolls, gravel bag berms, sand bag berms, compost socks, biofilter bags).

Waste and Materials Management

- Management of the following types of materials, products, and wastes: solid, liquid, sanitary, concrete, hazardous, and equipment-related wastes. Management measures include covered storage and secondary containment for material storage areas, secondary containment for portable toilets, covered dumpsters, dedicated and lined concrete washout/waste areas, proper application of chemicals, and proper disposal of all wastes.

- A spill response and prevention program will be incorporated as part of the SWPPP and spill response materials will be available and conspicuously located at all times on site.

Non-stormwater Management

- BMPs or good housekeeping practices to reduce or limit pollutants at their source before they are exposed to stormwater, including such measures as water conservation practices, vehicle and equipment cleaning and fueling practices, illicit connection/discharege elimination, and concrete curing and finishing. All such measures will be recorded and maintained as part of the project SWPPP.

Training and Education

- Inclusion of CGP defined "Qualified SWPPP Developers" (QSD) and "Qualified SWPPP Practitioners" (QSP). QSDs and QSPs shall have required certifications and shall attend State Board sponsored training.
- Training of individuals responsible for SWPPP implementation and permit compliance, including contractors and subcontractors.
- Signage (bilingual, if appropriate) to address SWPPP-related issues (such as site cleanup policies, BMP protection, washout locations, etc.).

Inspections, Maintenance, Monitoring, and Sampling

- Performing routine site inspections and inspections before, during (for storm events > 0.5 inches), and after storm events.
- Where applicable, preparing and implementing Rain Event Action Plans (REAPs) prior to any storm event with 50% probability of producing 0.5 inches of rainfall, including performing required preparatory procedures and site inspections.
- Implementing maintenance and repairs of BMPs as indicated by routine, storm-event, and REAP inspections.
- Implementation of the Construction Site Monitoring Plan for non-visible pollutants, if a leak or spill is detected.
- Where applicable, sampling of discharge points for turbidity and pH, at minimum, three times per qualifying storm event and recording and retention of results.

In addition, in compliance with the CGP, temporary sediment traps would be constructed for areas less than 5 acres each that would remain in a mass graded condition for a temporary period of time. For areas greater than 5 acres, but less than 75 acres, temporary sediment basins would be constructed (Appendix 4.9-3).

Construction of the proposed project may require dewatering. For example, dewatering of captured stormwater may be needed if water has been standing on site and needs to be removed for construction, vector control, or other reasons. Further, dewatering may be necessary if groundwater is encountered during excavations, or to allow discharges associated with testing of water lines, sprinkler systems, and other facilities. However, dewatering of groundwater is generally not allowed under the CGP. If groundwater is encountered and displaced, the pumped groundwater cannot be discharged into surface waters unless the owner applies for a separate Groundwater Dewatering Permit with the Regional Water Quality Control Board (RWQCB) (Order R9-2015-0013, Goundwater Extraction and Similar Discharges to Surface Waters within the San Diego Region). In general, the CGP authorizes other construction-related non-stormwater discharges as long as they (a) comply with Section III.C of the General Permit, (b) do not cause or contribute to violation of any water quality standards, (c) do not violate any other provisions of the General Permit, (d) do not require a non-stormwater permit as issued by some Regional Water

Boards, and (e) are not prohibited by a Basin Plan provision. Through implementation of the requirements outlined in the CGP, construction-related impacts to surface water and groundwater would be minimized and impacts would be **less than significant**.

Operation

Surface Water Quality

Methodology

Any increases in pollutant concentrations resulting from project development are considered an indication of a potentially significant adverse water quality impact. If pollutant loads and concentrations resulting from development are predicted to remain the same or to be reduced when compared with existing conditions, it is concluded that the proposed project would not cause a significant adverse impact to the ambient water quality of the receiving waters for that pollutant (Appendix 4.9-1).

If pollutant loads or concentrations are expected to increase for the operational phase of the proposed project, potential impacts have been assessed by evaluating compliance of the proposed project with applicable regulatory requirements of the Small MS4 Permit. Further, post-development increases in pollutant loads and concentrations have been evaluated by comparing the magnitude of the increase to relevant benchmarks, including receiving water quality objectives and criteria from the San Diego RWQCB Basin Plan and CTR. However, water quality criteria are considered benchmarks for comparison purposes only, as such criteria apply within receiving waters, as opposed to applying directly to runoff discharges. Narrative and numeric water quality objectives contained in the Basin Plan apply to the proposed project receiving waters, including the Lower San Diego River and Murphy Canyon Creek (Appendix 4.9-1).

Water quality criteria contained in the CTR provide concentrations that are not to be exceeded in receiving waters more than once in a 3-year period for those waters designated with aquatic life or human health related uses. Projections of runoff water quality have been compared to the acute form of the CTR criteria, as stormwater runoff is associated with episodic events of limited duration, whereas chronic criteria apply to four-day exposures, which do not describe typical storm events in the project area, which last seven hours on average. If pollutant levels in runoff are not predicted to exceed receiving water benchmarks, it is one indication that no significant impacts would result from project development (Appendix 4.9-1).

Project Impacts

In addition to parks, recreation, and open space areas, including the River Park, the proposed project would include a new multipurpose Stadium, campus structures, campus residential units, campus hospitality, retail space, trolley/transit infrastructure enhancements, parking garages, surface parking, and associated utilities. Based on the 2014 and 2016 Clean Water Act Section 303(d) List of Water Quality Limited Segments, the major sources of pollution in on-site runoff would be contaminants such as oil/grease, other petroleum hydrocarbons, pesticides, trace metals, trash/debris, and pathogens (e.g., bacteria), which that have accumulated on rooftops and other impervious surfaces, such as driveways, parking lots, and pedestrian walkways (Appendices 4.9-1 and 4.9-4).

The proposed project would result in a substantial increase in turf/landscape areas, with a decrease in impervious surfaces from approximately 90% to 57% of the project site. While this increase in vegetation would provide substantial benefits with respect to decreased runoff and increased filtration of incidental contaminant

concentrations, contaminants that may be present in runoff include nitrogen and phosphorous from fertilizers applied to landscaping and turf. Excess fertilizers can impact water quality by promoting excessive and/or a rapid growth of aquatic vegetation, which reduces water clarity and results in oxygen depletion. The San Diego RWQCB Basin Plan includes a water quality objective for biostimulatory substances, which states: "Concentrations of nitrogen and phosphorus, by themselves or in combination with other nutrients, shall be maintained at levels below those which stimulate algae and emergent plant growth" (San Diego RWQCB 2016). The Basin Plan provides specific total phosphorus concentrations allowable in creeks. The Lower San Diego River is listed as impaired for total nitrogen and total phosphorus in the 2014/2016 Clean Water Act Section 303(d) list (Appendix 4.9-1; San Diego RWQCB 2016).

Pesticides can also enter urban runoff after application on landscaped areas, can be toxic to aquatic organisms, and can bioaccumulate in larger species, such as birds and fish. Oil and grease can enter dry-weather and stormwater runoff from vehicle leaks, traffic, and maintenance activities. Metals can enter runoff as surfaces corrode, decay, or leach. Potential gross pollutants associated with operational activities include clippings associated with landscape maintenance, street litter, and pathogens (bacteria). Pathogens (from sanitary sewer overflows, spills and leaks from portable toilets, pets, and human activities) and other potential surface water contaminants could impact downstream beneficial uses, as listed in Table 4.9-1.

Low Impact Development Features

As previously discussed and indicated in Table 2-2, Existing and Proposed Conditions Summary, in Chapter 2, the proposed project would result in a substantial increase in turf/landscape areas, with a decrease in impervious surfaces from 90% (existing) to 57% (post-construction) of the project site. As indicated in Section 2.3.4.3, Parks, Recreational, and Open Space Uses, of Chapter 2, the proposed project would include a River Park, walking paths and trails, and associated open space (Figure 2-9D). Landscaping features, such as paseos, malls, greens, and green space would be interspersed throughout the campus land uses. Implementation of these project features would be consistent with Small MS4 Permit regulations and the SDSU SWMP.

In accordance with the Small (Phase II) MS4 Permit, the proposed project will implement LID standards designed to reduce runoff, treat stormwater, treat dry weather runoff, and provide baseline hydromodification management to the extent feasible to meet the numeric sizing criteria identified in the permit. As described in Chapter 2, Project Description, and as specified in the proposed project hydrology and water quality technical reports (Appendices 4.9-1 through 4.9-4), BMPs incorporated into the proposed project to address surface water quality and hydromodification impacts include LID site design, source control, and stormwater treatment/baseline hydromodification control BMPs. Source control BMPs refer to land use or site planning practices, or structures that aim to prevent urban runoff pollution, by reducing the potential for contamination at the source of pollution. Source control BMPs minimize the contact between pollutants and urban runoff. Stormwater treatment/baseline hydromodification control BMPs are features such as bioswales, infiltration basins, or bioretention basins, which are designed to infiltrate, filter, and/or treat runoff from the proposed project footprint (Appendices 4.9-1 and 4.9-4).

As indicated in Section 2.3.1, Site Constraints (Drainage); Section 2.3.4.6, Utilities and Public Services (Stormwater); and Section 2.3.6, Construction Activities and Phasing, the proposed storm drain system would collect and retain runoff and direct drainage to bio-retention basins, in compliance with MS4 requirements (Figure 4.9-4, LID BMP Drainage Areas). As indicated in this figure, the project site has been divided into nine Drainage Management Areas (DMAs), all of which contain impervious surfaces. The proposed bioretention basins would capture runoff from these areas. A conceptual drawing of a bioretention basin is provided in Figure 4.9-5,

Conceptual Bioretention Basin. In addition to the bioretention basins, lined biofiltration planter boxes would be used throughout the campus (Figure 4.9-6, Conceptual Biofiltration Planter Box) (Appendix 4.9-1).

Based on existing soil conditions, stormwater infiltration has preliminarily been assumed to be infeasible in these bioretention basins. Any potential overflow of the proposed bioretention basins and biofiltration planters, such as that generated during larger storms, would be directed to catchment basins near the southern edge of the project site, which would flow into the existing storm drain outlets located at the southern project boundary (Figure 4.9-7, Proposed Drainage). During the final engineering phase of the proposed project, infiltration feasibility would be assessed based on the City of San Diego Storm Water Standards Manual. If the final design incorporates partial or full infiltration, runoff volumes and pollutant loads would decrease in the post-development condition compared to no infiltration (Appendix 4.9-1).

Biofiltration BMPs, consisting of partial retention and lined bioretention facilities, achieve water quality treatment by filtering captured stormwater through vegetation and layers of treatment media and drainage rock prior to controlled releases through an underdrain and surface outlet structure. Some retention may occur due to incidental evapotranspiration, but the primary means of water quality treatment is through filtration, sedimentation, and biological treatment processes. Bioretention with an underdrain is a volume-based biofiltration BMP that is characterized by a treatment media layer, drainage layer, underdrain at the bottom of the drainage layer, inflow and outflow control structures, vegetation, and an impermeable liner when warranted by site conditions. Flow-through biofiltration BMPs include green roofs, planter boxes, tree well filters, and other types of proprietary bio-filters (Appendix 4.9-1).

The biofiltration BMPs 1A, 1B, 1C, 3, and 5C (Figure 4.9-4, LID BMP Drainage Areas) would be designed to treat the full runoff design control volume, or water quality design volume, providing water quality treatment for the 85th percentile, 24-hour, 2-year storm event, to the maximum extent feasible, based on the maximum feasible footprint for DMA 1A, 1B, 1C, 3, and 5C, respectively. The biofiltration BMPs would not be intended to provide water quality benefit for larger and less frequent storms. The biofiltration BMPs 4 and 5B would use the design control volume reduction gained by implementing street trees in their respective DMAs 4 and 5B to satisfy the design control volume requirements, as determined by the San Diego Storm Water Standards Manual. Furthermore, the excess volume provided in BMP 5C would be used to offset the remaining required volume in BMP 5B. DMA 2 consists of the lower bowl of seating and field of the proposed Stadium. For DMA 2, due to the flow line of the storm drain, the finished grade of the field, and the fixed tie-in point downstream, the proposed project would include a proprietary compact biofiltration system (Appendices 4.9-1 and Appendix 4.9-4).

The drainage design of the proposed project would include routing on-site runoff from the DMAs via the proposed storm drains designed to convey the peak flow rates toward the proposed River Park, where low flow structures would divert runoff for the small and more frequently occurring storms through these permanent pollutant control stormwater BMPs for water quality purposes, then would discharge runoff through each of the three existing storm drain outfalls along the San Diego River (Figure 4.9-7, Proposed Drainage). The proposed project structural LID BMPs would also incorporate full trash capture (Appendices 4.9-1 and 4.9-4).

The bioretention facilities in the proposed River Park would be designed to create and increase habitat to the extent feasible while treating the proposed project stormwater runoff. Consultation would occur with the San Diego Management and Monitoring Program staff or the U.S. Geological Survey staff regarding selection of vegetation materials for the bioretention facilities to maximize habitat and biofiltration. The upper slopes of the project site would be planted with appropriate native or non-native/non-invasive, drought-tolerant vegetation, and the lower

portions of the bioretention facilities would be planted with plant materials that support habitat and are suitable for inundation as part of the biofiltration process (Appendix 4.9-1).

Although the proposed project is only subject to the requirements of the Small (Phase II) MS4 Permit and would not be subject to the requirements of the San Diego Regional MS4 Permit (Order R9-2013-0001), the LID features described above would be consistent with the latter permit requirements, as well as the 2018 City of San Diego Storm Water Standards Manual, where feasible to the maximum extent practicable. SDSU would be responsible for ensuring implementation and funding of maintenance of the permanent BMPs, as described in Section 4.0, Operation and Maintenance Plan, of Appendix 4.9-4. In addition, the water quality design for the proposed roadway improvements adjacent to the proposed project would rely on the use of biofiltration facilities, where feasible, or the use of proprietary biofiltration units (Appendice 4.9-1 and 4.9-4).

Surface Water Quality Modelling

A water quality model was used to estimate pollutant loads and concentrations in project stormwater runoff for certain pollutants of concern for pre-development and post-development conditions, including incorporation of the proposed project LID design, as described above. The water quality model is one the few models that considers the observed variability in stormwater hydrology and water quality by characterizing the probability distribution of observed rainfall event depths, the probability distribution of event mean concentrations, and the probability distribution of the number of storm events per year. These distributions are then sampled randomly to develop estimates of mean annual loads and concentrations. The pollutants of concern for which there are sufficient flow composite sampling data in the databases used for modeling are:

- TSS
- TDS
- Total phosphorus
- Nitrate-nitrogen, nitrate-nitrogen, and ammonia
- Total copper
- Dissolved copper
- Total lead
- Total zinc
- Dissolved zinc (Appendix 4.9-1)

The model incorporates project BMPs, including LID site design, source control, and LID structural BMPs (as previously described), consistent with the Small MS4 Permit requirements. In addition, the model conservatively assumes that the LID structural BMPs would not provide any volume reduction via infiltration and evapotranspiration. Based on the modelling:

1) The Basin Plan objective for TDS in the San Diego River at the project site is 1,500 mg/L. The predicted concentration in project runoff is 0.08 mg/l, which is well below the water quality objective.
2) The Basin Plan water quality objective indicates that total phosphorus concentrations shall not exceed 0.05 mg/L in any stream at the point where it enters any standing body of water. Although the developed condition has a predicted total phosphorus concentration of 0.22 mg/L, this concentration is more than a 40% decrease in concentration from the existing condition concentration of 0.37 mg/L. The modeling results are also conservative because it does not consider source control BMPs that target nutrients, which

would further reduce concentrations and loads of total phosphorous. As a result, the proposed project would decrease the discharge of total phosphorus into Lower San Diego River.

3) All nitrogen compound loads and concentrations are predicted to decrease with project development, except for the concentration of nitrate, which is predicted to increase slightly. There is no specific water quality objective for nitrate listed in the Basin Plan. The Drinking Water Standards Maximum Contaminant Level for nitrate is 10 mg/L as nitrogen. The predicted nitrate concentration in treated stormwater of 0.62 mg/l is well below this Maximum Contaminant Level.
4) Loads and concentrations for all metals are predicted to decrease with project development. Although metals concentrations in project discharges are predicted to be greater than the average observed concentrations in the Lower San Diego River, project discharges for all metals are predicted to be less than the CTR criteria (Appendix 4.9-1).

Additional Qualitative Water Quality Analysis

In addition, post-development stormwater runoff water quality impacts associated with the following pollutants of concern were addressed, based on literature information and professional judgement, as available data were not deemed sufficient for modeling:

- Turbidity
- Pathogens (bacteria, viruses, and protozoa)
- Pesticides
- Petroleum hydrocarbons (oil and grease, polycyclic aromatic hydrocarbons) (Appendix 4.9-1)

The following qualitative conclusions were reached:

1) Stormwater discharges from the project site could potentially exceed the Basin Plan Fecal Indicator Bacteria objectives for the San Diego River in the absence of BMPs. However, the Fecal Indicator Bacteria concentrations in runoff from the proposed project would be reduced, through the implementation of source control and LID structural BMPs, in comparison to existing conditions. The proposed project sewers would be designed to current standards, which would minimize the potential for leaks. In addition, the proposed project LID structural BMPs selected to manage pollutants of concern would not result in substantial changes in pathogen indicator levels compared to the existing condition that would cause a violation of the water quality objectives or waste discharge requirements, or otherwise substantially degrade water quality in the receiving waters.

2) Given that many pesticides exhibit toxicity at very low concentrations, the most effective control strategy is source control and compliance with regulations limiting outdoor applications. Structural treatment controls are less practical because of the variety of pesticides and wide range of chemical properties that affect their ability to treat these compounds. However, most pesticides are relatively insoluble in water and therefore tend to adsorb to the surfaces of sediment, which would be stabilized with development. In addition, biofiltration media contains sorption sites that would promote the removal of pesticides. Thus, treatment in the LID structural BMPs would achieve some removal of pesticides from stormwater as TSS is reduced and stormwater is biofiltered.

3) Petroleum hydrocarbons in urban runoff are primarily associated with transportation activities. Source control BMPs that address petroleum hydrocarbons include educational materials on oil disposal and

recycling programs. Supplemental to this strategy would be utilization of LID structural BMPs that will further reduce petroleum hydrocarbons in runoff, as these compounds tend to be adsorbed to particulates and therefore amenable to LID structural BMPs that incorporate processes such as settlement, filtration, and/or adsorption (Appendix 4.9-1).

Conclusion

Effective management of wet and dry weather runoff water quality begins with limiting increases in runoff pollutants and flows at the source. LID design and source control BMPs are practices designed to minimize runoff and the introduction of pollutants into runoff. LID treatment control/baseline hydromodification control BMPs are designed to remove pollutants following mobilization by rainfall and runoff and to reduce changes to runoff volume to the extent practicable. SDSU would be responsible for ensuring implementation and funding of maintenance of the permanent BMPs, as described in detail in Section 4.0, Operation and Maintenance Plan, of Appendix 4.9-4. Based on the quantitative (i.e., modeled) and qualitative water quality analysis, in combination with incorporation of proposed LID design, source control BMPs, and structural BMPs, as described above, water quality impacts during project operations would be **less than significant**.

Groundwater Quality

Discharge from the proposed project's developed areas to groundwater may occur in two ways: (1) through infiltration of urban runoff in the proposed LID BMPs after treatment; and (2) infiltration of urban runoff, after treatment in the proposed project BMPs, in the Lower San Diego River. Research conducted on the effects on groundwater from stormwater infiltration indicate that the potential for contamination is dependent on a number of factors, including the local hydrogeology and the chemical characteristics of the pollutants of concern. Pollutant characteristics that influence the potential for groundwater impacts include high mobility (low absorption potential), high solubility fractions, and abundance in runoff, including dry weather flows. As a class of constituents, trace metals tend to absorb onto soil particles and are filtered out by soils. This has been confirmed by extensive data collection beneath stormwater detention/retention ponds that showed that trace metals tend to be adsorbed in the upper few feet in the bottom sediments. Bacteria are also filtered out by soils. More mobile constituents such as chloride and nitrate would have a greater potential for groundwater impacts due to infiltration (Appendix 4.9-1).

As a result, nitrate is the primary pollutant of concern with respect to groundwater quality during project operations. High nitrate levels in drinking water can cause health problems in humans, including methemoglobinemia (blue-baby syndrome) in infants. Human activities and land use practices can influence nitrogen concentrations in groundwater. For example, irrigation water containing fertilizers can increase levels of nitrogen in groundwater. The Basin Plan objective for nitrate in groundwater in the project area is 10 mg/L, as nitrogen. As previously discussed, the predicted nitrate concentration in runoff after treatment in the BMPs is 0.62 mg/L as nitrogen, which is well below the groundwater quality objective (Appendix 4.9-1). Therefore, infiltration of post development stormwater runoff would not cause significant adverse groundwater quality impacts. As such, project operational impacts to groundwater quality would be **less than significant**.

Would the project substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin?

Construction

Groundwater is present at a depth of 7 to 9 feet in the vicinity of the proposed River Park and as deep as 38 feet in the vicinity of the existing SDCCU Stadium. Groundwater would not likely be encountered during proposed Stadium excavations, as final finished subgrades of the proposed Stadium would be at an elevation of 56 to 60 feet AMSL, with groundwater elevations of 37 to 49 feet. As a result, groundwater levels would be 7 to 23 feet below finished stadium Subgrade levels; see Table 4.9-6, Proposed Stadium Distance to Groundwater (Appendix 4.9-6).

Table 4.9-6. Proposed Stadium Distance to Groundwater

Stadium Level	Finished Subgrade Elevation (feet)	Measured Elevation of Groundwater (feet)	Distance between Finished Subgrade and Groundwater Level (feet)
Field Level	56 (cut)	37 – 49	7 – 19
Service Level: Loading Dock	56 (cut)	37 – 49	7 – 19
Service Level: Locker Room	60 (cut)	37 – 49	11 – 23
Main Concourse	87 (fill)	37 – 49	38 – 50

Note: The distance between finished subgrade and groundwater level is an approximate range specific to the Development Areas.
Source: Appendix 4.9-6.

Within the proposed campus office, research, and innovation area, buildings would have up to two levels of garage parking. Average finished subgrades of the proposed garages would be at an elevation of 56 to 70 feet AMSL, with groundwater elevations of 38 to 52 feet. As a result, groundwater levels would be 15 to 30 feet below finished garage subgrade levels; see Table 4.9-7, Project Components Distance to Groundwater (Appendix 4.9-6).

Table 4.9-7. Project Components Distance to Groundwater

Campus Component	Average Finished Subgrade Elevation (feet)	Measured Elevation of Groundwater (feet)	Distance between Finished Subgrade and Groundwater Level (feet)
Education, research, entrepreneurial zone (with parking garage)	55 (cut)	38 – 40	15 – 17
Stadium zone (with garage parking)	75 (cut)	45 – 48	27 – 30
Hotel and conference center	85 (fill)	43 – 49	36 – 42
Residential – North (R1 to R9)	70 (cut)	44 – 47	23 – 26
Residential – South (R10 to R15)	65 (cut)	44 – 52	13 – 21

Note: The distance between finished subgrade and groundwater level is an approximate range specific to the Development Areas.
Source: Appendix 4.9-6.

However, it is possible that groundwater could be encountered during excavations, due to seasonal variations in shallow groundwater levels, necessitating dewatering. In addition, groundwater management may be necessary during pile driving for the Stadium and to allow discharges associated with testing of water lines, sprinkler systems and other facilities (Appendices 4.9-1 and 4.9-6). Prior to construction, further site-specific testing will occur to further determine groundwater levels, soil conditions, and the need for dewatering. Dewatering BMPs, such as dewatering tanks or weir tanks that will hold the excavated groundwater, may be used during the construction

phase (Appendix 4.9-6). All dewatering would be conducted in compliance with the California NPDES CGP (Order No. 2009-009-DWQ, as amended by Order 2010-0014-DWQ and 2012-006-DWQ) and the San Diego RWQCB's General Waste Discharge Requirements for Groundwater Extraction Discharges to Surface Waters within the San Diego Region (Order No. R9-2015-0013, NPDES No. CAG919003). The CGP authorizes construction dewatering activities and other construction-related non-stormwater discharges as long as they (a) comply with Section III.C of the General Permit~~.~~; (b) do not cause or contribute to violation of any water quality standards, (c) do not violate any other provisions of the General Permit, (d) do not require a non-stormwater permit as issued by some Regional Water Boards, and (e) are not prohibited by a Basin Plan provision.

In addition, any construction dewatering would be temporary and would represent negligible quantities with respect to available groundwater beneath the site. As a result, dewatering would not substantially decrease groundwater supplies such that the proposed project would impede sustainable groundwater management of the basin. Impacts would be **less than significant**.

Operation

The project site is largely dominated by paved surface parking and is largely impervious. Implementation of the proposed project would reduce the impervious surfaces from approximately 90% (existing) to 57% (post-construction) of the total project area and would result in greater opportunity for groundwater recharge, resulting in beneficial impacts. No direct dewatering discharges are expected during operations, as finished subgrades would be designed to be above the groundwater table. If needed, permanent dewatering discharges would be managed to prevent impacts to the San Diego River by recharging the dewatering back to groundwater at a suitable location on the project site (Appendix 4.9-6). Further, structural LID BMPs would be lined to prevent impacts to groundwater unless it is determined in the design phase of the proposed project that infiltration is desirable at the specific BMP locations. As a result, project operations would not substantially interfere with groundwater recharge such that the proposed project would impede sustainable groundwater management of the basin. Impacts would be **less than significant**.

Would the project substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:

a. result in substantial erosion or siltation on or off site;

Although the internal drainage patterns would be somewhat altered as a result of project development, the proposed project would maintain the existing outfall structures in the post-construction condition (Figure 4.9-2, Existing Drainage System, and Figure 4.9-7, Proposed Drainage). The proposed project would entail minor alterations to the existing stormwater drainage system so this system can better filter and convey the site's runoff to the San Diego River. The project site consists almost entirely of paved surfaces. Once under construction, these paved surfaces would be removed, which will help to encourage natural, on-site percolation and will have an immediate effect of reducing runoff from the site. No part of the construction effort would alter the course of a stream or river, or result in substantial erosion or siltation.

In the post-development conditions, placement of impervious surfaces will serve to stabilize soils and to reduce the amount of erosion that may occur from the proposed project during storm events and will therefore decrease turbidity in runoff from the proposed project. Project BMPs, including source controls (such as common area landscape management and common area litter control) and LID structural BMPs in compliance with the Small MS4 Permit, would prevent or reduce the release of organic materials and nutrients (which might contribute to algal blooms) to receiving waters. Based on implementation of post-construction

project BMPs, runoff discharges from the proposed project will not cause a substantial increase in erosion, and therefore, the proposed project would not result in substantial erosion or siltation on or off site. Impacts would be **less than significant**.

b. substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or off site;

Construction

Because the proposed project would entail an overall reduction in impervious surface throughout construction, no portion of project construction would result in increased runoff that could cause flooding on or off site. Construction would not necessitate or result in any alterations to Murphy Canyon Creek, the San Diego River, or other unnamed drainages that traverse the site. By systematically taking out the impervious surface that is currently on the proposed project site, the site will serve to attenuate more water on site and may reduce run-off quantities leaving the site throughout construction. Therefore, even during construction, the proposed project will help reduce off-site flooding due to the immediate infiltration effect of removal of impervious surfaces. The proposed project would have a positive impact on flooding issues when compared to the existing conditions; therefore, impacts would be **less than significant**.

Operation

Based on hydrologic analyses completed for the proposed project (Appendices 4.9-2 and 4.9-3), peak stormwater flows were estimated for on-site runoff associated with the 50- and 100-year frequency storm event, in the existing and proposed condition, to assess changes in peak runoff as a result of the proposed project. Post-construction, the proposed River Park would serve as a floodplain buffer between the San Diego River and the developed portions of the proposed project, which would be constructed on building pads elevated above the floodplain levels. As previously discussed, the drainage design for the proposed project includes routing on-site runoff through permanent stormwater quality basins (Figure 4.9-4, LID BMP Drainage Areas), followed by conveyance through proposed pipe drainage systems and discharge through the existing storm drain outfalls. Water quality basins are designed to treat a "low-flow" storm event to address pollutant loads. Flows in excess of the "low-flow" would bypass the basin and be conveyed directly to the storm drain outlets. Therefore, for the purpose of flood condition modeling, the water quality basins were assumed to be full/clogged, and the storage capacity of the basins was excluded from the model (Appendix 4.9-2).

As previously discussed, the existing outfalls for drainage systems A, B, and C penetrate through an 84- to 96-inch diameter sanitary sewer main paralleling the north bank of the San Diego River (Figure 4.9-7, Proposed Drainage). These outfalls would not be modified. The proposed drainage system would similarly tie into these existing outfalls. Flow in excess of the capacity of Outfalls B and C are designed to pond aboveground before discharge, similar to the existing condition. Flow in excess of the capacity of Outfall A would be conveyed in a constructed channel to Outfall D. Similar to the existing condition, the diameter of the three proposed major storm drain outfalls to the San Diego River will be the limiting factor of the drainage systems' discharge capacity in the proposed condition (Appendix 4.9-2). The on-site improvements along with the adjacent improvements associated with Street 'A,' portions of Mission Village Drive/Street 'F,' and portions of Street 'I' would comingle and discharge south to the San Diego River. The adjacent improvements associated with Friars Road, San Diego Mission Road, and portions of Street "I"

will be conveyed by separate, existing storm drain systems to the two Murphy Canyon Channel outfalls. (Appendix 4.9-1).

The proposed project would result in a substantial increase in turf/landscape areas, with a decrease in impervious surfaces from approximately 90% to 57% of the project site. Pervious surfaces allow infiltration of stormwater runoff into on-site soils, thus reducing runoff volumes and discharge rates. The increased pervious surfaces would consist of the planned River Park and biofiltration BMPs, which would retain the volume of stormwater runoff produced from the 85th percentile, 24-hour storm event (water quality design volume), to the maximum extent feasible. The water quality model previously described (Appendix 4.9-1) incorporates project BMPs, including LID site design, source control, and LID structural BMPs, consistent with the Small MS4 Permit requirements. Site design BMPs would further reduce stormwater runoff volume. However, the model conservatively assumes that the LID structural BMPs would not provide any volume reduction via infiltration and evapotranspiration. Implementing partially or fully infiltrating BMPs, which may occur as part of the buildout of the proposed project if site conditions are favorable, would result in even more runoff volume reduction from the proposed project compared to the pre-development condition (Appendices 4.9-1 and 4.9-4).

Regardless of the lack of stormwater runoff volume reduction as a result of the biofiltration basins, the total post-project peak flow would be substantially lower than the total pre-project peak flow, resulting in a net decrease in peak flow rates and volume of runoff (Appendix 4.9-2). Because the proposed project would reduce the peak flow rate from the area and volume of runoff, the proposed project would result in beneficial impacts with respect to stormwater runoff and associated flooding. Impacts are considered **less than significant**.

c. 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.

As discussed for (b), above, because the proposed project would reduce the peak flow rate from the area and volume of runoff, the proposed project would result in beneficial impacts with respect to stormwater runoff. As a result, the proposed project would not create or contribute runoff water that would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional source of polluted runoff. Impacts are considered **less than significant**.

d. impede or redirect flood flows?

The proposed project site is designated as FEMA "Zone A" along the eastern perimeter adjacent to Murphy Canyon Creek and FEMA "Zone AE" along the southern perimeter adjacent to the San Diego River. Development regulations differ for a watercourse with a Zone AE designation compared to a Zone A designation. For a Zone AE floodplain and floodway, development in the floodway is generally discouraged and must preclude a rise in the 100-year water surface elevation. Development in the flood fringe (area within the floodplain, but outside the floodway) is allowed subject to San Diego Municipal Code Section 143.0145(f). Proposed project development would avoid encroachment into the floodway that would increase water surface elevations, and would also meet the San Diego Municipal Code floodplain and floodway regulations. Since the San Diego River floodplain and floodway are defined based on detailed engineering methods, project development would adhere to applicable floodplain and floodway regulations associated with the San Diego River. Additional hydraulic analyses are not required at the current design development stage to assist in understanding development constraints guided by the regulations (Appendix 4.9-5).

A triangular portion of the San Diego River floodway currently encroaches into the Stadium parking lot (Figure 4.9-3, Existing Flood Zones). Development in the triangular area would not be allowed to increase the 100-year water surface elevation. During final engineering, map revisions may be processed through FEMA in an attempt to remove the triangular floodway area and eliminate the associated restrictions (Appendix 4.9-5).

For Zone A, the floodplain along the San Diego River has been delineated based on detailed engineering analysis. However, the Murphy Canyon Creek floodplain is based on approximate information, since detailed engineering has not been performed. The Flood Insurance Rate Map indicates that the 100-year flood flow overflows the banks of Murphy Canyon Creek, approximately 0.5 miles north of Friars Road. The spillover becomes surface runoff that re-enters the project site near the KMEP MVT access road. The runoff then continues south across the stadium parking lot to the San Diego River. The proposed project would convey the spillover flow within the proposed River Park (Figure 4.9-8, Post Development Flood Zones). Under proposed conditions, the model shows that flows would spill out of the approaching open channel at the upstream end of the box culverts. The spill would occur at flows above 2,600 cubic feet per second (cfs). Since the 100-year flow approaching the culverts is 3,500 cfs, the spillover is approximately 900 cfs (Appendix 4.9-5).

No structures would be built within this floodway or within any other portion of the 100-year flood zone. The River Park will serve as a floodplain buffer between the San Diego River and the developed portions of the proposed project, which will be constructed on pads elevated above the floodplain depths. Therefore, all structures would be set back from the natural floodplain. As a result, the proposed project would not impede or redirect flood flows at the site. Impacts are considered **less than significant**.

In flood hazard, tsunami, or seiche zones, would the project risk release of pollutants due to project inundation?

Construction and Operation

Seiches are oscillations in an enclosed body of water caused by seismic shaking. Because no structures would be located in proximity to the San Diego River, the closest body of water, the proposed project would not be susceptible to damage by seiches. Similarly, considering the project site's elevation ranges from approximately 50 feet to 80 feet, and is approximately 7 miles east of the Pacific Ocean, the proposed project would not be susceptible to inundation by a tsunami.

As previously discussed, the project site is designated as FEMA "Zone A" along the eastern perimeter adjacent to Murphy Canyon Creek and FEMA "Zone AE" along the southern perimeter adjacent to the San Diego River. No structures would be built within this floodway or within any other portion of the 100-year flood zone. The River Park will serve as a floodplain buffer between the San Diego River and the developed portions of the proposed project, which will be constructed on pads elevated above the floodplain depths. Therefore, all structures would be set back from the natural floodplain. In addition, with the exception of sto rage of minor quantities of petroleum products and hazardous materials, the proposed project would not include industrial facilities that typically store large quantities of such materials. As a result, the proposed project would not risk release of pollutants due to project inundation. Impacts are considered **less than significant**.

Would the project conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan?

Construction

Construction activities such as demolition of existing structures (e.g., existing Stadium) and grading, excavation, and trenching for construction of proposed facilities would expose soils, slopes, and construction equipment/materials to stormwater runoff. Construction site runoff can contain soil particles and sediments from these activities. Dust from construction sites also can be transported to other nearby locations where the dust can enter runoff or water bodies. Spills or leaks from heavy equipment and machinery, staging areas, or building sites also can enter runoff. Typical pollutants could include petroleum products and heavy metals from equipment, as well as products such as paints, solvents, and cleaning agents, which could contain hazardous constituents. Sediment from erosion of graded or excavated surface materials, leaks or spills from equipment, or inadvertent releases of construction materials could result in water quality degradation if runoff containing the sediment entered receiving waters in sufficient quantities to exceed Basin Plan water quality objectives.

As CSU/SDSU seeks to conform with local regulations whenever it is feasible to do so, compliance with the water quality and stormwater standards for state-sponsored projects, such as those on the SDSU campus—particularly with respect to the general permit for Small MS4s described above—achieve a similar result to compliance with local development standards. The proposed project would be required to prepare a SWPPP, in accordance with the NDPES CGP, which will include a risk determination and list the appropriate water quality BMPs that will be used to protect stormwater quality throughout the construction phase. Additionally, the SWPPP must contain a visual monitoring program and a chemical monitoring program for "non-visible" pollutants to monitor the effectiveness of the selected BMPs. The SWPPP will be required to demonstrate that the construction activities will not violate discharge prohibitions, effluent limitations, and water quality standards as outlined in the CGP. As such, with implementation of the SWPPP, construction of the proposed project would not conflict with or obstruct the Basin Plan.

As discussed in Section 4.9.1.7, Groundwater, the proposed project overlies the Mission Valley Groundwater Basin. Currently no significant withdrawals are conducted due to the petroleum plume from the KMEP MVT (Appendix 4.9-1). The groundwater plume spread to approximately 50% of the area below the SDCCU Stadium parking lot. (Refer to EIR Section 4.8, Hazards and Hazardous Materials.) In San Diego County, the state has designated four of the County's basins as medium-priority and subject to the SGMA: Borrego Valley, San Diego River Valley, San Luis Rey Valley, and San Pasqual Valley (County of San Diego 2018). As such there is no Groundwater Sustainability Plan for the Mission Valley Groundwater Basin at this time. Thus, the Mission Valley Groundwater Basin would not be subject to a sustainable groundwater management plan, mandated by the SGMA for DWR basins determined to be of medium to high priority. As noted above, the proposed project is not expected to violate any water quality standards and with measures that would be taken during construction, including implementation of a SWPPP in compliance with the NPDES CGP. The proposed project would not conflict with or obstruct implementation of the Basin Plan; **no impact** would occur.

Operation

Changes in impervious areas created and non-point source pollutants associated with proposed land uses could alter the types and levels of pollutants that could be present in project site runoff. Runoff from building rooftops, driveways, and landscaped areas can contain non-point source pollutants such as sediment, trash, oil, grease, heavy metals, pesticides, herbicides, and/or fertilizers. In compliance with the Small MS4 Permit, the proposed

project campus development must implement stormwater quality control and flow control BMPs. Project BMPs, including source controls (such as common area landscape management and common area litter control) and LID structural BMPs in compliance with the Small MS4 Permit, will prevent or reduce the release of organic materials and nutrients (which might contribute to algal blooms) to receiving waters. As such, the proposed stormwater treatment devices would be sufficient to avoid substantial polluted runoff from the site. Furthermore, any pollutant sources would be limited to non-point sources such as trash/debris and sediment. As such, the proposed project is not expected to violate any water quality standards and measures would be taken such that the proposed project would not conflict with or obstruct implementation of the Basin Plan; **no impact** would occur.

The project site itself is approximately 90% impervious in the existing condition; therefore, there are no natural drainage pathways to maintain. The proposed project would the implement LID retention BMPs to retain the volume of stormwater runoff to the maximum extent feasible. Further, although the proposed project would alter the existing drainage of the parking lot, the intent is to more closely mimic the conditions that existed at the project site prior to development of the current SDCCU Stadium and parking lot. Stormwater runoff will discharge through the same outfalls to the San Diego River as in the existing condition, so potential recharge through the San Diego River channel will also increase. Considering the Mission Valley Groundwater Basin is not subject to a sustainable groundwater management plan or GSP mandated by the SGMA for DWR basins, and the proposed project would implement LID retention BMPs, the proposed project would not conflict with or obstruct a water quality control plan or sustainable groundwater management plan; **no impact** would occur.

Would the project result in a cumulative impact to hydrology and water quality?

Construction and Operation

The proposed project, along with other projects occurring in the area, would be required to comply with applicable federal, state, and local water quality regulations. The proposed project, along with other projects of greater than 1 acre (which includes most of the projects in the cumulative scenario), would be required to obtain coverage under the NPDES CGP, which requires project proponents to identify and implement stormwater BMPs that effectively control erosion and sedimentation and other construction-related pollutants. Further, nearly all projects identified in the cumulative scenario would meet the definition of "new development and redevelopment projects" under the San Diego County MS4 Permit. Such projects are required to implement site design; source control; and, in some cases, treatment control BMPs to control the volume, rate, and water quality of stormwater runoff from the proposed project during long-term operations. Because adverse water quality and major hydrologic alterations are linked to large-scale development projects and industrial and agricultural land uses, the provisions within the various NPDES permits seek to address cumulative conditions.

The anticipated quality of effluent from the proposed project BMPs will not contribute concentrations of pollutants of concern that would be expected to cause or contribute to a violation of the water quality objectives for the proposed project's surface receiving waters. In addition, the proposed project's LID BMPs would control stormwater discharges in accordance with the Small MS4 Permit and Phase II Permit requirements for hydromodification control. Therefore, the proposed project's incremental effects on surface water quality and hydromodification would be less than significant, and not cumulatively considerable.

Cumulative impacts to water quality and hydromodification resulting from the proposed project and any future development similar to the proposed project in the watershed are addressed through compliance with the MS4 PermitsCGP; and benchmark Basin Plan water quality objectives, CTR criteria, and CWA 303(d) listings, which are intended to be protective of beneficial uses of the receiving waters. Based on compliance with these requirements

designed to protect beneficial uses, the cumulative water quality and hydromodification impacts would be **less than significant** and thus **not cumulatively considerable**.

4.9.5 Summary of Impacts Prior to Mitigation

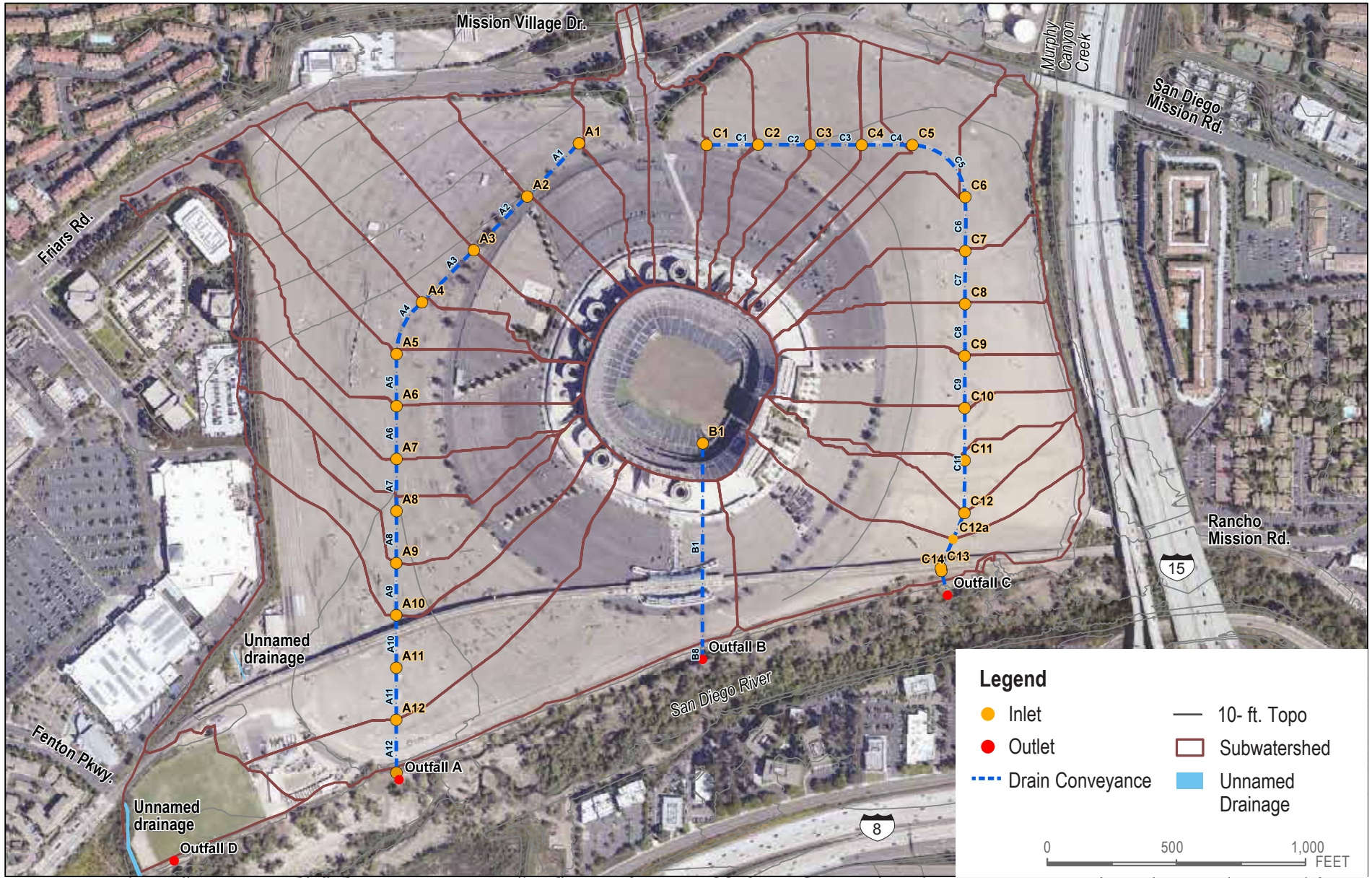
Impacts to hydrology and water quality would be **less than significant**.

4.9.6 Mitigation Measures

Because all potential impacts of the proposed project would be less than significant as a result of compliance with applicable laws and regulations and the implementation of corresponding project design features and BMPs, no mitigation measures are required.

4.9.7 Level of Significance After Mitigation

The combination of source control, site design features (e.g., landscaping and green rooftops), and biofiltration BMPs to be incorporated into the proposed project are adequate to avoid or substantially reduce potential impacts associated with increases in the rate, volume, and/or pollutant load of surface runoff to the San Diego River. There are no mitigation measures required; therefore, project impacts related to hydrology and water quality would remain **less than significant**.



SOURCE: GEOSYNTEC CONSULTANTS 5/21/2019

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Figure 4.9-1

Existing Hydrology Features

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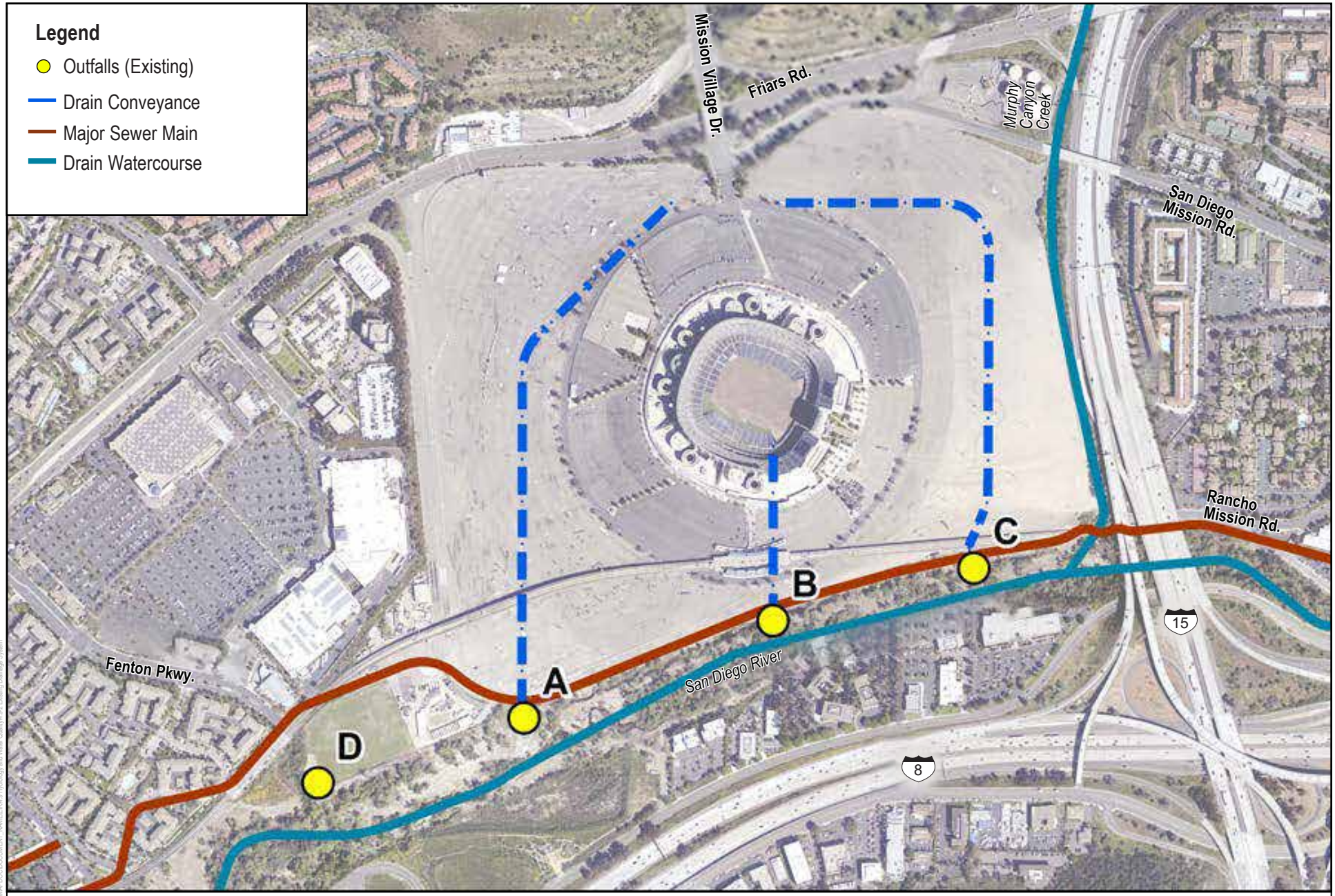

SOURCE: GEOSYNTEC CONSULTANTS 5/21/2019

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Figure 4.9-2

Existing Drainage System

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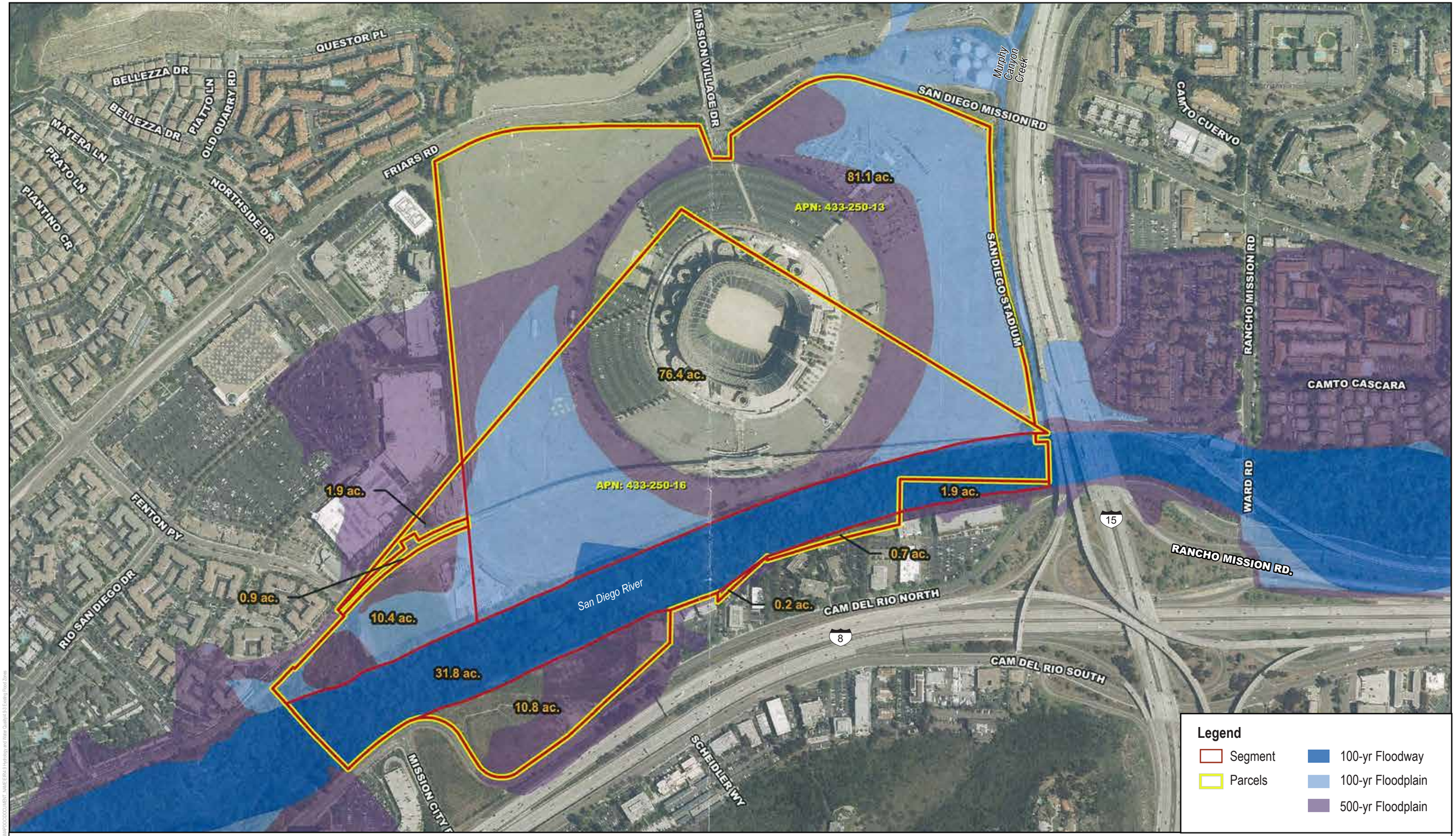

SOURCE: RICK ENGINEERING 4/8/2015

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0 500 1,000 FEET

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Figure 4.9-3
Existing Flood Zones

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SOURCE: RICK ENGINEERING 4/8/2015

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0 500 1,000 FEET

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Figure 4.9-4
LID BMP Drainage Areas

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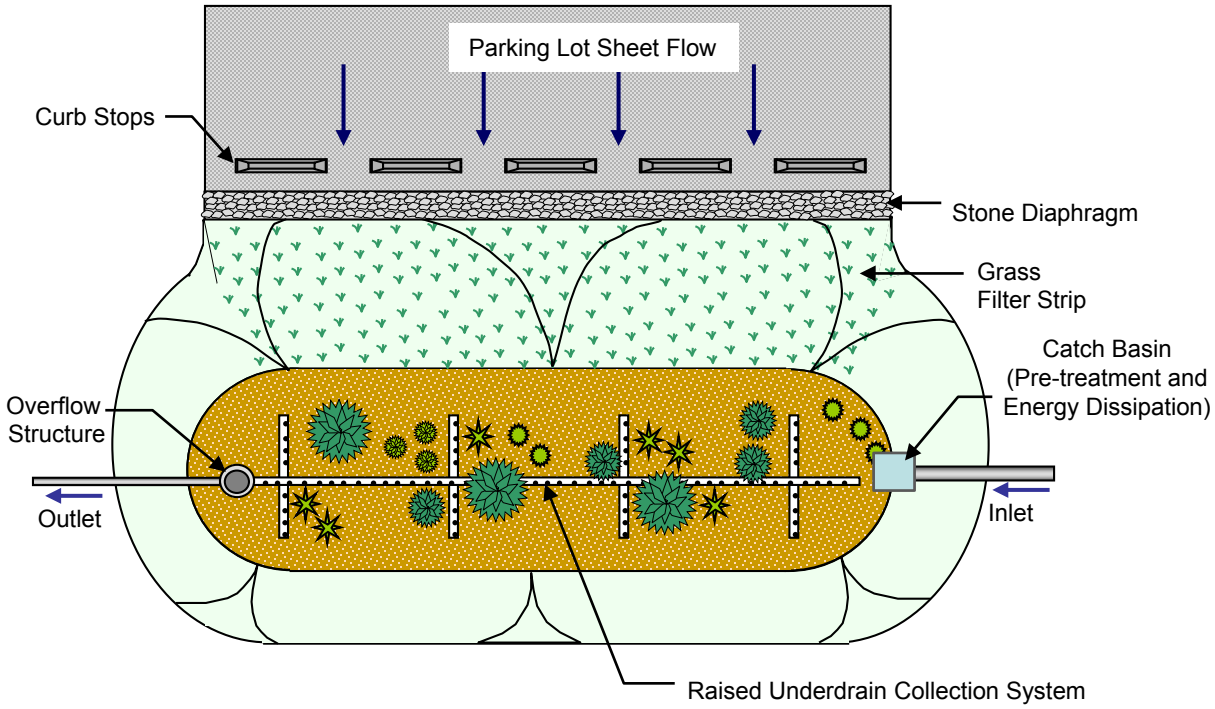
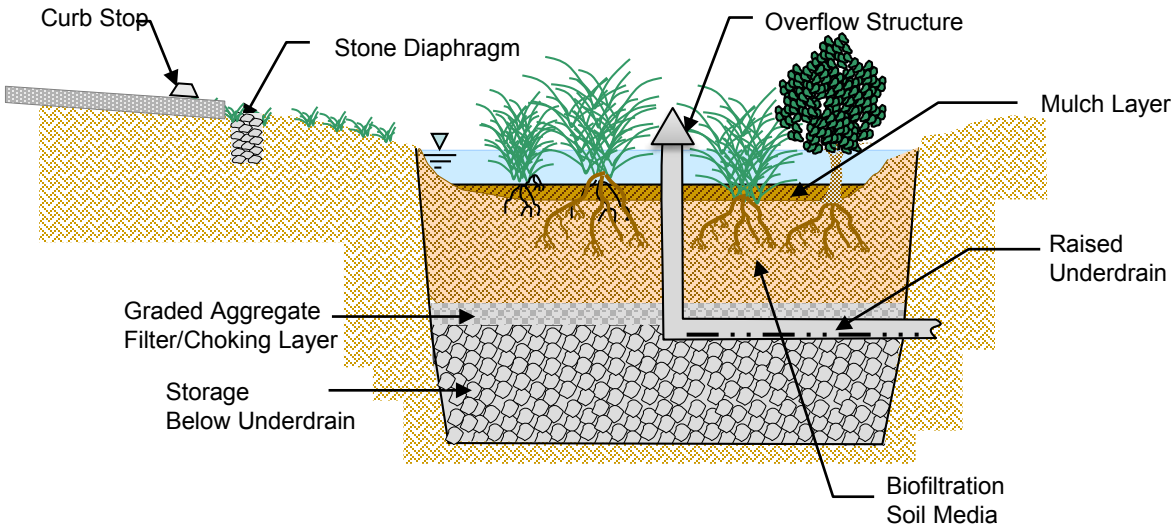
Plan View



Profile



SOURCE: GEOSYNTEC CONSULTANTS 5/21/2019

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Figure 4.9-5

Conceptual Bio Retention Basin

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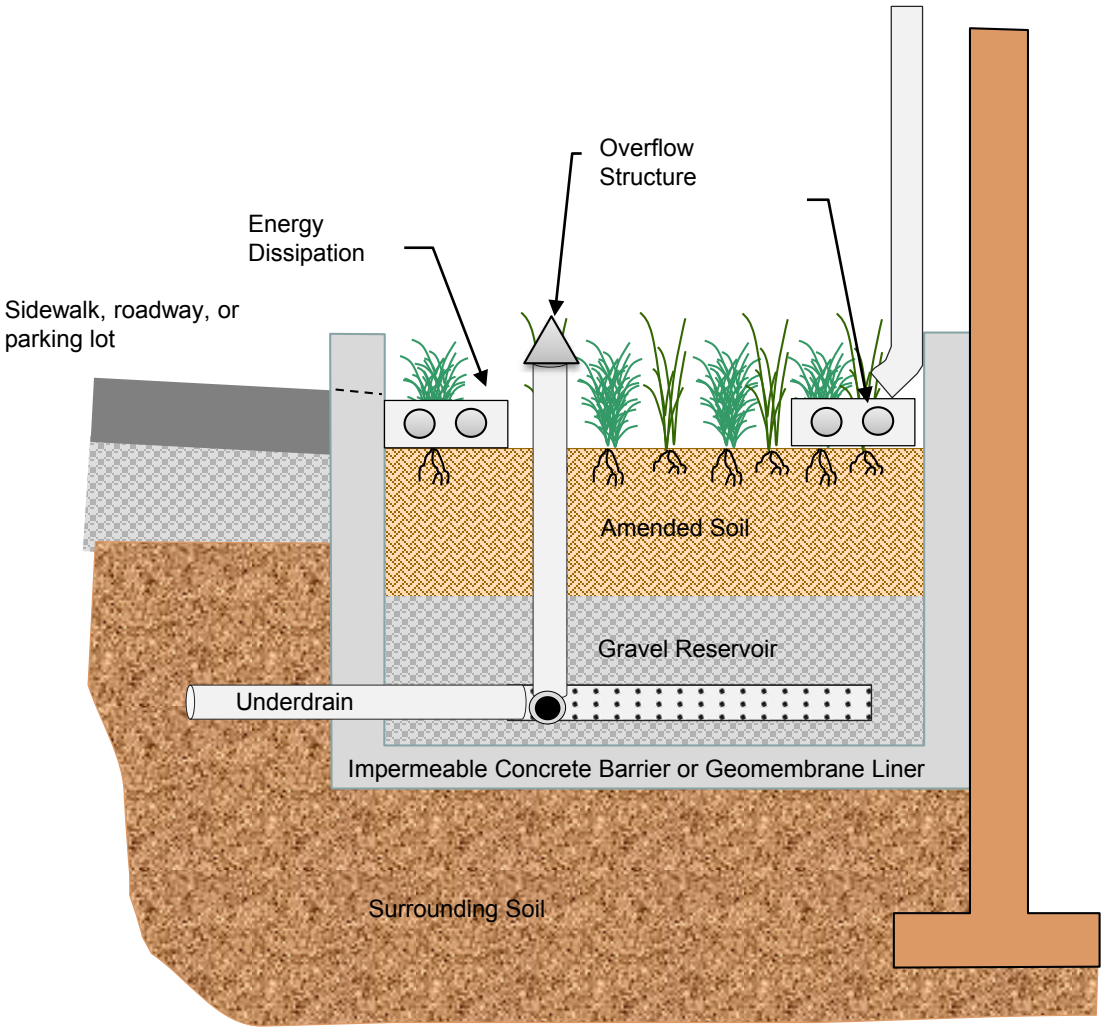
Profile



SOURCE: GEOSYNTEC CONSULTANTS 5/21/2019

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Figure 4.9-6

Conceptual Bio Filtration Planter Box

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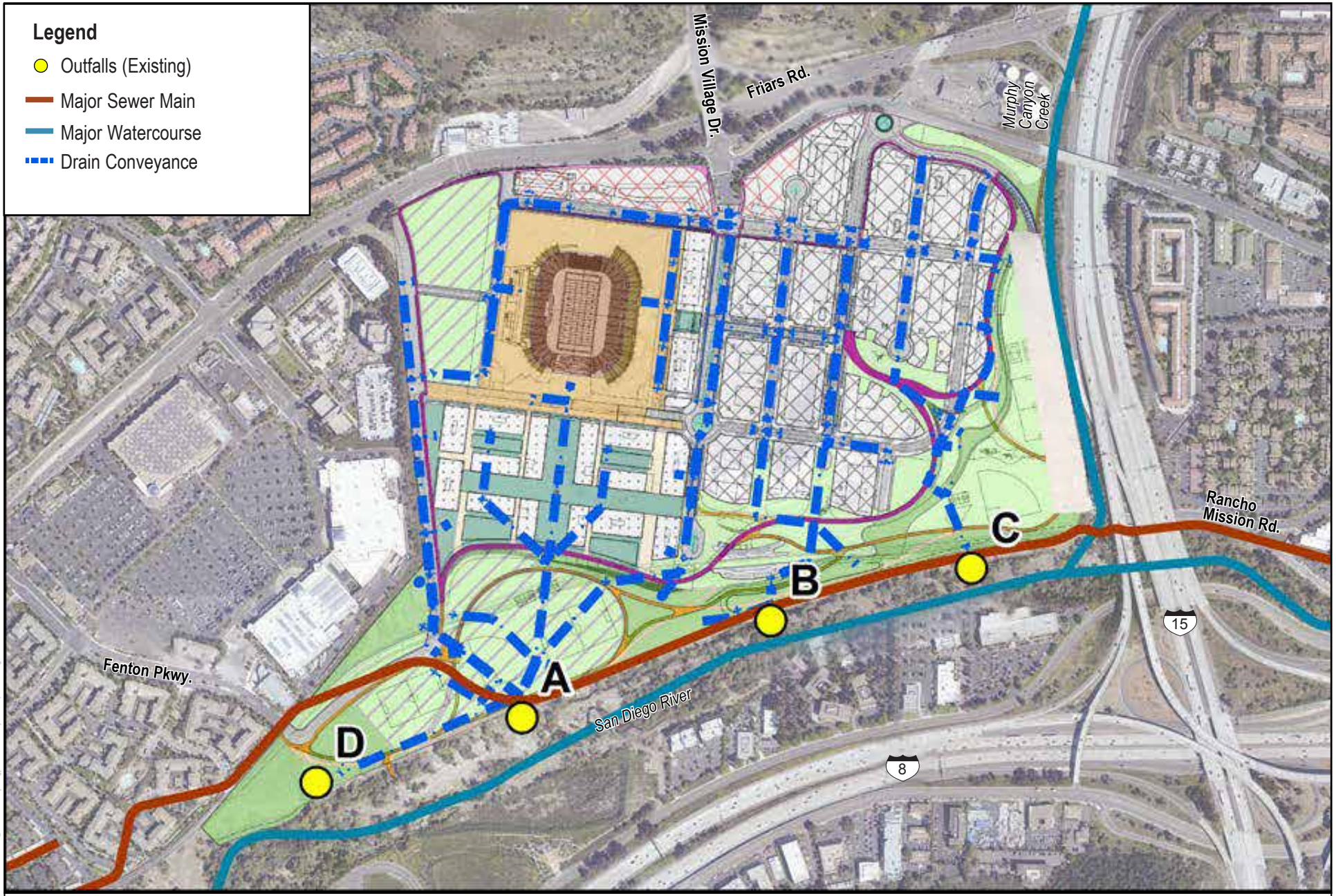

SOURCE: GEOSYNTEC CONSULTANTS 5/21/2019

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Figure 4.9-7

Proposed Drainage

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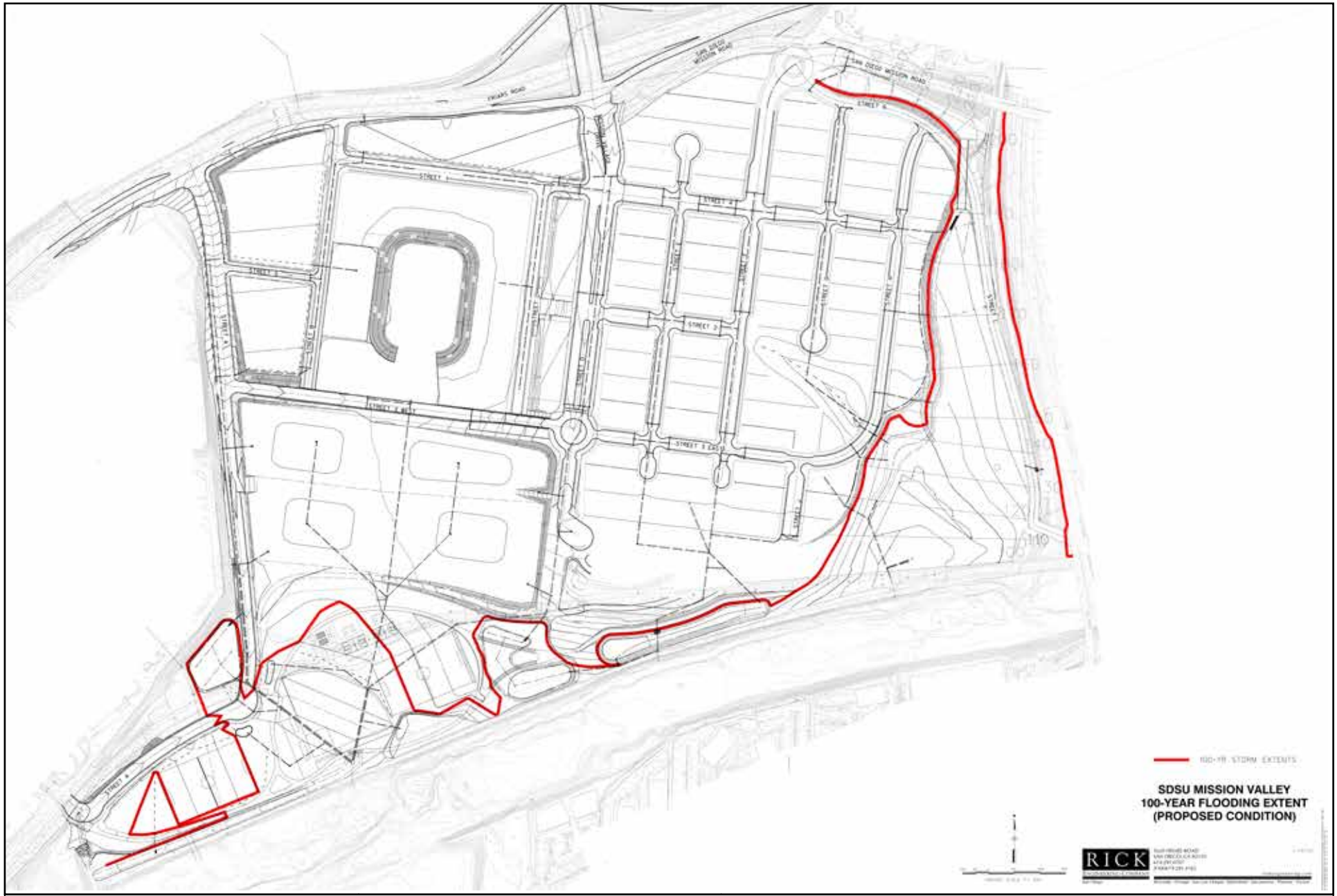

SOURCE: RICK ENGINEERING / JULY 2019

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Figure 4.9-8

Post Development Flood Zones

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