Appendix F

Water Resources Technical Report

FUSCOE ENGINEERING

PASEO MARINA

WATER RESOURCES TECHNICAL REPORT

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County of Los Angeles, California

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1. INTRODUCTION

1.1. PROJECT DESCRIPTION

The Paseo Marina project ("Project") is a mixed-use development project on an approximately 6.05-acre site ("Project Site") located at the intersection of Maxella Avenue and Glencoe Avenue in the City of Los Angeles. The Project Site is bordered to the north by the Tierra del Rey Apartments and the Villa Velletri Townhouses, to the west by Gelsons and AMC and the Stella Apartments, to the east by Pavilions and to the south by Hotel MdR Marina del Rey – a Double Tree by Hilton.

The Project Site is currently occupied by several retail buildings and surface parking lots. The existing land uses cover a total 100,781 square feet (SF) including restaurant area (8,532 SF) and commercial area (92,249 SF). The retail buildings include a Barnes and Noble, a DSW Designer Shoe Warehouse, and various other restaurants and office uses. The site is relatively flat with grade sloping gently to the south and east.

The Project will entail the demolition and removal of all existing onsite land uses. The proposed development will include two options (Options A and Option B), which are described in the following paragraphs.

Option A would consist of three seven-story buildings with an approximate maximum height of 77 feet, and would contain a total of 658 multi-family residential units. The residential units would include studio (97 units), one-bedroom (386 units) and two-bedroom (175 units) apartments. The Project's ground-level would include neighborhood-serving commercial uses, comprising of 27,300 SF of retail space including restaurants (13,650 SF) and general retail (13,650 SF). Two levels of above-grade retail parking would be provided as well as two levels of subterranean parking for residents.

Option B proposes the construction of 425 multi-family residential units. The residential units would include studio (63 units), one-bedroom (231 units), and two-bedroom (131 units) apartments. The project would also include 90,000 square feet of office space, and 40,000 square feet of neighborhood-serving commercial uses. The commercial uses are anticipated to consist of 20,000 square feet of retail, and 20,000 square feet of restaurants. As with Option A, Option B would also consist of three buildings. The two proposed multi-family residential buildings would be comprised of seven stories, while the office building would include four stories. One level of above-grade parking would be provided, as well as two levels of subterranean parking for residents.

1.2. SCOPE OF WORK

As part of the environmental impact report (EIR) for the Project, this report will describe the existing and proposed surface water hydrology, surface water quality, and groundwater at the Project Site and immediate surrounding areas, as well as an analysis of the Project's potential impacts on each of these water resources.

For the purpose of this report, the collective Project (Option A or Option B) components (residential, retail and restaurants) will be analyzed and considered as one project.

2. REGULATORY FRAMEWORK

2.1. SURFACE WATER HYDROLOGY

County of Los Angeles Hydrology Manual

Per the City of Los Angeles (City)'s Special Order No. 007-1299, December 3, 1999, the City has adopted the Los Angeles County (County) Department of Public Works Hydrology Manual as its basis of design for storm drainage facilities. The Hydrology Manual requires that a storm drain conveyance system be designed for at least a 10-year storm event. Areas with sump conditions are required to have a storm drain conveyance system capable of conveying flow from a 50-year storm event. The County also limits the allowable discharge into existing storm drain facilities based on the MS4 Permit and is enforced on all new developments that discharge directly into the County's storm drain system. Any proposed drainage improvements of County owned storm drain facilities such as catch basins and storm drain lines requires the approval/review from the County Flood Control District department.

The Los Angeles County Department of Public Works Hydrology Manual (January 2006) establishes the Los Angeles County Department of Public Works' hydrologic design procedures based on historic rainfall and runoff data collected within the county. The hydrologic techniques in the manual apply for the design of local storm drains, retention and detention basins, pump stations, and major channel projects.

The proposed Project is required to utilize the 2006 Hydrology Manual and accompanying hydrologic tools including HydroCalc Calculator to calculate existing and proposed discharges and volumes from the Project.

Los Angeles Municipal Code

Any proposed drainage improvements within the street right-of-way or any other property owned by, to be owned by, or under the control of the City requires approval through the B-Permit process (Section 62.105, LAMC). Through the B-Permit process, storm drain installation plans which include any connections to the City's storm drain system from a property line to a catch basin or storm drain pipe, are subject to review and approval by the City of Los Angeles Department of Public Works, Bureau of Engineering.

2.2. SURFACE WATER QUALITY

Clean Water Act

Controlling pollution of the nation's receiving water bodies has been a major environmental concern for more than three decades. Growing public awareness of the impacts of water pollution in the United States culminated in the establishment of the federal Clean Water Act[1] (CWA) in 1972, which provided the regulatory framework for surface water quality protection.

The United States Congress amended the CWA in 1987 to specifically regulate discharges to waters of the United States from public storm drain systems and storm water flows from industrial facilities, including construction sites, and require such discharges be regulated through permits under the National Pollutant Discharge Elimination System (NPDES).[2] Rather than setting numeric effluent limitations for storm water and urban runoff, CWA regulation calls for the implementation of Best Management Practices (BMPs) to reduce or prevent the discharge of pollutants from these activities to the Maximum Extent Practicable

[1] Also referred to as the Federal Water Pollution Control Act of 1972.
[2] CWA Section 402(p).

(MEP) for urban runoff and meeting the Best Available Technology Economically achievable (BAT) and Best Conventional Pollutant Control Technology (BCT) standards for construction storm water. Regulations and permits have been implemented at the federal, state, and local level to form a comprehensive regulatory framework to serve and protect the quality of the nation's surface water resources.

In addition to reducing pollution with the regulations described above, the CWA also seeks to maintain the integrity of clean waters of the United States – in other words, to keep clean waters clean and to prevent undue degradation of others. As part of the CWA, the Federal Anti-Degradation Policy [40 Code of Federal Regulations (CFR) Section 131.12] states that each state "shall develop and adopt a statewide anti-degradation policy and identify the methods for implementing such policy…" [40 CFR Section 131.12(a)]. Three levels of protection are defined by the federal regulations:

1. Existing uses must be protected in all of the Nation's receiving waters, prohibiting any degradation that would compromise those existing uses;
2. Where existing uses are better than those needed to support propagation of aquatic wildlife and water recreation, those uses shall be maintained, unless the state finds that degradation is "…necessary to accommodate important economic or social development" [40 CFR Section 131.12(a)(2)]. Degradation, however, is not allowed to fall below the existing use of the receiving water; and
3. States must prohibit the degradation of Outstanding National Resource Waters, such as waters of national and state parks, wildlife refuges, and waters of exceptional recreation or ecological significance.

Federal Anti-Degradation Policy

The Federal Anti-Degradation Policy (40 CFR 131.12) requires states to develop statewide anti-degradation policies and identify methods for implementing them. Pursuant to the CFR, state anti-degradation policies and implementation methods shall, at a minimum, protect and maintain (1) existing in-stream water uses; (2) existing water quality, where the quality of the waters exceeds levels necessary to support existing beneficial uses, unless the state finds that allowing lower water quality is necessary to accommodate economic and social development in the area; and (3) water quality in waters considered an outstanding national resource.

Porter-Cologne Water Quality Act

In the State of California, the State Water Resources Control Board (SWRCB) and local Regional Water Quality Control Boards (RWQCBs) have assumed the responsibility of implementing the United States Environmental Protection Agency's (USEPA) NPDES Program and other programs under the CWA such as the Impaired Waters Program and the Anti-Degradation Policy. The primary quality control law in California is the Porter-Cologne Water Quality Act (Water Code Sections 13000 et seq.). Under Porter-Cologne, the SWRCB issues joint federal NPDES Storm Water permits and state Waste Discharge Requirements (WDRs) to operators of municipal separate storm sewer systems (MS4s), industrial facilities, and construction sites to obtain coverage for the storm water discharges from these operations.

California Anti-Degradation Policy

The California Anti-Degradation 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 Anti-degradation, Policy, the California Anti-Degradation Policy applies to all waters of the State, not just surface waters. The policy states that whenever the existing quality of a water body is better than the quality established in individual Basin Plans, such high quality shall be maintained and discharges to that water body shall not unreasonably affect present or anticipated beneficial use of such water resource.

California Toxic Rule

In 2000, the EPA promulgated the California Toxic Rule, which establishes water quality criteria for certain toxic substances to be applied to waters in the State. The EPA promulgated this rule based on the EPA's determination that the numeric criteria are necessary in the State to protect human health and the environment. The California Toxic Rule establishes acute (i.e., short-term) and chronic (i.e., long-term) standards for bodies of water such as inland surface waters and enclosed bays and estuaries that are designated by the Los Angeles Regional Water Quality Control Board (LARWQCB) as having beneficial uses protective of aquatic life or human health.

Board Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties

As required by the California Water Code, the LARWQCB has adopted a plan entitled "Water Quality Control Plan, Los Angeles Region: Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties" (Basin Plan). Specifically, the Basin Plan designates beneficial uses for surface and groundwaters, sets narrative and numerical objectives that must be attained or maintained to protect the designated beneficial uses and conform to the state's anti-degradation policy, and describes implementation programs to protect all waters in the Los Angeles Region. In addition, the Basin Plan incorporates (by reference) all applicable state and Regional Board plans and policies and other pertinent water quality policies and regulations. Those of other agencies are referenced in appropriate sections throughout the Basin Plan.

NPDES Permit Program

The NPDES permit program was first established under authority of the CWA to control the discharge of pollutants from any point source into the waters of the United States. As indicated above, in California, the NPDES stormwater permitting program is administered by the SWRCB through its nine RWQCBs.

The General Permit for Construction Activities

SWRCB Order No. 2009-0009-DWQ known as "General Permit" was adopted on September 2, 2009 and was amended by Order No 2012-0006-DWQ which became effective on July 17, 2012. This NPDES permit establishes a risk-based approach to stormwater control requirements for construction projects by identifying three project risk levels. The main objectives of the General Permit are to:

1. Reduce erosion
2. Minimize or eliminate sediment in stormwater discharges
3. Prevent materials used at a construction site from contacting stormwater
4. Implement a sampling and analysis program
5. Eliminate unauthorized non-stormwater discharges from construction sites
6. Implement appropriate measures to reduce potential impacts on waterways both during and after construction of projects
7. Establish maintenance commitments on post-construction pollution control measures

California mandates requirements for all construction activities disturbing more than one acre of land to develop and implement Stormwater Pollution Prevention Plans (SWPPP). The SWPPP documents the selection and implementation of BMPs for a specific construction project, charging Owners with stormwater quality management responsibilities. A construction site subject to the General Permit must prepare and implement a SWPPP that meets the requirements of the General Permit.

As part of the Project, preparation, and implementation of a SWPPP will be required. In addition, the Project will be required to obtain a Waste Discharger Identification Number (WDID) through the State's Storm Water Multiple Application and Report Tracking System (S.M.A.R.T.S.).

Los Angeles County Municipal Storm Water System (MS4) Permit

As described previously, USEPA regulations require that MS4 permittees implement a program to monitor and control pollutants being discharged to the municipal system from both industrial and commercial projects that contribute a substantial pollutant load to the MS4.

On December 13, 2001, the LARWQCB adopted Order No. 01-182 under the CWA and the Porter-Cologne Act. This Order is the NPDES Permit or MS4 permit for municipal stormwater and urban runoff discharges within Los Angeles County. The requirements of this Order (the "Permit") cover 84 cities and most of the unincorporated areas of Los Angeles County. Under the Permit, the LACFCD is designated as the Principal Permittee. The Permittees are the 84 Los Angeles County cities (including the City of Los Angeles) and unincorporated areas within Los Angeles County. Collectively, these are the "Co-Permittees". The Principal Permittee helps to facilitate activities necessary to comply with the requirements outlined in the Permit but is not responsible for ensuring compliance of any of the Permittees.

Since adoption of Order No. 01-182, the LARWQCB has seen adopted Order No. R4-2012-0175, as amended by State Water Board Order WQ 2015-0075 NPDES Permit No. CAS004001 on November 8, 2012. This current permit will expire on December 28, 2017.

The City of Los Angeles is a Permittee of the California Regional Water Quality Control Board, Los Angeles Region, and is therefore subject to the requirements set forth in Order No. R4-2012-0175, as amended by State Water Board Order WQ 2015-0075, NPDES Permit No. CAS004001.

Los Angeles Municipal Code

Section 64.70 of LAMC sets forth the City's Stormwater and Urban Runoff Pollution Control Ordinance. The ordinance prohibits the discharge of the following items into any storm drain systems:

- Any liquids, solids, or gasses which by reason of their nature or quantity are flammable, reactive, explosive, corrosive, or radioactive, or by interaction with other materials could result in fire, explosion, or injury.
- Any solid or viscous materials, which could cause obstruction to the flow or operation of the storm drain system.
- Any pollutant that injures or constitutes a hazard to human, animal, plant, or fish life, or creates a public nuisance.
- Any noxious or malodorous liquid, gas, or solid in sufficient quantity, either singly or by interaction with other materials, which creates a public nuisance, hazard to life, or inhibits authorized entry of any person into the storm drain system.
- Any medical, infectious, toxic, or hazardous material or waste.

Earthwork activities, including grading, are overseen by the Los Angeles Building Code, which is contained in Los Angeles Municipal Code (LAMC), Chapter IX, Article 1. Section 91.7013 contains regulations pertaining to erosion control and drainage devices and Section 91.7014 provide requirements for flood, mudflow protection and general construction requirements.

Standard Urban Stormwater Mitigation Plan (SUSMP)

Under the current Los Angeles County Municipal NPDES Permit, permittees are required to implement a development planning program to address storm water pollution. These programs require project applicants for certain types of projects to implement Standard Urban Stormwater Mitigation Plans (SUSMP) throughout the operational life of their projects. The purpose of SUSMP is to reduce the discharge of pollutants in storm water by outlining BMPs which must be incorporated into the design plans of new development and redevelopment.

The Project falls within the definition of "redevelopment" under the MS4 Storm Water Permit which requires compliance with the Low Impact Development (LID) requirements and SUSMP requirements.

Low Impact Development

LID is a stormwater strategy that is used to mitigate the impacts of runoff and stormwater pollution as close to its source as possible. Urban runoff discharged from municipal storm drain systems is one of the principal causes of water quality impacts in most urban areas. The stormwater may contain pollutants such as trash and debris, bacteria and viruses, oil and grease, sediments, nutrients, metals, and toxic chemicals that can negatively affect the ocean, rivers, plant and animal life, and public health.

LID encompasses a set of site design approaches and BMPs that are designed to address runoff and pollution at the source. These LID practices can effectively remove nutrients, bacteria, and metals, while reducing the volume and intensity of stormwater flows.

The Project is subject to compliance of Order No. R4-2012-0175, which became effective on November 8, 2012. The main purpose of this law is to ensure that development and redevelopment projects mitigate runoff in a manner that captures or treats rainwater at its source, while utilizing natural resources.

In accordance with Order No. R4-2012-0175, stormwater runoff shall be infiltrated, evapotranspired, captured and used, or treated through high removal efficiency BMPs, onsite, through stormwater management techniques that comply with provisions of the City of Los Angeles Development Best Management Practices Handbook.

The City of Los Angeles published *Planning and Land Development Handbook for Low Impact Development (LID Handbook) 5th Edition*. The *LID Handbook* was adopted by the City of Los Angeles, Board of Public Works on May 9, 2016, as authorized by Section 64.72 of the Los Angeles Municipal Code approved by Ordinance No. 183833. Section 4 of the *LID Handbook* includes requirements for BMP prioritization of BMP selection. The order of priority is specified below:

1. Infiltration Systems,
2. Stormwater Capture and Use,
3. High Efficiency Biofiltration/Bioretention Systems,
4. Combination of Any of the Above

Hydromodification

In addition to the LID requirements listed in the Permit, the Permit also addresses requirements for Hydromodification as pertaining to the project. Per Part VI.D.7.c.iv of the Permit:

"Each Permittee shall require all New Development and Redevelopment projects located within natural drainage systems as described in Part VI.D.7.c.iv.(1)(a)(iii) to implement hydrologic control measures, to prevent accelerated downstream erosion and to protect stream habitat in natural drainage systems. The purpose of the hydrologic controls is to minimize changes in post-development hydrologic storm water runoff discharge rates, velocities, and duration. This shall be achieved by maintaining the project's pre-project stormwater runoff flow rates and durations."

However, per Part VI.D.7.c.iv.(1)(b)(iv) of the Permit, the project is exempt from such requirements as runoff from the site is discharged directly via storm drain to a receiving water that is not susceptible to hydromodification impacts. Ballona Creek and Marina del Rey harbor are categorized as not susceptible to hydromodification. Therefore, the project is not required to implement hydrologic control measures as mitigation for hydromodification impacts. In addition, implementation of the project will result in a reduction of peak flows and volumes as compared to existing conditions, thereby satisfying hydromodification requirements in addition to the receiving water exemption.

2.3. GROUNDWATER

California Groundwater Sustainability Act

On Sept. 16, 2014, California Governor Jerry Brown signed into law a three-bill legislative package, known as the Sustainable Groundwater Management Act of 2014 (SGMA). The SGMA provides a framework for sustainable management of groundwater supplies by local authorities, with a limited role for state intervention only if necessary to protect the resource.

The SGMA requires the formation of local groundwater sustainability agencies (GSAs) that must assess conditions in their local water basins and adopt locally-based management plans. The act provides substantial time – 20 years – for GSAs to implement plans and achieve long-term groundwater sustainability. It protects existing surface water and groundwater rights and does not impact current drought response measures.

The California Water Commission (CWC) requires a statewide prioritization of California's groundwater basins using the following eight criteria:

1. Overlying population;
2. Projected growth of overlying population;
3. Public supply wells;
4. Total wells;
5. Overlying irrigated acreage;

6. Reliance on groundwater as the primary source of water;
7. Impacts on the groundwater; including overdraft, subsidence, saline intrusion, and other water quality degradation; and
8. Any other information determined to be relevant by the Department.

The Project Site is located within a medium priority California Statewide Groundwater Elevation Monitoring groundwater basin. GSAs responsible for high-and medium-priority basins must adopt groundwater sustainability plans within five to seven years, depending on whether the basin is in critical overdraft. Agencies may adopt a single plan covering an entire basin or combine a number of plans created by multiple agencies. Preparation of groundwater sustainability plans is exempt from CEQA. Plans must include a physical description of the basin, including groundwater levels, groundwater quality, subsidence, information on groundwater-surface water interaction, data on historical and projected water demands and supplies, monitoring and management provisions, and a description of how the plan will affect other plans, including city and county general plans. Plans will be evaluated every five years.

Board Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties

As required by the California Water Code, the LARWQCB has adopted a plan entitled "Water Quality Control Plan, Los Angeles Region: Basin Plan for the Coastal Watersheds of Los Angeles and Ventura Counties" (Basin Plan). Specifically, the Basin Plan designates beneficial uses for surface and groundwaters, sets narrative and numerical objectives that must be attained or maintained to protect the designated beneficial uses and conform to the state's anti-degradation policy, and describes implementation programs to protect all waters in the Los Angeles Region. In addition, the Basin Plan incorporates (by reference) all applicable state and regional board plans and policies and other pertinent water quality policies and regulations. Those of other agencies are referenced in appropriate sections throughout the Basin Plan.

The Basin Plan is a resource for the LARWQCB and others who use water and/or discharge wastewater in the Los Angeles Region. Other agencies and organizations involved in environmental permitting and resource management activities also use the Basin Plan. Finally, the Basin Plan provides valuable information to the public about local water quality issues.

Safe Drinking Water Act (SDWA)

The federal Safe Drinking Water Act (SDWA), established in 1974, sets drinking water standards throughout the country and is administered by the USEPA. The drinking water standards established in the SDWA, as set forth in the CFR, are referred to as the National Primary Drinking Water Regulations (Primary Standards, Title 40, CFR Part 141) and the National Secondary Drinking Water Regulations (Second Standards, 40 CFR Part 143). California passed its own SDWA in 1986 that authorizes the State's Department of Health Services (DHS) to protect the public from contaminants in drinking water by establishing maximum contaminants levels, as set forth in the California Code of Regulations (CCR), Title 22, Division 4, Chapter 15, that are at least as stringent as those developed by the USEPA, as required by the federal SDWA.

Watermaster Service for the Santa Monica Basin

The Santa Monica Basin is an unadjudicated basin. The primary producer in the basin is the city of Santa Monica. The Groundwater management in the Santa Monica Basin has centered primarily on the cleanup of groundwater contaminated by MTBE, most notably in the Arcadia and Charnock subbasins. The cleanup operations are coordinated/overseen by the Los Angeles Regional Water Quality Control Board.

3. ENVIRONMENTAL SETTING

3.1. SURFACE WATER HYDROLOGY

3.1.1. Regional

The Project is located within the Ballona Creek Watershed in the County of Los Angeles and directly adjacent to the Marina del Rey Watershed. The Ballona Creek Watershed covers approximately 130 square miles in the coastal plain of the Los Angeles Basin. Its boundaries are the Santa Monica Mountains to the north, the Harbor Freeway (110) to the east, and the Baldwin Hills to the south. Ballona Creek flows as an open channel for just under 10 miles from mid-Los Angeles (south of Hancock Park) through Culver City, reaching the Pacific Ocean at Playa del Rey (Marina del Rey Harbor). The Estuary portion (from Centinela Avenue to the outlet) is soft bottomed, while the remainder of the creek is lined in concrete. Ballona Creek is fed by a network of underground storm drains, which reaches north into Beverly Hills and West Hollywood. The average dry weather flow at the Watershed's terminus in Playa del Rey is 25 cubic feet per second (cfs). The average wet weather flow is ten times higher, or even more during large storms.

The northern portion of the Project discharges into the Marina del Rey Watershed. The watershed consists of the harbor water area, including the docks, back basins, Marina Beach, Oxford Retention Basin (Oxford Basin) and the land adjacent to the harbor back basins including portions of Los Angeles County unincorporated area parcels, streets, and other facilities. The Harbor consists of the Main Channel and eight back basins (A-H). The Project discharges into back basin "E" which has impairments to water quality due to poor circulation and tidal as explained in more detail in Section 3.2.

3.1.2. Local

Stormwater runoff is collected from the Project Site and conveyed through offsite storm drain facilities along the public streets surrounding the Project Site. Stormwater from the site flows northwest to Maxella Avenue or south east and west to ribbon gutters within adjacent parking lots offsite that ultimately connect to a channel under Highway Route 90. The storm drain facilities along Maxella Avenue are owned and maintained by Los Angeles County Flood Control District (LACFCD). The storm drain along Maxella Avenue flows in a southwesterly direction and connects to the storm drain along Berkley Drive, which flows westerly and discharges into the Marina del Rey Harbor. The southeast and southwesterly flows ultimately discharge into Ballona Creek located to the southeast. Please refer to Appendix A for the existing condition hydrology map.

3.1.3. On Site

Under the existing conditions, the entire Paseo Marina project area is fully built-out with high impervious conditions throughout each existing drainage area, and the predominant land use being surface parking lots and buildings. The topography of the site is relatively flat, with slopes varying from about 0.5% to approximately 1%. As mentioned previously, a portion of the site drains toward Maxella Avenue, and the remainder of the site drains to ribbon gutters within adjacent parking lots offsite to the south that ultimately connect to a channel under Highway Route 90. The site is fully developed with a few landscaped areas within the site. The highest elevation of the site is 23' near the Maxella Avenue/Glencoe Avenue intersection, while the lowest elevation of the site is 18' located at the southern corner of the site, north of the existing Pavilions building offsite. The site drains to various discharge points, including the western portion of the property, the eastern corner of the property, and the two south corners of the property. See Appendix A for existing drainage areas and discharge points.

The only existing underground drainage facilities within the property are an inlet and water quality structure (CDS/Contech manhole) at the northwest corner of the property, near the hotel driveway, which collects and conveys drainage from the northwest portion of the property to an adjacent offsite water quality biofiltration BMP at the end of the adjacent driveway. The drainage on the other portions of the property is conveyed offsite via surface gutters. There are no drainage issues associated with the project site.

The existing condition hydrology for the project site has been delineated into six Drainage Sub-Areas (DAs) served by various storm drains both on- and off-site (see Appendix A for exhibits). There is an existing Los Angeles County Department of Public Works (LACDPW) 45" RCP storm drain in Maxella Avenue (north side of roadway), which drains in a westerly direction from Glencoe Avenue toward Del Rey Avenue. This storm drain currently collects drainage from an onsite inlet, located at the northwest corner of the property. The 45"-diameter LACDPW storm drain ultimately drains to the northern portion of the Marina del Rey harbor at Basin E. DA's 1E and 1F drain in a westerly direction to catch basins and connect to the 45" pipe along Maxella Avenue.

There are also two existing 18" lines and one existing 24" line beyond the southern end of the property along Route 90. The 24" line is the farthest east of the offsite lines. Runoff from DA 1A flows offsite through a system of gutters and connect to the 24" line. DA's 1B and 1C drainage flows to the two 18" lines along Route 90. DA 1D flows southwest off site to a system of gutters ultimately to the 54" City drain offsite along Route 1/Pacific Coast Highway.

Table 1 below provides 10-year and 50-year storm frequency analysis for the Project Site's existing conditions. These two storm frequencies are required by Los Angeles County Public Works (10-year) and the City of Los Angles CEQA guideline requirements (50-year). Output calculations are provided in Appendix B.

Table 1 Existing Condition 10-year and 50-year Storm Event Hydrology

Existing Conditions10-year Storm Frequency				
Drainage Sub-Area	Acreage	Time of Concentration (min)	% Imperviousness	Q_{10} (cfs)
1A	1.42	8	96%	2.34
1B	2.23	11	96%	3.16
1C	0.86	8	96%	1.42
1D	0.31	6	96%	0.586
1E	0.97	9	96%	1.51
1F	0.26	5	96%	0.536
Total Site	**6.05**	--	**96%**	**9.55**
Existing Conditions 50-year Storm Frequency				
Drainage Sub-Area	Acreage	Time of Concentration (min)	% Imperviousness	Q_{50} (cfs)
1A	1.42	7	96%	3.50
1B	2.23	9	96%	4.88
1C	0.86	7	96%	2.12
1D	0.31	5	96%	0.90
1E	0.97	7	96%	2.39
1F	0.26	5	96%	0.75
Total Site	**6.05**	--	**96%**	**14.5**

Notes:
See Appendix A for the existing hydrology exhibit and Appendix B for existing hydrology calculations.

3.1.4. FEMA

The project is within Panel 1752 of 2350 (Map Number 06037C1752F, dated September 26, 2008) on Federal Emergency Management Agency's (FEMA's) Flood Insurance Rate Map (FIRM). Based on the FIRM, the project is within Zone X, which depicts areas determined to be outside of the 0.2% (500-year) annual chance floodplain. Therefore, the processing of a CLOMR/LOMR, through FEMA, will not be required for this project.

3.2. SURFACE WATER QUALITY

3.2.1. Regional

As described previously, the Project is located within the Ballona Creek Watershed although the northern portion of the site discharges into the Marina del Rey Watershed. Ballona Creek is an impaired watershed and includes the cities of Beverly Hills, West Hollywood, portions of the cities of Los Angeles, Culver City, Inglewood and Santa Monica, unincorporated areas of Los Angeles County, and areas under the jurisdiction of Caltrans. The Ballona Creek Watershed is comprised of a highly urbanized area and includes 64% residential, 8% commercial, 4% industrial, and 17% open space. The Marina del Rey Watershed is also impaired and consists of runoff from portions of the cities of Culver City, Los Angeles, as well as portions of the unincorporated County of Los Angeles.

3.2.1.1. Beneficial Uses in Ballona Creek/Marina Del Rey Watersheds

The existing and potential beneficial uses for the waters within the Ballona Creek Watershed, where the majority of the surface water flows from the Project ultimately discharge are described below. Beneficial uses for waterbodies in the Ballona Creek Watershed are primarily identified for coastal waters that receive discharges from the storm drains.

Table 2 Beneficial Uses of Ballona Creek and Ballona Estuary

NAV - Navigation	**MAR** - Marine Habitat
MUN* - Municipal and Domestic Supply	**WILD** - Wildlife Habitat
REC1 - Water Contact Recreation	**RARE** - Rare, Threatened, or Endangered Species
REC2 - Non-Contact Water Recreation	**MIGR** - Migration or Aquatic Organisms
COMM - Commercial and Sport Fishing	**SPWN** - Spawning, Reproduction, and/or Early Development
WARM* - Warm Freshwater Habitat	**SHELL** - Shellfish Harvesting
EST - Estuarine Habitat	
Notes: * Potential beneficial use Source: Los Angeles Regional Water Quality Control Board Beneficial Use Table, found here: http://www.waterboards.ca.gov/losangeles/water_issues/programs/basin_plan/Beneficial_Uses/ch2/Revised%20Beneficial%20Use%20Tables.pdf	

The existing and potential beneficial uses for the waters within the harbor area of the Marina del Rey Watershed where surface water flows from the northwestern portion of the Project ultimately discharge are described below. Discharges to the Marina del Rey harbor are routed through a series of storm drain lines.

Table 3 Beneficial Uses of Marina del Rey Watershed

NAV - Navigation	MAR - Marine Habitat
COMM - Commercial and Sport Fishing	WILD - Wildlife Habitat
SHELL - Shellfish Harvesting	
Notes: Source: Los Angeles Regional Water Quality Control Board Beneficial Use Table, found here: http://www.waterboards.ca.gov/losangeles/water_issues/programs/basin_plan/Beneficial_Uses/ch2/Revised%20Beneficial%20Use%20Tables.pdf	

3.2.1.2. Impairments and TMDL's in the Ballona Creek Watershed and Marina del Rey Harbor

CWA 303(d) List of Water Quality Limited Segments

Under Section 303(d) of the CWA, states are required to identify water bodies that do not meet their water quality standards. Biennially, the LARWQCB prepares a list of impaired waterbodies in the region, referred to as the 303(d) list. The 303(d) list outlines the impaired waterbody and the specific pollutant(s) for which it is impaired. All waterbodies on the 303(d) list are subject to the development of a Total Daily Maximum Load (TMDL).

Storm water runoff from the Project discharges to Ballona Creek Estuary and to Marina del Rey Harbor. According to the 2010 303(d) list of Limited Water Quality Segments published by the SWRCB, the Ballona Creek Estuary and Marina del Rey Harbor are listed as impaired by the constituents in the Table below.

Table 4 List of 303(d) Impairments

Water Body	303(d) Impairment
Ballona Creek Estuary	Cadmium, chlordane, coliform bacteria, copper, DDT, lead, PAHs, PCBs, shellfish harvesting advisory, silver and zinc
Marina del Rey Harbor	Chlordane, copper, fish consumption advisory, indicator bacteria, lead, PCBs, and zinc
Notes: Source: 2010 Integrated Report (Clean Water Act Section 303(d) List / 305(b) Report) – Statewide, found here: http://www.waterboards.ca.gov/water_issues/programs/tmdl/integrated2010.shtml?wbid=CAB11522000020020108171136	

Total Maximum Daily Loads (TMDLs)

Ballona Creek Watershed

Once a water body has been listed as impaired on the 303(d) list, a TMDL for the constituent of concern (pollutant) must be developed for that water body. A TMDL is an estimate of the daily load of pollutants that a water body may receive from point sources, non-point sources, and natural background conditions (including an appropriate margin of safety), without exceeding its water quality standard. Those facilities and activities that are discharging into the water body, collectively, must not exceed the TMDL. In general terms, municipal, small MS4, and other dischargers within each watershed are collectively responsible for meeting the required reductions and other TMDL requirements by the assigned deadline.

The Los Angeles RWQCB has adopted wet-weather TMDLs in Ballona Creek Estuary for silver, zinc, shellfish harvesting advisory, sediment toxicity, PCBs, PAHs, lead, DDT, copper, coliform bacteria, chlordane, and cadmium as explained in more detail as follows:

- Ballona Creek, Estuary, and Sepulveda Channel Bacteria TMDL - includes numeric limits and waste load allocations applicable to urban runoff for total coliform, fecal coliform, enterococcus, and E. coli. LARWQCB 2005). The TMDL effective date is April 27, 2007. A TMDL

Implementation Plan was due to the LARWQCB October 27, 2009, however an extension to this date was granted to the responsible agencies.

- **Ballona Creek Estuary Toxic Pollutants TMDL** - includes numeric targets and waste load allocations for the following constituents in sediment: cadmium, copper, lead, silver, zinc, chlordane, DDT, total PCBs, and Total PAHs (LARWQCB 2005). The TMDL effective date is January 11, 2006; a TMDL Implementation Plan is due to the LARWQCB January 11, 2011.

The Ballona Creek Estuary Toxics TMDL Implementation Plan (Implementation Plan) defines the approaches that the cities of Los Angeles (lead agency), Culver City, Beverly Hills, Inglewood, West Hollywood, Santa Monica, and the California Department of Transportation (Caltrans), (the responsible jurisdictions), will take to comply with the requirements of the Ballona Creek Estuary Toxics TMDL (Toxics TMDL). Compliance with Waste Load Allocation (WLA) for toxic pollutants based on the BMPs described above are shown in Table 5.

Table 5 Ballona Creek Estuary Toxics TMDL and Compliance with WLA

Constituent	Baseline Load	Load Reduction	Post BMP Load	WLA (MS4 Permitees and Caltrans)	Percent Exceedance
Metals	(kg/yr)	(kg/yr)	(kg/yr)	(kg/yr)	%
Cadmium	4.53	0.48	4.05	8.11	0%
Copper	243.95	25.75	218.19	230.50	0%
Lead	184.87	19.52	165.35	316.70	0%
Silver	2.96	0.31	2.65	6.78	0%
Zinc	1,012.58	106.90	905.69	1,017.00	0%
Organics	(g/yr)	(g/yr)	(g/yr)	(g/yr)	%
Chlordane	17.32	1.83	15.50	3.39	357%
DDTs	52.53	5.55	46.99	10.71	339%
PCBs	13.43	1.42	12.01	154.00	0%
PAHs	973.43	102.76	870.67	27,300.00	0%
Source: http://www.lastormwater.org/wp-content/files_mf/bcestuarytoxicstmdlimplementationplan2011.pdf					

Marina del Rey Watershed

The Marina del Rey Watershed has one of the most aggressive TMDL schedules for both Toxics and Bacteria and often leads the way in TMDL implementation for the rest of Los Angeles County[3]. The Marina del Rey Watershed is subject to three TMDLs; the Santa Monica Bay Nearshore Debris TMDL (Debris TMDL), the Marina del Rey Harbor Mother's Beach and Back Basin Bacteria TMDL (Bacteria TMDL), and the Toxic Pollutants in Marina del Rey Harbor TMDL (Toxics TMDL).

[3] Marina del Rey Enhanced Watershed Management Program Plan (2016), found here: http://www.waterboards.ca.gov/losangeles/water_issues/programs/stormwater/municipal/watershed_management/marina_delrey/MdR_EWMP_Final_wAppendices4-26.pdf

The Marina del Rey Watershed specifically has wet-weather TMDLs for chlordane, copper, fish consumption advisory, indicator bacteria, lead, PCBs, and zinc. The Toxics TMDL numeric targets include concentrations of toxic pollutants in the back basins of the harbor, i.e., Basins D, E and F (the Project discharges into Basin E). The WLA are for the maximum amount of each of these constituents that can be transported from the Marina del Rey Watershed to the Back Basins. A majority of these constituents are bound to sediment and transported as storm-borne sediment during wet weather runoff events. See Table 6 below for a summary of the Marina del Rey harbor numeric targets and WLAs.

Table 6 Marina del Rey Harbor TMDLs and WLAs

Metals	Numeric Target (mg/kg)	WLA (kg/yr)
Copper	34	2.06
Lead	46.7	2.83
Zinc	150	9.11
Organics	**Numeric Target (µg/kg)**	**TMDL (g/yr)**
Chlordane	0.5	0.03
Total PCBs	22.7	22.7

3.2.2. Local

Within the urban environment of the Project, stormwater runoff occurs during and shortly after rain events. The volume of runoff depends on the intensity and duration of the storm event and the imperviousness of the drainage area. Typical urban pollutants associated with stormwater runoff following rain events includes sediment, trash, bacteria, metals, nutrients and potentially organics and pesticides. The source of contaminants is wide ranging and includes all areas where rainfall occurs along with atmospheric deposition. Therefore, sources of contaminants within urban areas include roadways, building tops, parking lots, landscape areas and maintenance areas.

To reduce contaminant loads from entering the storm drain system, the City conducts routine street cleaning operations as well as periodic cleaning and maintenance of the catch basins to reduce stormwater pollution within the storm drain system.

3.2.3. On Site

Under the existing conditions, the entire Paseo Marina project area is built out with high impervious conditions throughout each existing drainage area, and the predominant land use being surface parking lots and buildings. As mentioned, the only existing underground drainage facilities within the property are an inlet and water quality structure (CDS/Contech manhole) at the northwest corner of the property, near the hotel driveway, which collects and conveys drainage from the northwest portion of the property. The drainage on the other portions of the property is conveyed offsite via surface gutters. There are no drainage issues associated with the project site. Anticipated pollutants consistent with parking lots, building areas and landscaping include total suspended solids (TSS), oil/grease, heavy metals, nutrients, pesticides, and trash.

3.3. GROUNDWATER

3.3.1. Regional

The City of Los Angeles overlies the Los Angeles Coastal Plain Groundwater Basin (Basin) which consists of four major subbasins: Hollywood, Santa Monica, Central and West Coast. Replenishment of the Basin occurs primarily through percolation of rainfall throughout the watershed via permeable surfaces, spreading grounds, and groundwater migration from adjacent basins. Injection wells are also used to pump freshwater along specific seawater barriers to prevent the intrusion of salt water. Groundwater flow within the Basin generally flows in a south and southwesterly direction.

3.3.2. Local

The Project also resides within the Los Angeles Coastal Plain Groundwater Basin, specifically overlying the Santa Monica Groundwater Subbasin, which is located in the northwestern part of the Los Angeles Coastal Plain Groundwater Basin. The Santa Monica Subbasin is bounded on the north by impermeable rocks of the Santa Monica Mountains, the Newport-Inglewood fault to the east, the Pacific Ocean to the west, and the Ballona Escarpment to the south. Extensive faulting within the Santa Monica Subbasin further separates the Subbasin into five subbasins. These include the Arcadia, Olympic, Coastal, Charnock, and Crestal subbasins. The Santa Monica Subbasin is a natural groundwater basin that encompasses a surface area of approximately 50.2 square miles and is estimated to have a total storage capacity of approximately 1.1 million acre-feet. Replenishment of groundwater in the Santa Monica Basin is mainly by percolation of precipitation and surface runoff onto the subbasin from the Sana Monica Mountains.

3.3.3. On Site

Geotechnical Professionals Inc. (GPI) has prepared a geotechnical analysis of the site. The soils encountered in the exploratory boring consisted of predominately very stiff clay to a depth of 16 feet with two interbedded layers of loose to medium dense silty sands at approximate depths of 5 and 7 feet below ground surface. Below 16 feet, medium dense to dense sand with silt and gravel to the 31 ½-foot depth limit were encountered. The natural clay soils were generally moist to very moist, the upper sandy soils were moist to wet, and the deeper sands were wet.

Groundwater was encountered at a depth of approximately 16.5 feet below the existing ground surface. Based on data from the State of California (CDMG, 1998), the historical shallowest depth to groundwater within the site vicinity is approximately 6 feet below existing grades.

GPI concluded that the sandy clay and clay soils encountered between 10 and 16 feet below grade are not considered conducive to infiltration, due to the low infiltration rates. The silty sand soil layers encountered at depths of 5 and 7.5 feet in the boring are also not considered to be conducive to infiltration, due to the potential for mounding in relatively thin layers of potentially permeable soils overlying practically impermeable layers or groundwater. In addition, infiltration at shallower depths would require that hydrostatic pressures be considered for the subterranean levels of the adjacent structures.

County of Los Angeles guidelines recommend that the corrected infiltration rate be equal or greater than 0.3 inches per hour. The results of GPI's investigation found that the measured percolation rates are between 0.00 and 0.01 inches per hour. Additionally, the volume of water applied during their testing was relatively low as compared to that of the planned stormwater system. Based on the very low infiltration rates, infiltration is not considered to be feasible as a BMP for this project.

In addition to the geotechnical analysis, an analysis was performed by Carlin Environmental Consulting, Inc. (CEC) regarding methane concentrations in the underlying soils (see Appendix D) The Los Angeles Municipal Code requires all buildings within a Methane Zone or Methane Buffer Zone to provide a methane mitigation system based on appropriate site design levels. As the Project is located within a Methane Buffer Zone, and results from the analysis included concentrations ranging from 15 parts per million (ppm) to 1,050 ppm, the Project site is considered a Level III. According to Table 1B – Mitigation Requirements for Methane Buffer Zone (see Appendix D), Level III site design levels do not require any specific design features other than following standard protocols during construction and operation of the Project.

4. SIGNIFICANCE THRESHOLD

4.1. SURFACE WATER HYDROLOGY

The City of Los Angeles CEQA Thresholds Guide states that a project would normally have a significant impact on surface water hydrology if it would:

- Cause flooding during the projected 50-year developed storm event, which would have the potential to harm people or damage property or sensitive biological resources;
- Substantially reduce or increase the amount of surface water in a water body; or
- Result in a permanent, adverse change to the movement of surface water sufficient to produce a substantial change in the current or direction of water flow.

4.2. SURFACE WATER QUALITY

The City of Los Angeles CEQA Thresholds Guide states that a project would normally have a significant impact on surface water quality if discharges associated with the project would create pollution, contamination or nuisance, as defined in Section 13050 of the California Water Code (CWC) or that cause regulatory standards to be violated, as defined in the applicable NPDES stormwater permit or Water Quality Control Plan for the receiving water body.

The City of Los Angeles CEQA Thresholds Guide and CWC include the following relevant definitions:

"Pollution" means an alteration of the quality of the waters of the state to a degree which unreasonably affects either of the following: 1) the waters for beneficial uses or 2) facilities which serve these beneficial uses. "Pollution" may include "Contamination".

"Contamination" means an impairment of the quality of the waters of the state by waste to a degree, which creates a hazard to the public health through poisoning or though the spread of disease. "Contamination" includes any equivalent effect resulting from the disposal of waste, whether or not waters of the state are affected.

"Nuisance" means anything which meets all of the following requirements: 1) is injurious to health, or is indecent or offensive to the senses, or an obstruction to the free use of property, so as to interfere with the comfortable enjoyment of life or property; 2) affects at the same time an entire community or neighborhood, or any considerable number of persons, although the extent of the annoyance or damage inflicted upon individuals may be unequal; and 3) occurs during, or as a result of, the treatment or disposal of wastes.

4.3. GROUNDWATER

According to the City of Los Angeles CEQA Thresholds Guide, a project would normally have a significant impact on groundwater quality and groundwater level if it would:

- Affect the rate or change the direction of movement of existing contaminants;
- Expand the area affected by contaminants;
- Result in an increased level of groundwater contamination (including that from direct percolation, injection or salt water intrusion); or
- Cause regulatory water quality standards at an existing production well to be violated, as defined in the California Code of Regulations (CCR), Title 22, Division 4, and Chapter 15 and in the Safe Drinking Water Act.

- Change potable water levels sufficiently to:
  - Reduce the ability of a water utility to use the groundwater basin for public water supplies, conjunctive use purposes, storage of imported water, summer/ winter peaking, or to respond to emergencies and drought;
  - Reduce yields of adjacent wells or well fields (public or private); or
  - Adversely change the rate or direction of flow of groundwater; or
- Result in demonstrable and sustained reduction of groundwater recharge capacity.

5. METHODOLOGY

5.1. SURFACE WATER HYDROLOGY

In December 3, 1999, the City of Los Angeles issued Special Order No. 007-1299 which adopted the Los Angeles County Department of Public Works' Hydrology Manual to be used for studies within the City of Los Angeles. According to the County's 2006 Hydrology Manual, storm drains associated with the Project must carry flow from at least the 10-year frequency design storm. The 10-year storm event also corresponds with the design storm of the existing storm drain infrastructure receiving the flows from the Project.

The City's LA CEQA Thresholds Guide; however, has determined that a 50-year storm frequency analysis is required when determining flood hazards impacts and changes in the amount or movement of surface water. To analyze the Project's potential impacts under both thresholds, runoff for both 10- and 50-year frequency design storms was calculated for this report.

This study was prepared using HydroCalc 0.3.1-beta software in conformance with the County's Hydrology Manual (2006). The HydroCalc program uses the Modified Rational Method to calculate the required time of concentration and designed flowrates for 25- and 50-year storm events. The peak runoff for a drainage area is calculated using the formula Q= CIA, where

- Q= flowrate (cfs)
- C= runoff coefficient (unit less)
- I=rainfall intensity (in/hr)
- A= basin area (acres)

The HydroCalc calculator is supported by the County's online GIS system. This database is used to locate the Project Site's 50-year isohyet rainfall frequency as well as relevant soil type (please refer to Appendix B). The data collected is then used in the HydroCalc program to calculate peak stormwater runoff values.

5.2. SURFACE WATER QUALITY

5.2.1. Construction

Prior to the issuance of grading permits, the applicant is required by The City to provide of a Notice of Intent (NOI) and WDID Number issued from the SWRCB in accordance with the requirements of the General Permit to ensure the potential for soil erosion and construction impacts are minimized. In accordance with the updated General Permit (Order No 2012-0006-DWQ), the following Permit Registration Documents (PRD's) are required to be submitted to the SWRCB prior to commencement of construction activities:

- Notice of Intent (NOI);
- Risk Assessment (Standard or Site-Specific);
- Particle Size Analysis (if site-specific risk assessment is performed);
- Site Map;
- SWPPP;
- Annual Fee & Certification.

The updated General Permit uses a risk-based approach for controlling erosion and sediment discharges from construction sites, since the rates of erosion and sedimentation can vary from site to site depending on factors such as duration of construction activities, climate, topography, soil condition, and proximity to receiving water bodies. The updated General Permit identifies three levels of risk with differing requirements, designated as Risk Levels 1, 2 and 3, with Risk Level 1 having the fewest permit requirements and Risk Level 3 having the most-stringent requirements.

The Risk Assessment incorporates two risk factors for a project site: sediment risk (general amount of sediment potentially discharged from the site) and receiving water risk (the risk sediment discharges can pose to receiving waters). Based on the Risk Level a project falls under, different sets of regulatory requirements are applied to the site. The main difference between Risk Levels 1, 2, and 3 are the numeric effluent standards. In Risk Level 1, there are no numeric effluent standard requirements, as it is considered a Low sediment risk and Low receiving water risk. Instead, narrative effluent limits are prescribed. In Risk Level 2, Numeric Action Levels (NALs) of pH between 6.5-8.5 and turbidity below 250 NTU are prescribed in addition to the narrative effluent limitations found in Risk Level 1 requirements. Should the NAL be exceeded during a storm event, the discharger is required to immediately determine the source associated with the exceedance and to implement corrective actions if necessary to mitigate the exceedance. Risk Level 3 dischargers must comply with Risk Level 2 requirements for NALs in addition to more rigorous monitoring requirements such as receiving water monitoring and in some cases bioassessment, should NALs be exceeded.

5.2.2. Operation

The Project (Option A or Option B) will meet the requirements of the LID Manual[4]. Post-construction stormwater BMPs shall be designed to manage and capture stormwater runoff. Infiltration systems are the first priority type of BMP improvements, as they provide for percolation and infiltration of the stormwater into the ground, which not only reduces the volume of stormwater runoff entering the MS4, but can contribute to groundwater recharge. If stormwater infiltration is not feasible, the next priority BMP shall be used.

The LID Manual establishes an order of priority, as specified below. Each type of BMP shall be implemented to the maximum extent feasible when determining the appropriate BMPs for a project.

1. Infiltration Systems
2. Stormwater Capture and Use
3. High Efficiency Biofiltration/Bioretention Systems
4. Combination of Any of the Above

Geotechnical Professionals Inc. (GPI) has prepared percolation testing of the project site. The testing was performed in accordance with the County of Los Angeles requirements (COLA, 2017). Based on the results of the percolation testing, the subsurface soils at the site were determined to be not suitable for stormwater infiltration based on measured field permeability. The design infiltration rates are less than 0.3 inches/hour, which is the minimum usable rate per County guidelines.

Since Infiltration is deemed to be infeasible for this project, the next item on the priority list, Capture and Use, shall be evaluated. Capture and use, commonly referred to as rainwater harvesting, collects and stores stormwater for later use, thereby offsetting potable water demand and reducing pollutant loading to the storm drain system. Therefore, sufficient landscaped area with appropriate water demand is needed for the captured runoff to be directed to. In the City of Los Angeles, the use of collected stormwater is primarily limited to irrigation of landscaped surfaces. Harvest and Use feasibility analysis requires input from the Landscape Architect of various planting factors and parameters. Harvest and Use feasibility will be evaluated when planting information can be confirmed.

Projects that have demonstrated that they cannot manage 100% of the water quality design volume onsite through infiltration and/or capture and use BMPs may manage the remaining volume through the use of a high removal efficiency biofiltration/bioretention BMP. The high removal efficiency biofiltration/bioretention BMP shall be sized to adequately capture 1.5 times the volume not managed through infiltration and/or capture and use. Biofiltration BMPs are landscaped facilities that capture and

[4] The Development Best Management Practices Handbook, Part B Planning Activities, 5h Edition; adopted by the City of Los Angeles, Board of Public Works on May 9, 2016 to reflect LID requirements that took effect on May 12, 2012.

treat stormwater runoff through a variety of physical and biological treatment processes. These facilities, also called Bioretention Planter Boxes, provide multiple benefits, including pollutant control, peak flow control, and low amounts of volume reduction through infiltration and evapotranspiration.

Water quality BMPs will be evaluated and selected during Final Design of the Project.

5.3. GROUNDWATER

This report discusses the impact of the Project as it relates to the underlying groundwater conditions of the Los Angeles Coastal Plain Groundwater Basin. The significance of the Project as it relates to the condition of the underlying groundwater table included a review of the following existing considerations:

- Identification of the Los Angeles Coastal Plain Groundwater Basin as the underlying groundwater basin, and description of the level, quality, direction of flow, and existing uses for the groundwater
- Description of the location, existing uses, production capacity, quality, and other pertinent data for spreading grounds and potable water wells in the vicinity (typically within a one-mile radius) and;

The analysis of the proposed Project impacts on groundwater conditions include a review of the following proposed considerations:

- Description of the rate, duration, location and quantity of extraction, dewatering, spreading, injection or other activities;
- The projected reduction in groundwater resources and any existing wells in the vicinity (typically within one-mile radius); and
- The projected change in local or regional groundwater flow patterns

In addition, short-term groundwater quality impacts could potentially occur during construction of the Project as a result of soil or shallow groundwater being exposed to construction activities, materials, wastes, and spilled materials. These potential impacts are qualitatively assessed.

6. SIGNIFICANCE THRESHOLD

6.1. CONSTRUCTION

6.1.1. Surface Water Hydrology and Quality

Implementation of the Project would result in construction activities that includes demolition of the existing parking lots and buildings on-site and over-excavation of existing soils. It is anticipated that the Project would result in the excavation of approximately 220,000 cubic yards of soil that will be exported.

Construction activities have the potential to temporarily alter the existing drainage patterns of the Project site and also increase the permeability of a site based on increased pervious surface coverage during construction. Exposed pervious surfaces also have the potential for erosion, scour and increased sediment and associated pollutants discharging from the site during construction activities. The main pollutant of concern during construction is typically sediment and soil particles that discharge off-site due to wind, rain, and construction patterns.

At this stage in the proposed Project, a detailed, site-specific Risk Assessment cannot be performed. However, based on the Project's location and known site conditions, a preliminary erosion calculation can be performed The Project is located in a low risk watershed and the predicted sediment loss is <15 tons/acre (14.51 tons/acre). However, as construction is predicted to last longer than 18 months, the Project will likely classify as a Risk Level 2. If a conservative Risk Level 2 assumption was made, certain monitoring requirements apply to the Project. See Table 7 below highlighting the various requirements for Risk Levels 1-3.

Table 7 Risk Level Requirements

	Visual Inspection					Sample Collection	
Risk Level	Quarterly Non-Storm Water Discharge	Baseline	REAP	Daily Storm BMP	Post Storm	Storm Water Discharge	Receiving Water
1	X	X		X	X		
2	X	X	X	X	X	X	
3	X	X	X	X	X	X	X [1]

Notes
[1] When numeric effluent level (NEL) exceeded.
REAP (Rain Event Action Plan)

In the event exceedances of receiving water quality objectives are observed, measures must be taken and documented within the SWPPP to improve discharge water quality and runoff effluent. This may include but not limited to increasing the size of existing BMPs such as sediment traps, adding more BMPs to the drainage area such as erosion control stabilizers, additional filtering and/or a reduction in active grading area.

Construction Best Management Practices (BMPs)

In accordance with the existing and updated General Permit, a construction SWPPP must be prepared and implemented for the Project site, and revised as necessary, as administrative or physical conditions change. The SWPPP must be made available for review upon request, shall describe construction BMPs that address pollutant source reduction, and provide measures/controls necessary to mitigate potential pollutant sources. These measures/controls include, but are not limited to: erosion controls, sediment controls, tracking controls, non-storm water management, materials & waste management, and good housekeeping practices including the following:

- Erosion control BMPs, such as hydraulic mulch, soil binders, and geotextiles and mats, protect the soil surface by covering and/or binding the soil particles. Temporary earth dikes or drainage swales may also be employed to divert runoff away from exposed areas and into more suitable locations. If implemented correctly, erosion controls can effectively reduce the sediment loads entrained in storm water runoff from construction sites.
- Sediment controls are designed to intercept and filter out soil particles that have been detached and transported by the force of water. All storm drain inlets on the project site or within the project vicinity (i.e., along streets immediately adjacent to the project boundary) should be adequately protected with an impoundment (i.e., gravel bags) around the inlet and equipped with a sediment filter (i.e., fiber roll). Bags should also be placed around areas of soil disturbing activities, such as grading or clearing.
- Stabilize all construction entrance/exit points to reduce the tracking of sediments onto adjacent streets. Wind erosion controls should be employed in conjunction with tracking controls.
- Non-storm water management BMPs prohibit the discharge of materials other than storm water, as well as reduce the potential for pollutants from discharging at their source. Examples include avoiding paving and grinding operations during the rainy season (i.e., October 1 through April 30 each year) where feasible, and performing any vehicle equipment cleaning, fueling and maintenance in designated areas that are adequately protected and contained.
- Waste management consists of implementing procedural and structural BMPs for collecting, handling, storing, and disposing of wastes generated by a construction project to prevent the release of waste materials into storm water discharges.

Prior to commencement of construction activities, the General Permit requires the Project SWPPP to be prepared in accordance with the site-specific sediment risk analyses based on the grading plans, with erosion and sediment controls proposed for each phase of construction for the Project. The phases of construction will define the maximum amount of soil disturbed, the appropriately sized sediment basins and other control measures to accommodate all active soil disturbance areas and the appropriate monitoring and sampling plans. Major phases of the construction for the Project are described below.

Mass & Rough Grading

During mass and/or rough grading, a substantial amount of soil disturbing activities or earthwork will occur. As a consequence, soil loss potential will be at its highest risk level to exceed NALs/NELs specified in the General Permit. Therefore, an effective combination of erosion and sediment controls must be implemented during this phase of construction.

This region requires the use of sediment basins or sediment traps to control the amount of sediment discharged off-site during the rainy season. Sediment basins or sediment traps generally act as primary sediment control facilities at downstream locations that provide final polish of runoff prior to discharging off-site. Therefore, they are a major element in a project's erosion and sediment control design.

Utility and Road Installation

In addition to the erosion and sediment control BMP requirements for the grading phase, the utility and road installation phase will introduce materials to the Project site that may cause or contribute to exceedances of NALs specified in the General Permit. Materials include, but are not limited to hydrated lime, concrete, mortar, Portland cement treated base, and fly ash. For this reason, pH levels must be controlled at this stage through non-storm water management and waste and materials management BMPs. Stockpile management will also be important due to the trenching activities involved during utility installation. Should NALs/NELs be exceeded at any point in time, additional site management or good housekeeping BMPs shall be implemented and the source of pollution controlled.

Vertical Construction

Once utilities and roads are in place, sediment controls (such as sediment/desilting basins) found in the rough grade phase may no longer be applicable as previously designed, due to the installment of curb and gutter, catch basins, and storm drain infrastructure to convey runoff off-site per the post-construction condition. BMPs at this stage will thus be more focused on on-site sediment control BMPs and at discharge points (i.e., catch basin inlet protection). During vertical construction, a substantial amount of construction materials will be delivered to the site, and wastes generated from the site have the potential to negatively impact pH levels. Therefore, non-storm water management and waste and materials management BMPs will be employed regularly.

Final Stabilization and Landscaping

During final stabilization and landscaping, minimal construction will be taking place and the majority of the project site will be stabilized. The majority of activities will involve planting and landscaping lots and common areas. Sediment control at discharge locations and stockpile management will be of primary concern. Good housekeeping practices will continue in this phase of construction.

Through compliance with the General Permit including the preparation of a SWPPP, implementation of BMPs, and compliance with applicable City grading regulations, construction of the Project would not cause flooding, substantially increase or decrease the amount of surface water in a water body, or result in a permanent, adverse change to flow direction. The Project would also not result in discharges that would cause: (1) pollution that would impact the quality of waters of the State to a degree which negatively impacts beneficial uses of the waters; (2) contamination of the quality of the waters of the State by waste to a degree which creates a hazard to the public health through poisoning or through the spread of diseases; or (3) nuisance that would be injurious to health, affect an entire community or neighborhood or any considerable number of persons, and occurs during or as a result of the treatment or disposal of wastes.

Construction of the Project would not result in discharges that would cause regulatory impacts within the Ballona Creek or the Marina del Rey watersheds. Therefore, impacts to surface water hydrology and water quality during construction would be less than significant.

6.1.2. Groundwater Hydrology

Construction of the Project (Option A or Option B) is not anticipated to impact any water supply wells. No water supply wells are located at or within one thousand feet of the Project and the Project will not include the construction of any water supply wells. In addition, recharge of groundwater will not be impacted. Rather, groundwater recharge will increase due to increased perviousness at the Project Site which allows for increased natural infiltration of stormwater.

Construction of the Project will include excavation with average depths of 28 feet below ground surface (bgs). Groundwater was encountered at 16.5 feet bgs as mentioned in the geotechnical investigation by GPI. Based on these excavation depths, groundwater is anticipated to be encountered during construction of the subsurface parking garage. Therefore, temporary dewatering will be required of existing groundwater.

Dewatering activities must be done properly to avoid eroding the soil on the construction site and any significant impacts to existing groundwater hydrology. The Los Angeles Regional Water Quality Control Board (LARWQCB) passed the General NPDES Permit No CAG994004 on June 6, 2013 titled Waste Discharge Requirements for Discharges of Groundwater from Construction and Project Dewatering to Surface Waters in Coastal Watersheds of Los Angeles and Ventura Counties that will apply to the Project. The Project will acquire a dewatering permit from the LARWQCB and discharges will either go to the sewer (with separate authorization from City of Los Angeles Bureau of Sanitation) or to the storm drain system after water quality testing of the groundwater to ensure the quality of the water is sufficient to discharge to the adjacent storm drain system. The Project will comply with all Standard Provisions and with any additional conditions that are applicable under 40 CFR section 122.42 to ensure groundwater hydrology is protected. It is proposed that some of the dewatered groundwater will be reused for dust control which will keep a portion of the dewatered groundwater on site. The groundwater will be collected and monitored regularly to protect water quality as described in more detail below.

6.1.3. Groundwater Quality

As previously noted above, construction of the Project will include temporary dewatering practices during the construction of the subterranean parking structure due to the groundwater level of 16.5 feet bgs. To protect groundwater quality, the General NPDES Permit No CAG994004 (Order No. R4-2013-0095) covers discharges to surface waters of groundwater from dewatering operations. 40 CFR section 122.48 of the Permit requires that all NPDES permits specify requirements for recording and reporting water quality monitoring results. The Monitoring and Reporting Program establishes monitoring and reporting requirements to implement federal and State requirements. The LARWQCB evaluates the test results to determine if the water can be discharged under an NPDES dewatering permit, and if so, any treatment required to remove pollutants prior to discharge. As mentioned, the Project will acquire a dewatering permit from the LARWQCB and discharges will either go to the sewer (with separate authorization from City of Los Angeles Bureau of Sanitation) or to the storm drain system after water quality testing of the groundwater to ensure the quality of the water is sufficient to discharge to the adjacent storm drain system. All monitoring requirements and other provisions of the Permit will be followed.

As mentioned, an analysis of methane concentrations in the underlying soils was performed to determine any potential methane pollution that might impact the Project, specifically groundwater quality. If the Project site has a Level IV or Level V site design level, certain dewatering system design features and other methane mitigation must be included. As the Project is located within a Methane Buffer Zone, and results from the analysis included concentrations ranging from 15 ppm to 1,050 ppm, the Project site is considered a Level III. According to Table 1B – Mitigation Requirements for Methane Buffer Zone (see Appendix D), Level III site design levels do not require any specific methane mitigation design features other than following standard protocols during construction and operation. Therefore, standard dewatering protocols following NPDES Permit No CAG994004 will be followed.

During on-site grading and building activities, hazardous materials such as fuels, paints, solvents, and concrete additives could be used and require proper management and containment during construction activities. The presence of such materials provides an opportunity for hazardous materials to be released into groundwater. To protect groundwater resources, the Project will comply with all applicable federal, state and local requirements related to the handling, storage, application and disposal of hazardous waste which will reduce the potential for construction activities of the Project to release contaminants into groundwater that could affect existing contamination, mobilize or increase the level of groundwater

contamination, or cause a violation of regulatory water quality standards at an existing production well. Therefore, the Project would not result in a significant increase in groundwater contamination though hazardous materials releases and impacts on groundwater quality would be less than significant.

6.2. OPERATION

6.2.1. Surface Water Hydrology

Development of the Project (Option A or Option B) would result in the addition of landscaped areas throughout the Project Site, and would reduce the amount of impervious surfaces from 96 percent to 88 percent. This increase in pervious surfaces would result in a slight reduction in stormwater runoff. Table 8 below provides an analysis of the 10-year and 50-year frequency design storm events following construction of the Project. As this is still in the conceptual design stage of the Project, the hydrology analysis was performed assuming one outlet point in the proposed condition discharging to Glencoe Avenue to evaluate the most conservative potential impact on the local storm drain system, and may change during final design. Output calculations are provided in Appendix B.

Table 8 Proposed Condition 10-year and 50-year Storm Event Hydrology (Option A or Option B)

10-year Storm Event			
Area	Acreage	% Imperviousness	Q_{10} (cfs)
Total Site	6.05	88	8.41
50-year Storm Event			
Area	Acreage	% Imperviousness	Q_{50} (cfs)
Total Site	6.05	88	13.9
Notes: Calculations included in Appendix B.			

Table 9 provides a comparison of the existing and proposed peak flows for the 10-year and 50-year storm events.

Table 9 Existing versus Proposed Condition for the 10-year and 50-year Storm Event Hydrology

10-year Storm Event		
Condition	% Imperviousness	Q_{10} (cfs)
Existing Total Site	96%	9.55
Proposed Total Site	88%	8.41
50-year Storm Event		
Condition	% Imperviousness	Q_{50} (cfs)
Existing Total Site	96%	14.5
Proposed Total Site	88%	13.9
Notes: Calculations included in Appendix B.		

Based on the above, operation of the Project would decrease the amount of peaks flows from the 10-year and 50-year storm events due to increase pervious surfaces as compared to the existing condition. However, under the proposed condition, all flows are anticipated to be discharged to either Glencoe Avenue, Maxella Avenue, or split between the two roadways. To determine potential impacts to either of these roadways, street capacity calculations for both Glencoe Avenue and Maxella Avenue were performed to determine if either street could handle the entire project high flows. The street capacity calculations for both Glencoe Avenue and Maxella Avenue resulted in the conclusion that both roadways can handle the proposed 10-year flows associated with the Project, along with street flows already in the roadways. In Maxella Avenue, the street capacity of 11 cfs is sufficient to handle the total flows from the site (8.4 cfs), along with existing street flows of 1.2 cfs. In Glencoe Avenue, the street capacity of 24 cfs is sufficient to handle the flows from the site (8.4 cfs), along with the existing street flows of 1.2 cfs. The street capacity calculations were submitted to staff at West Los Angeles District, Bureau of Engineering, Department of Public Works and they concluded it would be acceptable for the proposed project to discharge into either street (Glencoe or Maxella) based on the available street conveyance capacity. Under final design, it is anticipated that the project flows will be split between Maxella Avenue and Glencoe Avenue which would reduce the amount of flows draining to each street.

Based on the hydrology analysis, the Project (Option A or Option B) would not result in on-site or off-site flooding, impact the capacity of the existing storm drain system or street conveyance system, or worsen an existing condition flood condition. In addition, the Project would not substantially reduce or increase the amount of surface water in the local water body, or result in a permanent adverse change in the drainage pattern that would result in an incremental effect on the capacity of the storm existing storm drain system. Therefore, operation of the Project would result in less than significant impact on surface water hydrology.

6.2.2. Surface Water Quality

Stormwater runoff from the Project (Option A or Option B) has the potential to discharge pollutants into the City and County storm drain systems. Anticipated pollutants and typical source areas include the following:

Table 10 Potential Stormwater Pollutants and Sources

Pollutant	Source
Sediment (coarse and fine)	Parking lots, driveways, building rooftops, landscape areas, roads
Nutrients (dissolved and particulates)	Landscape areas, lawns
Pesticides	Landscape areas, lawns
Pathogens	Landscape areas, lawns, building rooftops, food serving areas
Trash/debris	Parking lots, driveways, roadways, parks
Oil/grease	Parking lots, driveways, roadways, food serving areas
Metals (dissolved and particulate)	Parking lots, driveways, roadways

To meet the local MS4 Permit and LID requirements consistent with the City's LID Ordinance and LID Development BMP Handbook (May 2016), stormwater management strategies will be implemented throughout the Project Site.

As noted in the existing conditions description, the existing site does not have any structural or LID BMPs to treat or infiltrate stormwater onsite. Therefore, implementation of the LID features proposed as part of the Project would result in a significant improvement in surface water quality runoff as compared to existing conditions. Water quality (LID) hydrologic calculations and 85th Percentile 24-hour Isohyetal (Rainfall) Map are included in Appendix C. See Section 5.2.2 for a detailed description of the BMP hierarchy that will be followed when determining the most appropriate LID BMPs to be designed as part of the Project.

Based on the proposed LID Plan to be submitted during the Final Design phases of the Project, operation of the Project would not result in discharges that would cause: (1) an incremental increase in pollution which would alter the quality of the waters of the State (Ballona Creek or Marina del Rey Harbor) to a degree which unreasonably affects beneficial uses of the waters; (2) an incremental increase of contamination of the quality of the waters of the State by waste to a degree which creates a hazard to the public health through poisoning or through the spread of diseases; or (3) an incremental increase in the nuisance that would injurious to health; affect an entire community or neighborhood, or any considerable numbers of persons; and occurs during or as a result of the treatment or disposal of wastes. Lastly, operation of the Project would not result in discharges that would cause regulatory standards to be violated in Ballona Creek or Marina del Rey harbor. Thus, operational impacts on surface water quality would be less than significant.

6.2.3. Groundwater Hydrology

Under the proposed conditions, region and local potable water levels and adjacent wells or well fields will not be impacted by the Project. The post-developed Project does not include any groundwater pumping and relies on the local water purveyor for water. In addition, the Project is not anticipated to adversely change the rate of direction of flow of groundwater.

The Geotracker website (State Water Resources Control Board) indicates there are no significant sources of soil or groundwater pollution within the project area.

6.2.4. Groundwater Quality

The Geotracker website (State Water Resources Control Board) indicates there are no significant sources of soil or groundwater pollution within the project area and local vicinity. In addition, an analysis of methane concentrations in the underlying soils was performed to determine any potential methane pollution that might impact the Project, specifically groundwater quality. As specific by the Los Angeles Municipal Code, if a project site has a Level IV or Level V site design level, certain methane mitigation design features must be included. As the Project is located within a Methane Buffer Zone, and results from the analysis included concentrations ranging from 15 ppm to 1,050 ppm, the Project site is considered a Level III. According to Table 1B – Mitigation Requirements for Methane Buffer Zone (see Appendix D), Level III site design levels do not require any specific methane mitigation design features other than following standard protocols during construction and operation.

6.3. CUMULATIVE IMPACTS

6.3.1. Surface Water Hydrology

The regional geographic context for the cumulative impact analysis on surface water hydrology is the Ballona Creek Watershed and the Marina del Rey Watershed. The Project will reduce flows to these watersheds due to increased perviousness as compared to the existing conditions. BMPs will be implemented during the construction phase of the Project to ensure against erosion or negative impacts to surface water hydrology. As there is sufficient capacity within Maxella Avenue and Glencoe Avenue to handle the proposed flows during the operational phase, there are no significant impacts to surface water hydrology anticipated.

6.3.2. Surface Water Quality

No significant impacts are anticipated regarding surface water quality during the construction or operational phases of the Project. Construction of the Project will not result in discharges that would cause regulatory water quality impacts within the Ballona Creek or the Marina del Rey watersheds. No significant impacts to surface water quality are anticipated.

6.3.3. Groundwater Hydrology

Groundwater hydrology at the Project Site is not anticipated to be impacted. As mentioned, temporary dewatering will occur during the construction of the Project. A dewatering permit will be acquired from LARWQCB to ensure that groundwater hydrology is protected. Impacts to groundwater hydrology are considered less than significant.

6.3.4. Groundwater Quality

Groundwater quality at the Project Site is not anticipated to be impacted. The dewatering permit acquired from the LARWQCB will ensure that both groundwater hydrology and quality are protected during construction. The Geotracker website (State Water Resources Control Board) indicates there are no significant sources of soil or groundwater pollution within the project area and local vicinity. No significant impacts to groundwater quality are anticipated.

7. LEVEL OF SIGNIFICANCE

Based on the analysis contained in this report no significant impacts have been identified for surface water hydrology, surface water quality, or groundwater for this Project.

An assessment of the LID hierarchy will be performed during final design as part of the Project's LID Plan to confirm the most appropriate BMP for the Project. Preliminary geotechnical results show that infiltration is likely infeasible due to low percolation rates. Therefore, harvest and reuse and biofiltration BMPs will be assessed and included in the Project design. Detailed calculations and design will be included separately in the Project's LID Plan.

8. APPENDICES

Appendix A – Existing and Proposed Hydrology Map Exhibits

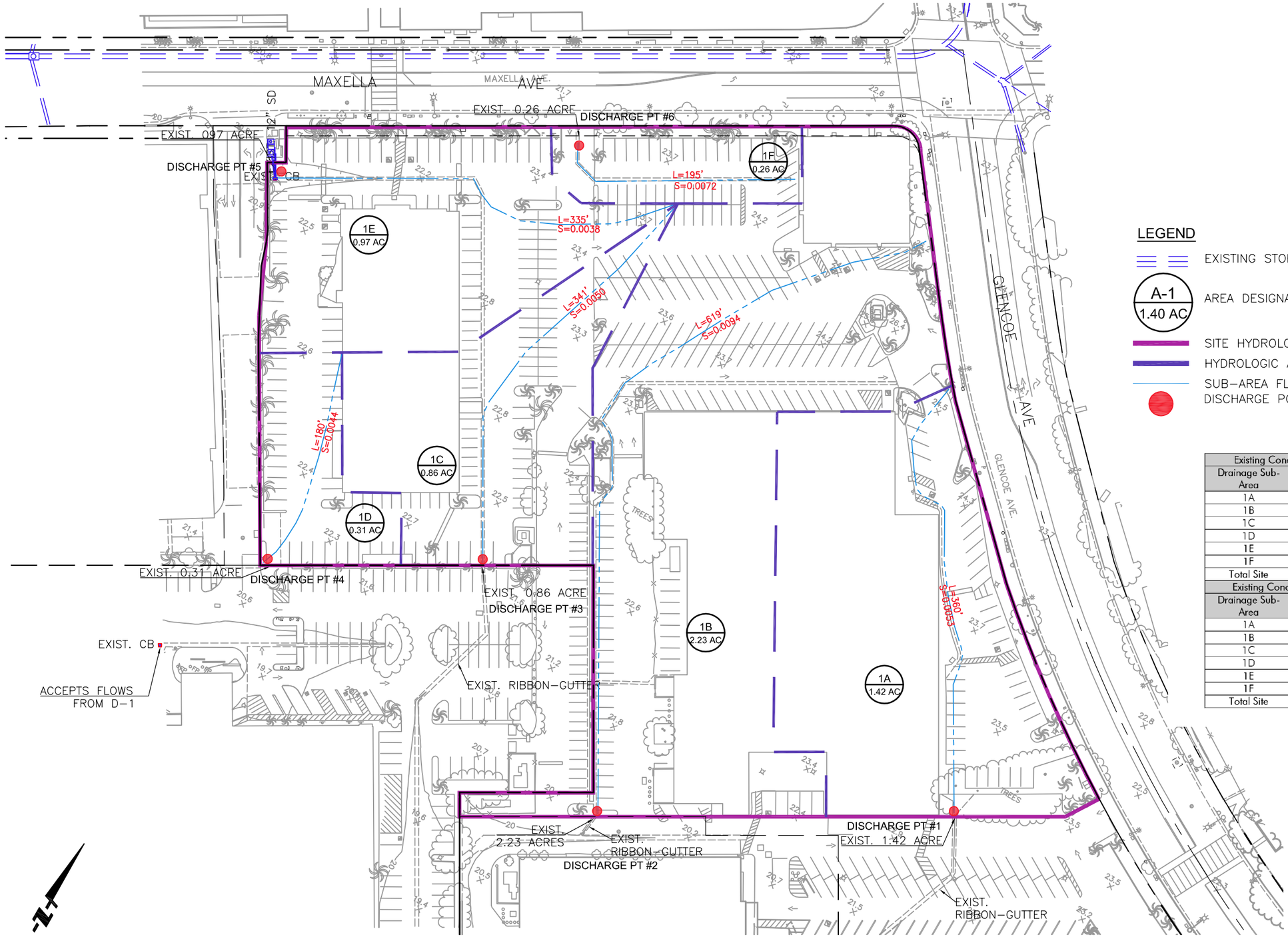
Appendix B – Existing and Proposed Hydrology Calculations

Appendix C – Water Quality Calculations

Appendix D – Geotechnical and Infiltration Findings

APPENDIX A

EXISTING AND PROPOSED HYDROLOGY MAP EXHIBITS



LEGEND

- EXISTING STORM DRAIN
- A-1 / 1.40 AC — AREA DESIGNATION / ACRES
- SITE HYDROLOGIC BOUNDARY
- HYDROLOGIC AREA SUB-BOUNDARY
- SUB-AREA FLOWPATH / DIRECTION OF FLOW
- DISCHARGE POINT (WHERE DRAINAGE LEAVES THE SITE)

Existing Conditions 10-year Storm Frequency		
Drainage Sub-Area	Acreage	Q_{10} (cfs)
1A	1.42	2.34
1B	2.23	3.16
1C	0.86	1.42
1D	0.31	0.586
1E	0.97	1.51
1F	0.26	0.536
Total Site	6.05	9.55
Existing Conditions 50-year Storm Frequency		
Drainage Sub-Area	Acreage	Q_{50} (cfs)
1A	1.42	3.50
1B	2.23	4.88
1C	0.86	2.12
1D	0.31	0.90
1E	0.97	2.39
1F	0.26	0.75
Total Site	6.05	14.5

EXISTING CONDITION HYDROLOGY

SCALE: 1" = 80'

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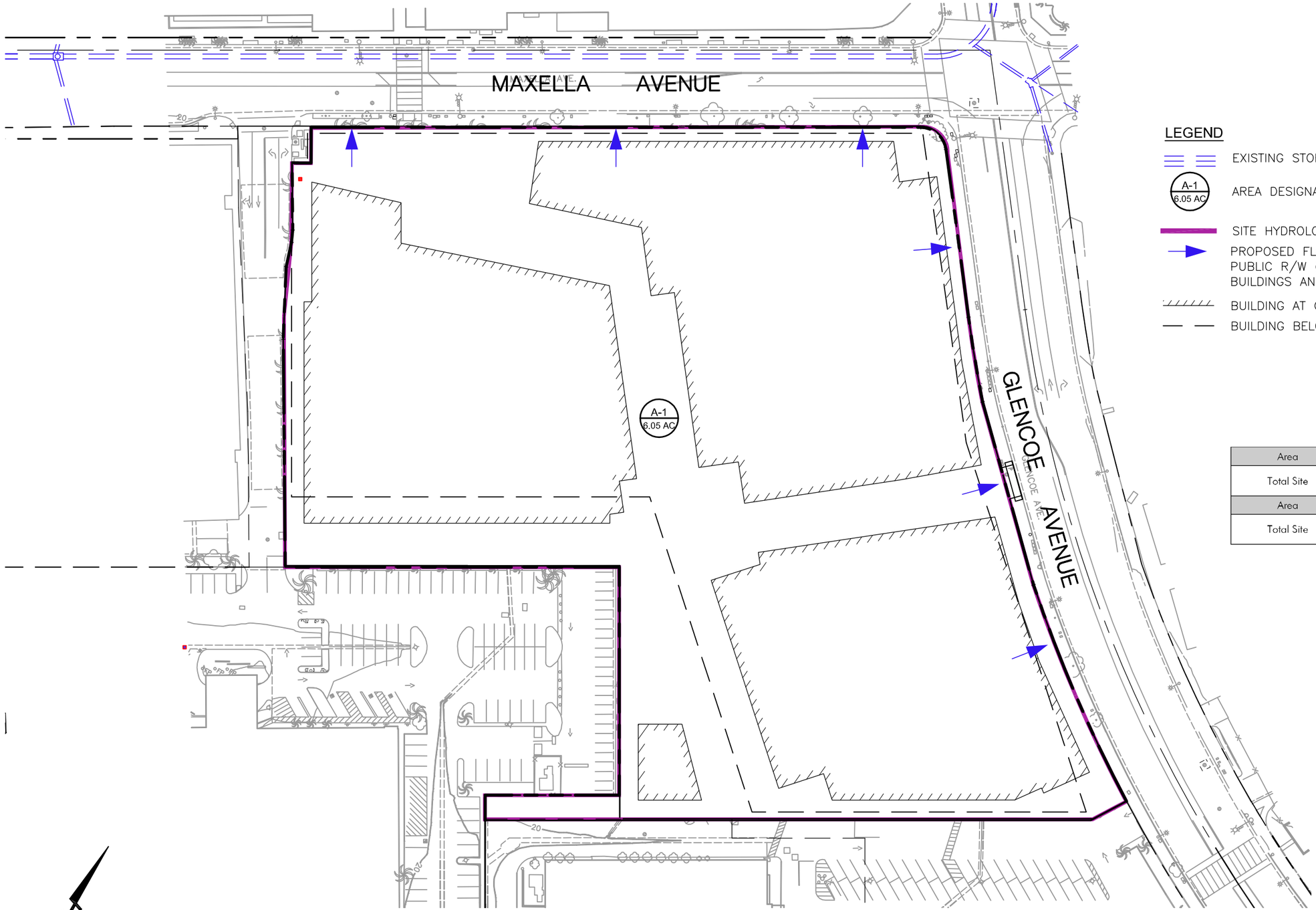

LEGEND

- EXISTING STORM DRAIN
- A-1 / 6.05 AC — AREA DESIGNATION / ACRES
- SITE HYDROLOGIC BOUNDARY
- PROPOSED FLOW DIRECTION FOR HIGH FLOWS TO PUBLIC R/W (REQUIRES INTERNAL PLUMBING WITHIN BUILDINGS AND PUMPS)
- BUILDING AT GRADE
- BUILDING BELOW GRADE

Area	Acreage	Q_{10} (cfs)
Total Site	6.05	8.41
Area	Acreage	Q_{50} (cfs)
Total Site	6.05	13.9

PROPOSED CONDITION HYDROLOGY

SCALE: 1" = 80'

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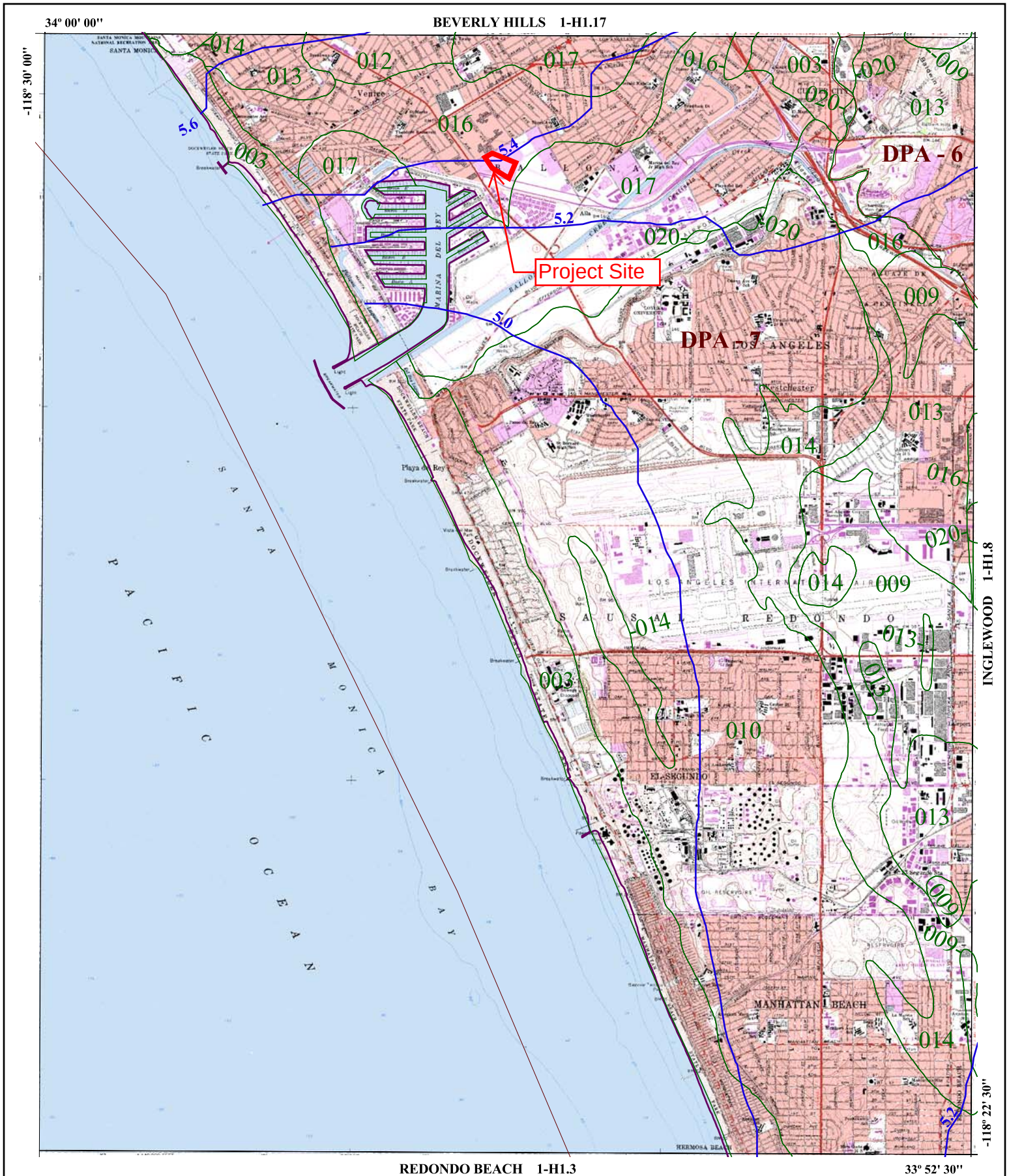
APPENDIX B

EXISTING AND PROPOSED HYDROLOGY CALCULATIONS



016 SOIL CLASSIFICATION AREA

7.2 INCHES OF RAINFALL

DPA - 6 DEBRIS POTENTIAL AREA

N W E S

1 0 1 2 Miles

25-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.878
10-YEAR 24-HOUR ISOHYET REDUCTION FACTOR: 0.714

V E N I C E
50-YEAR 24-HOUR ISOHYET

1-H1.7

LOS ANGELES COUNTY PUBLIC WORKS Public Service That Works

Peak Flow Hydrologic Analysis

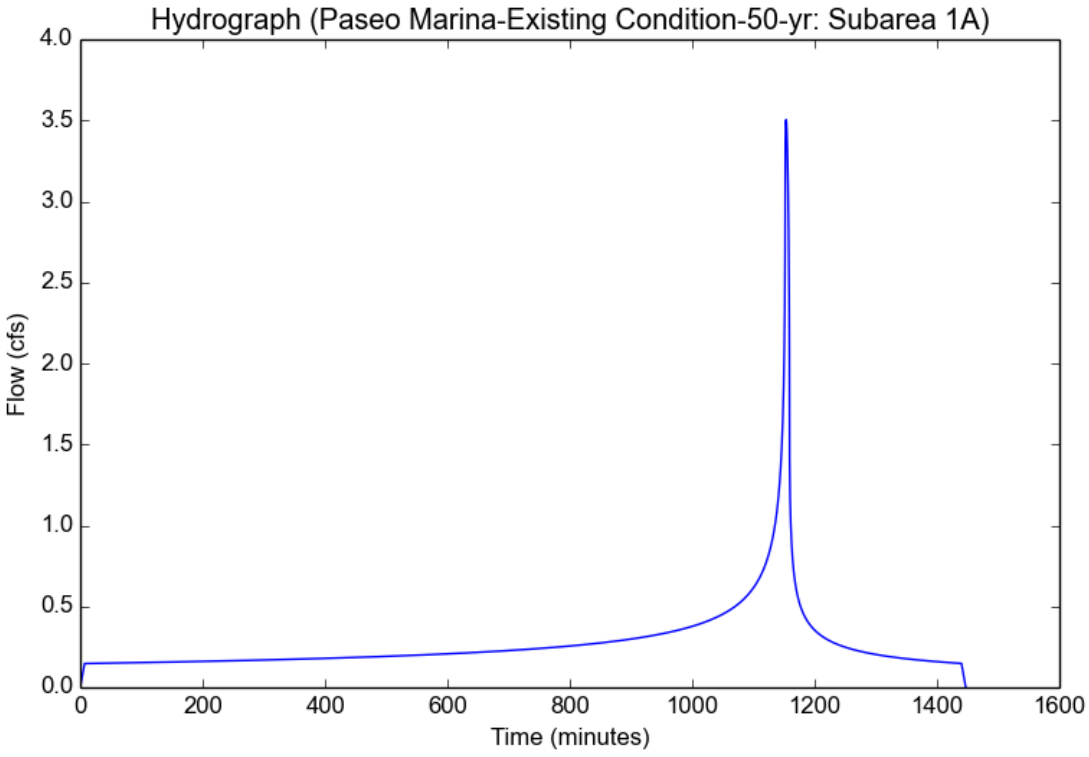
File location: C:/Users/Susan Williams/Desktop/Paseo Marina-Existing Condition-50-yr - Subarea 1A.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Paseo Marina-Existing Condition-50-yr
Subarea ID	Subarea 1A
Area (ac)	1.42
Flow Path Length (ft)	360.0
Flow Path Slope (vft/hft)	0.0053
50-yr Rainfall Depth (in)	5.4
Percent Impervious	0.96
Soil Type	16
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.4
Peak Intensity (in/hr)	2.7505
Undeveloped Runoff Coefficient (Cu)	0.8301
Developed Runoff Coefficient (Cd)	0.8972
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	3.5043
Burned Peak Flow Rate (cfs)	3.5043
24-Hr Clear Runoff Volume (ac-ft)	0.5523
24-Hr Clear Runoff Volume (cu-ft)	24057.6529



Peak Flow Hydrologic Analysis

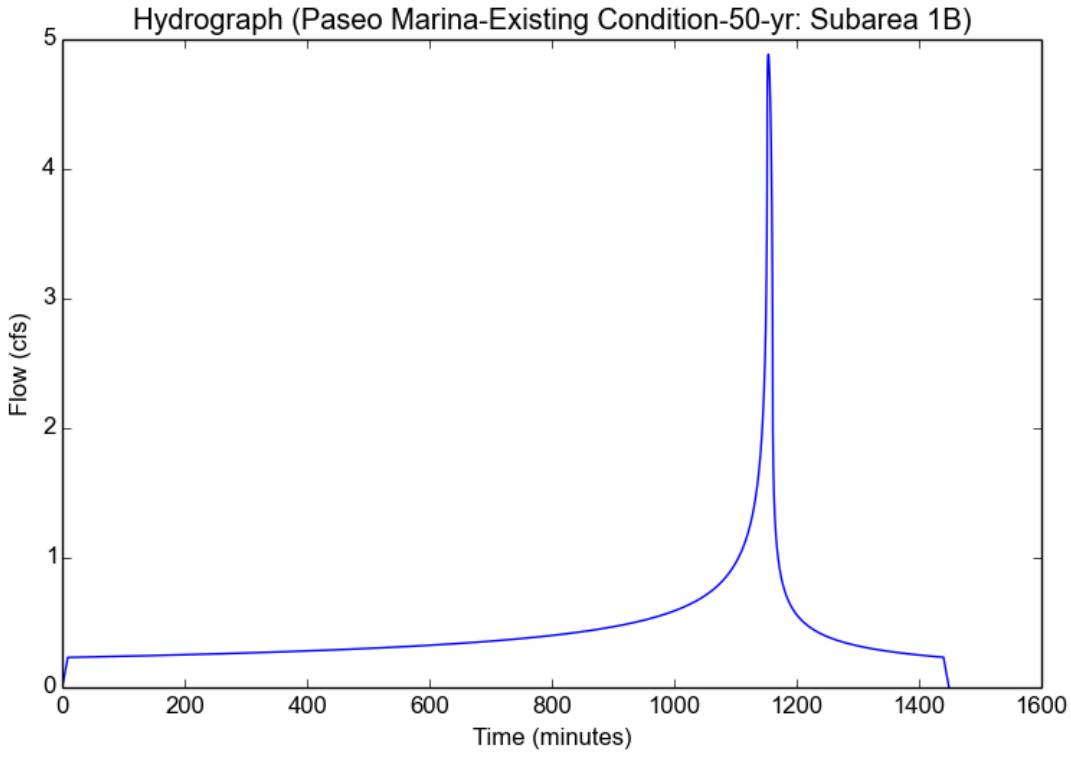
File location: C:/Users/Susan Williams/Desktop/Paseo Marina-Existing Condition-50-yr - Subarea 1B.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Paseo Marina-Existing Condition-50-yr
Subarea ID	Subarea 1B
Area (ac)	2.23
Flow Path Length (ft)	619.0
Flow Path Slope (vft/hft)	0.0094
50-yr Rainfall Depth (in)	5.4
Percent Impervious	0.96
Soil Type	16
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.4
Peak Intensity (in/hr)	2.4441
Undeveloped Runoff Coefficient (Cu)	0.8048
Developed Runoff Coefficient (Cd)	0.8962
Time of Concentration (min)	9.0
Clear Peak Flow Rate (cfs)	4.8845
Burned Peak Flow Rate (cfs)	4.8845
24-Hr Clear Runoff Volume (ac-ft)	0.8673
24-Hr Clear Runoff Volume (cu-ft)	37780.0814



Peak Flow Hydrologic Analysis

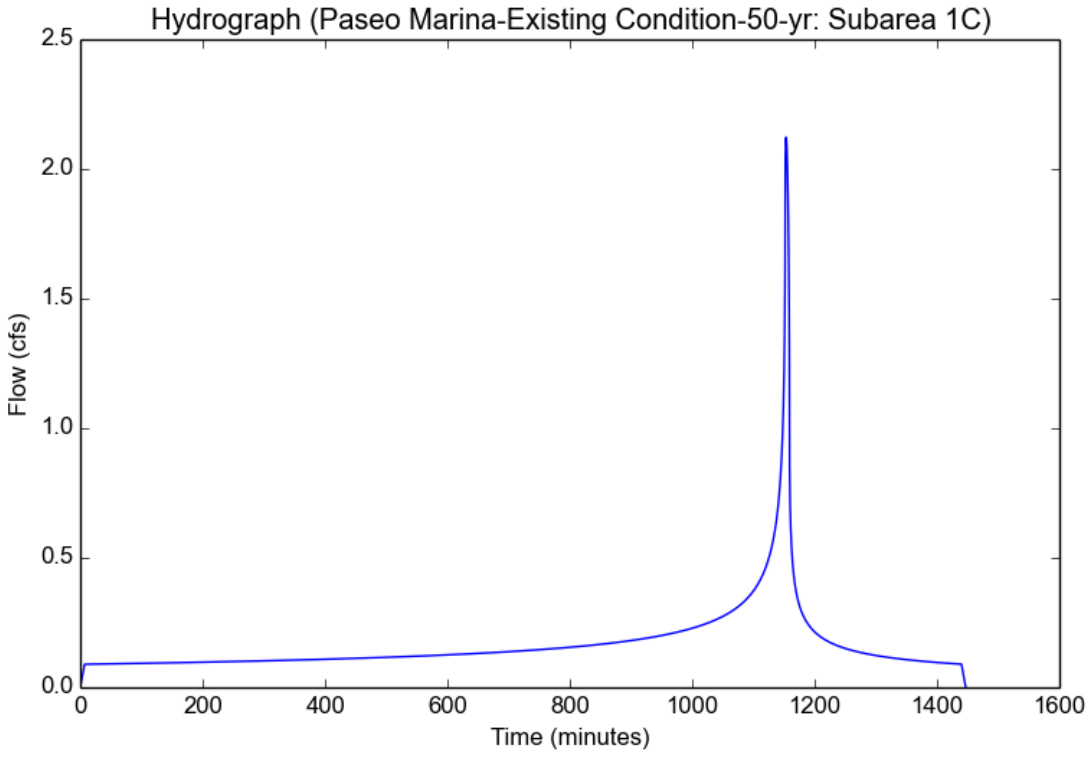
File location: C:/Users/Susan Williams/Desktop/Paseo Marina-Existing Condition-50-yr - Subarea 1C.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Paseo Marina-Existing Condition-50-yr
Subarea ID	Subarea 1C
Area (ac)	0.86
Flow Path Length (ft)	341.0
Flow Path Slope (vft/hft)	0.005
50-yr Rainfall Depth (in)	5.4
Percent Impervious	0.96
Soil Type	16
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.4
Peak Intensity (in/hr)	2.7505
Undeveloped Runoff Coefficient (Cu)	0.8301
Developed Runoff Coefficient (Cd)	0.8972
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	2.1223
Burned Peak Flow Rate (cfs)	2.1223
24-Hr Clear Runoff Volume (ac-ft)	0.3345
24-Hr Clear Runoff Volume (cu-ft)	14570.1278



Peak Flow Hydrologic Analysis

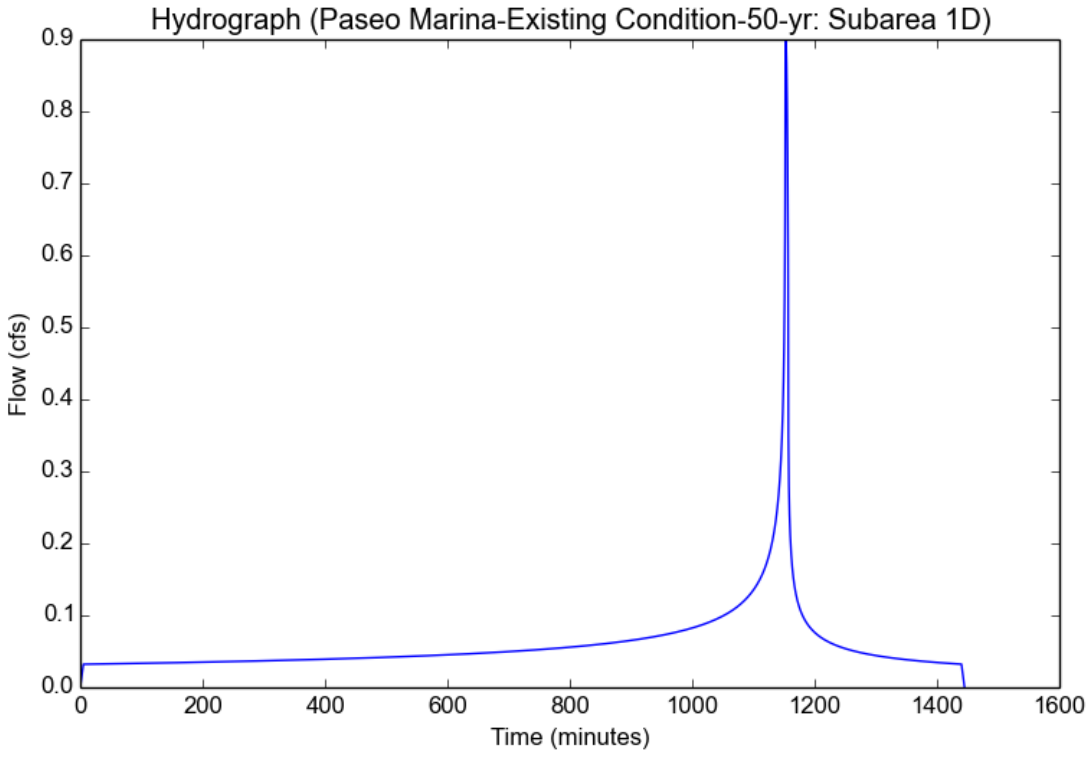
File location: C:/Users/Susan Williams/Desktop/Paseo Marina-Existing Condition-50-yr - Subarea 1D.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Paseo Marina-Existing Condition-50-yr
Subarea ID	Subarea 1D
Area (ac)	0.31
Flow Path Length (ft)	180.0
Flow Path Slope (vft/hft)	0.0044
50-yr Rainfall Depth (in)	5.4
Percent Impervious	0.96
Soil Type	16
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.4
Peak Intensity (in/hr)	3.2218
Undeveloped Runoff Coefficient (Cu)	0.8608
Developed Runoff Coefficient (Cd)	0.8984
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.8973
Burned Peak Flow Rate (cfs)	0.8973
24-Hr Clear Runoff Volume (ac-ft)	0.1206
24-Hr Clear Runoff Volume (cu-ft)	5252.1021



Peak Flow Hydrologic Analysis

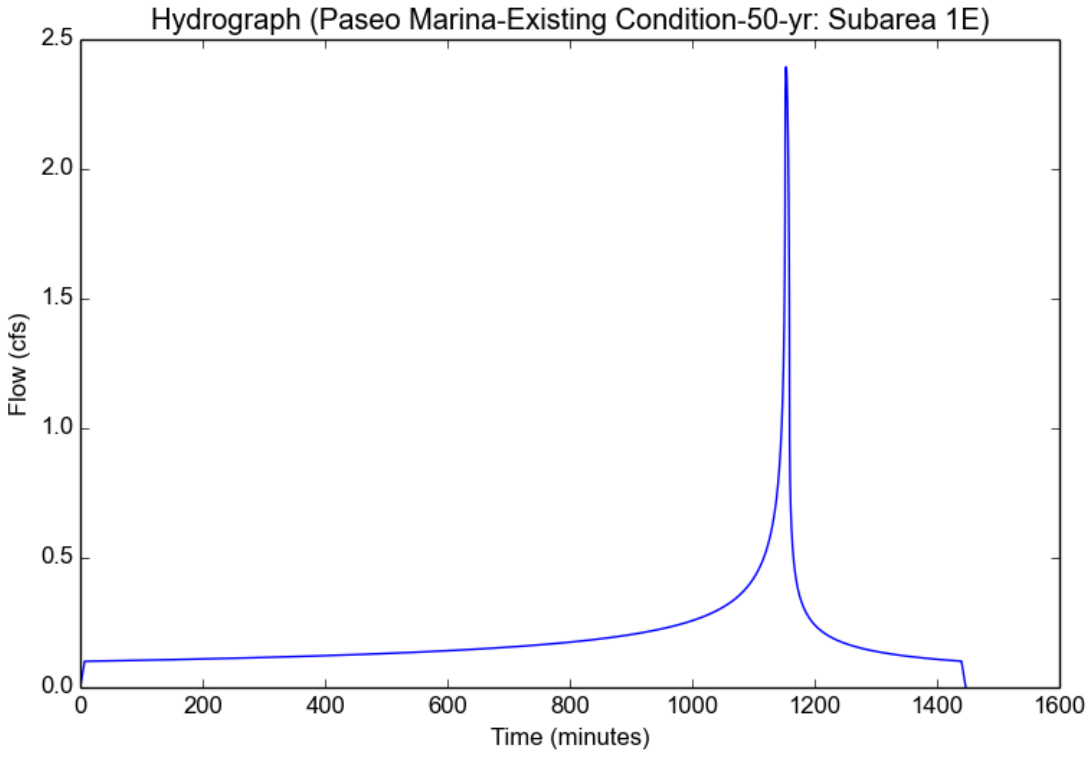
File location: C:/Users/Susan Williams/Desktop/Paseo Marina-Existing Condition-50-yr - Subarea 1E.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Paseo Marina-Existing Condition-50-yr
Subarea ID	Subarea 1E
Area (ac)	0.97
Flow Path Length (ft)	335.0
Flow Path Slope (vft/hft)	0.0038
50-yr Rainfall Depth (in)	5.4
Percent Impervious	0.96
Soil Type	16
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.4
Peak Intensity (in/hr)	2.7505
Undeveloped Runoff Coefficient (Cu)	0.8301
Developed Runoff Coefficient (Cd)	0.8972
Time of Concentration (min)	7.0
Clear Peak Flow Rate (cfs)	2.3938
Burned Peak Flow Rate (cfs)	2.3938
24-Hr Clear Runoff Volume (ac-ft)	0.3773
24-Hr Clear Runoff Volume (cu-ft)	16433.7488



Peak Flow Hydrologic Analysis

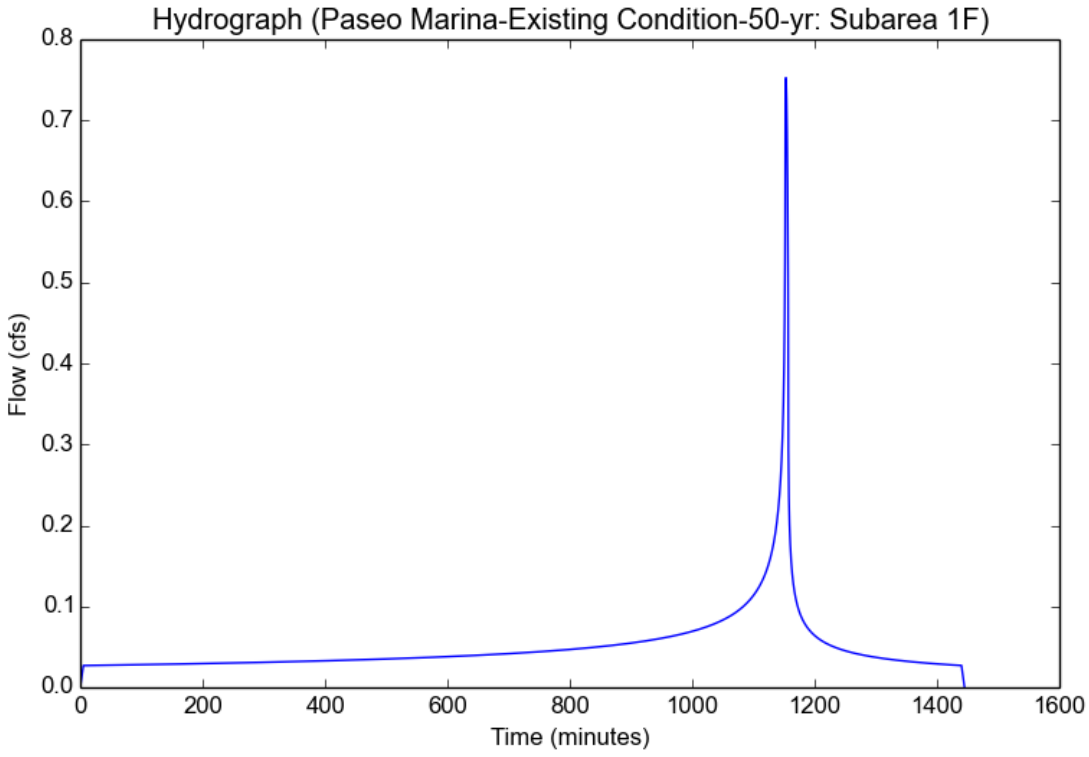
File location: C:/Users/Susan Williams/Desktop/Paseo Marina-Existing Condition-50-yr - Subarea 1F.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Paseo Marina-Existing Condition-50-yr
Subarea ID	Subarea 1F
Area (ac)	0.26
Flow Path Length (ft)	195.0
Flow Path Slope (vft/hft)	0.0072
50-yr Rainfall Depth (in)	5.4
Percent Impervious	0.96
Soil Type	16
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.4
Peak Intensity (in/hr)	3.2218
Undeveloped Runoff Coefficient (Cu)	0.8608
Developed Runoff Coefficient (Cd)	0.8984
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.7526
Burned Peak Flow Rate (cfs)	0.7526
24-Hr Clear Runoff Volume (ac-ft)	0.1011
24-Hr Clear Runoff Volume (cu-ft)	4404.9888



Peak Flow Hydrologic Analysis

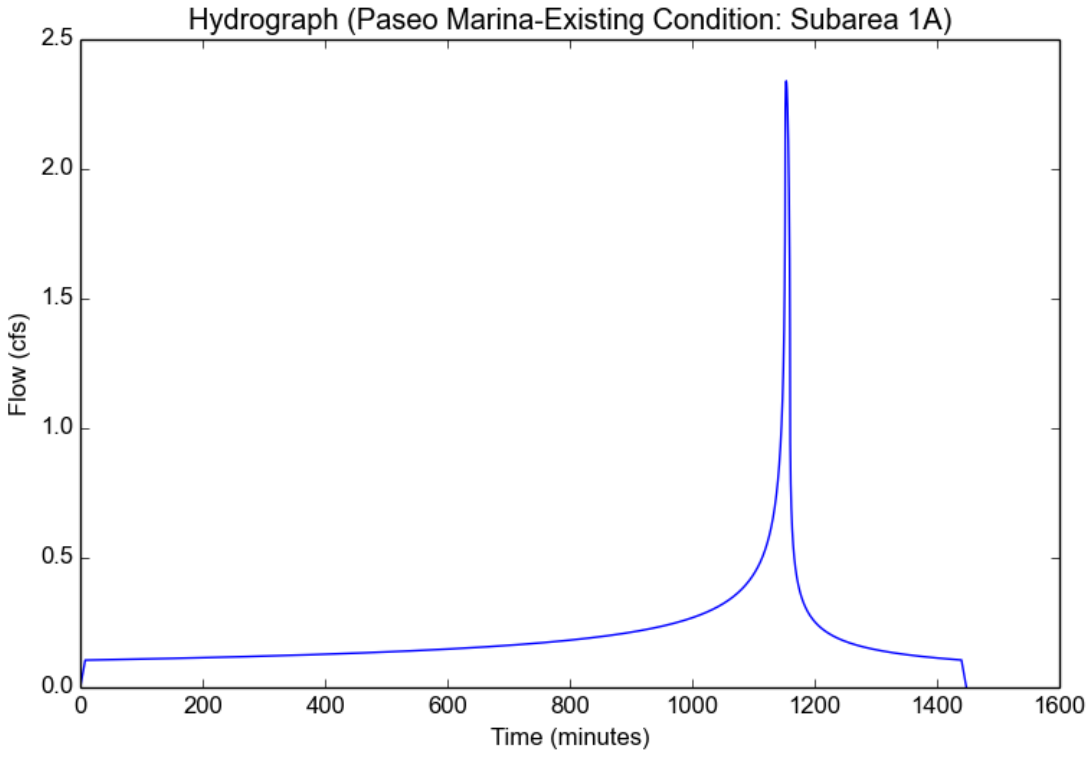
File location: C:/Users/Susan Williams/Desktop/Paseo Marina-Existing Condition - Subarea 1A.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Paseo Marina-Existing Condition
Subarea ID	Subarea 1A
Area (ac)	1.42
Flow Path Length (ft)	360.0
Flow Path Slope (vft/hft)	0.0053
50-yr Rainfall Depth (in)	5.4
Percent Impervious	0.96
Soil Type	16
Design Storm Frequency	10-yr
Fire Factor	0
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	3.8556
Peak Intensity (in/hr)	1.8444
Undeveloped Runoff Coefficient (Cu)	0.7326
Developed Runoff Coefficient (Cd)	0.8933
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	2.3396
Burned Peak Flow Rate (cfs)	2.3396
24-Hr Clear Runoff Volume (ac-ft)	0.3938
24-Hr Clear Runoff Volume (cu-ft)	17154.4249



Peak Flow Hydrologic Analysis

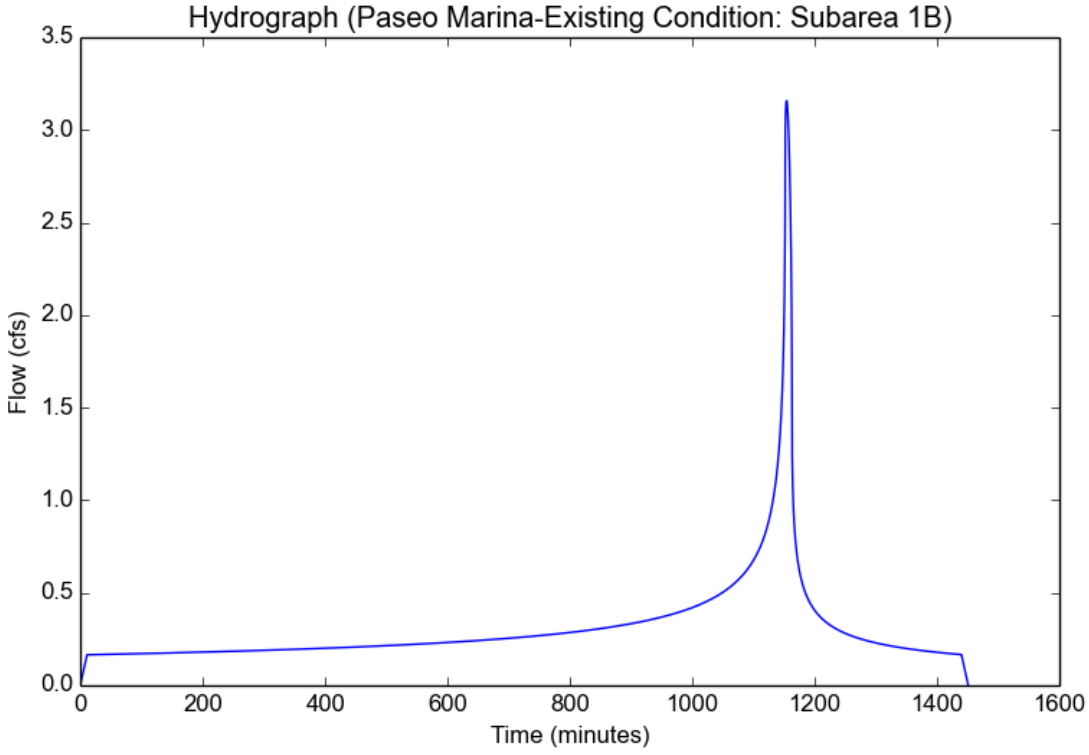
File location: C:/Users/Susan Williams/Desktop/Paseo Marina-Existing Condition - Subarea 1B.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Paseo Marina-Existing Condition
Subarea ID	Subarea 1B
Area (ac)	2.23
Flow Path Length (ft)	619.0
Flow Path Slope (vft/hft)	0.0094
50-yr Rainfall Depth (in)	5.4
Percent Impervious	0.96
Soil Type	16
Design Storm Frequency	10-yr
Fire Factor	0
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	3.8556
Peak Intensity (in/hr)	1.588
Undeveloped Runoff Coefficient (Cu)	0.6918
Developed Runoff Coefficient (Cd)	0.8917
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	3.1577
Burned Peak Flow Rate (cfs)	3.1577
24-Hr Clear Runoff Volume (ac-ft)	0.6184
24-Hr Clear Runoff Volume (cu-ft)	26938.9371



Peak Flow Hydrologic Analysis

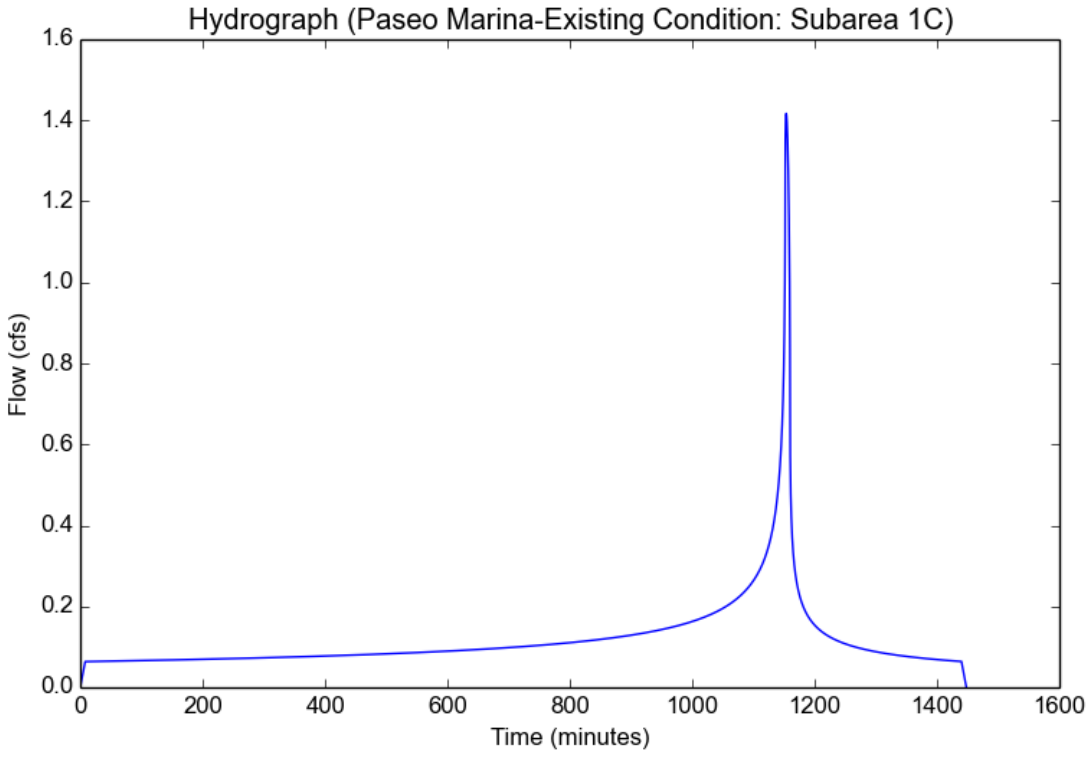
File location: C:/Users/Susan Williams/Desktop/Paseo Marina-Existing Condition - Subarea 1C.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Paseo Marina-Existing Condition
Subarea ID	Subarea 1C
Area (ac)	0.86
Flow Path Length (ft)	341.0
Flow Path Slope (vft/hft)	0.005
50-yr Rainfall Depth (in)	5.4
Percent Impervious	0.96
Soil Type	16
Design Storm Frequency	10-yr
Fire Factor	0
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	3.8556
Peak Intensity (in/hr)	1.8444
Undeveloped Runoff Coefficient (Cu)	0.7326
Developed Runoff Coefficient (Cd)	0.8933
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	1.417
Burned Peak Flow Rate (cfs)	1.417
24-Hr Clear Runoff Volume (ac-ft)	0.2385
24-Hr Clear Runoff Volume (cu-ft)	10389.2996



Peak Flow Hydrologic Analysis

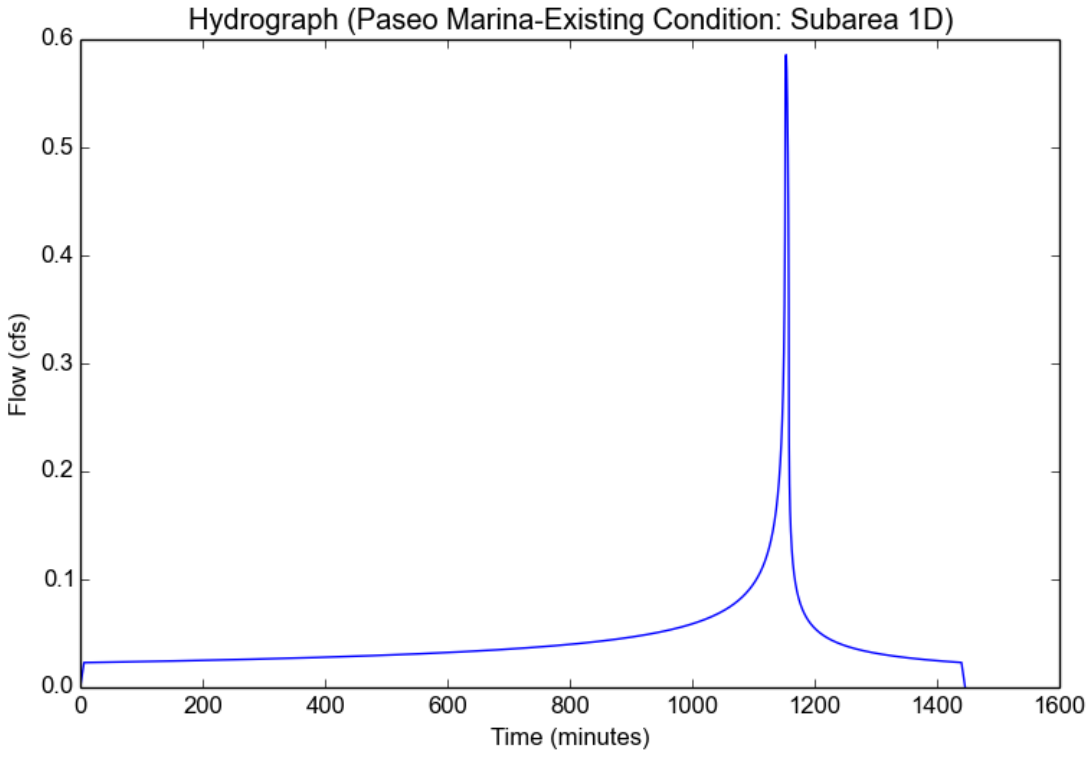
File location: C:/Users/Susan Williams/Desktop/Paseo Marina-Existing Condition - Subarea 1D.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Paseo Marina-Existing Condition
Subarea ID	Subarea 1D
Area (ac)	0.31
Flow Path Length (ft)	180.0
Flow Path Slope (vft/hft)	0.0044
50-yr Rainfall Depth (in)	5.4
Percent Impervious	0.96
Soil Type	16
Design Storm Frequency	10-yr
Fire Factor	0
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	3.8556
Peak Intensity (in/hr)	2.1114
Undeveloped Runoff Coefficient (Cu)	0.7692
Developed Runoff Coefficient (Cd)	0.8948
Time of Concentration (min)	6.0
Clear Peak Flow Rate (cfs)	0.5857
Burned Peak Flow Rate (cfs)	0.5857
24-Hr Clear Runoff Volume (ac-ft)	0.086
24-Hr Clear Runoff Volume (cu-ft)	3745.0756



Peak Flow Hydrologic Analysis

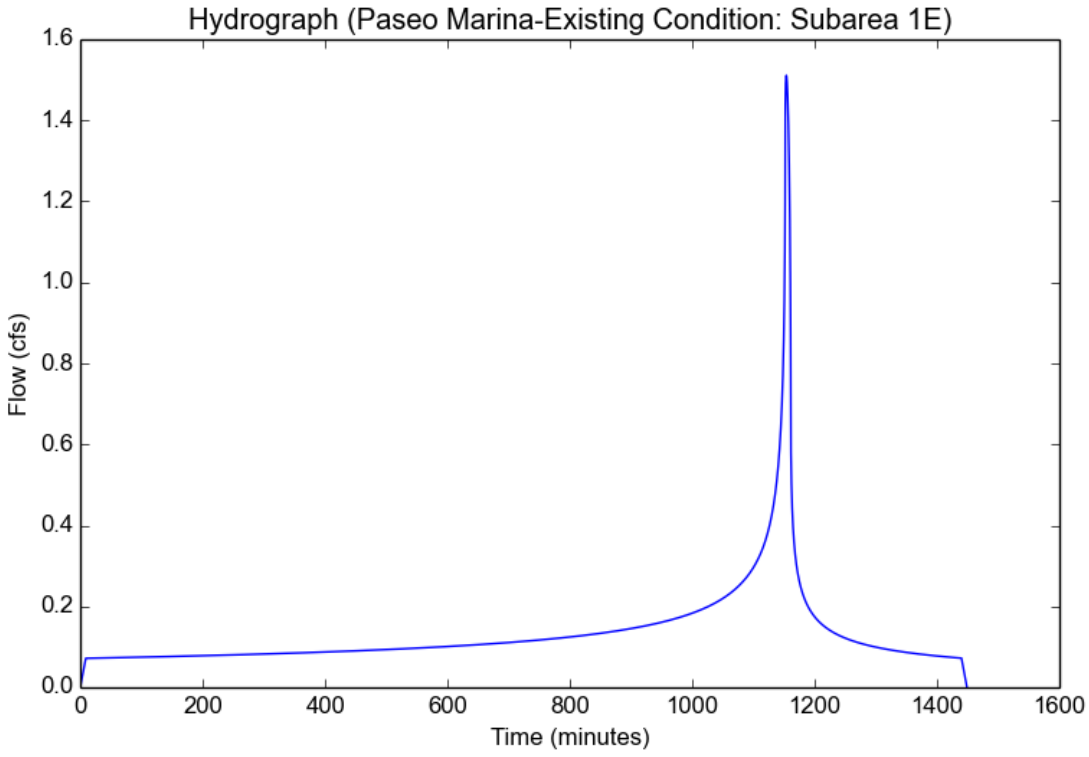
File location: C:/Users/Susan Williams/Desktop/Paseo Marina-Existing Condition - Subarea 1E.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Paseo Marina-Existing Condition
Subarea ID	Subarea 1E
Area (ac)	0.97
Flow Path Length (ft)	335.0
Flow Path Slope (vft/hft)	0.0038
50-yr Rainfall Depth (in)	5.4
Percent Impervious	0.96
Soil Type	16
Design Storm Frequency	10-yr
Fire Factor	0
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	3.8556
Peak Intensity (in/hr)	1.7451
Undeveloped Runoff Coefficient (Cu)	0.7168
Developed Runoff Coefficient (Cd)	0.8927
Time of Concentration (min)	9.0
Clear Peak Flow Rate (cfs)	1.5111
Burned Peak Flow Rate (cfs)	1.5111
24-Hr Clear Runoff Volume (ac-ft)	0.269
24-Hr Clear Runoff Volume (cu-ft)	11718.0404



Peak Flow Hydrologic Analysis

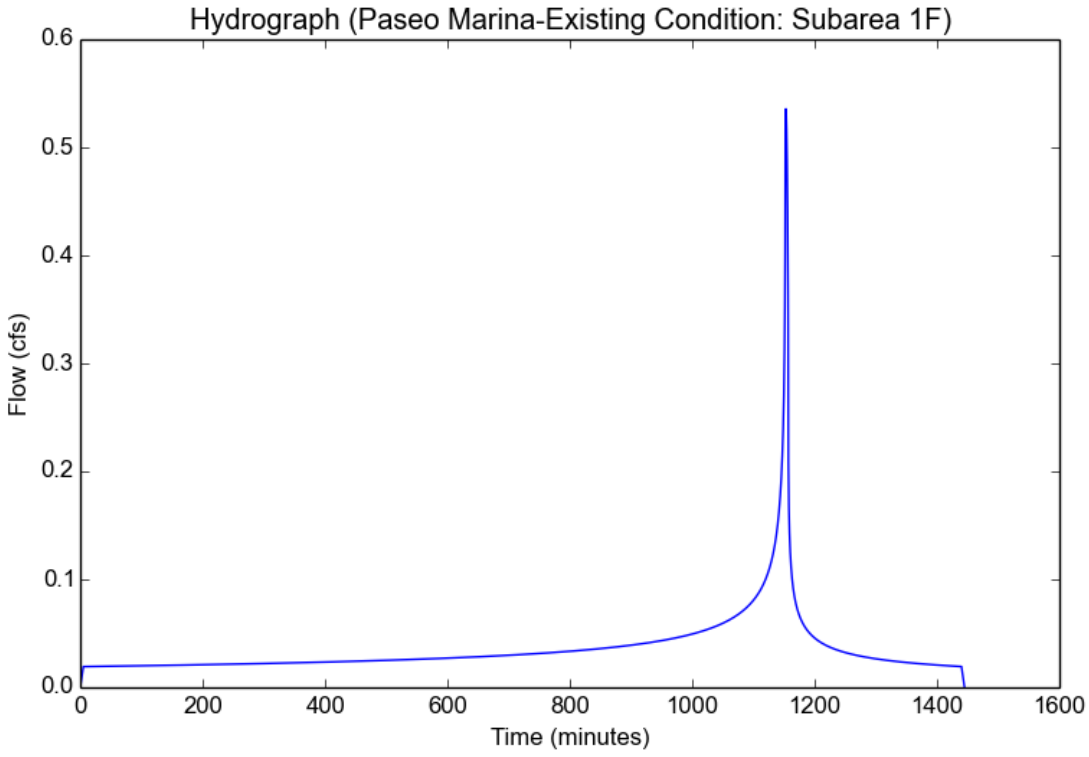
File location: C:/Users/Susan Williams/Desktop/Paseo Marina-Existing Condition - Subarea 1F.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Paseo Marina-Existing Condition
Subarea ID	Subarea 1F
Area (ac)	0.26
Flow Path Length (ft)	195.0
Flow Path Slope (vft/hft)	0.0072
50-yr Rainfall Depth (in)	5.4
Percent Impervious	0.96
Soil Type	16
Design Storm Frequency	10-yr
Fire Factor	0
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	3.8556
Peak Intensity (in/hr)	2.3004
Undeveloped Runoff Coefficient (Cu)	0.7894
Developed Runoff Coefficient (Cd)	0.8956
Time of Concentration (min)	5.0
Clear Peak Flow Rate (cfs)	0.5356
Burned Peak Flow Rate (cfs)	0.5356
24-Hr Clear Runoff Volume (ac-ft)	0.0721
24-Hr Clear Runoff Volume (cu-ft)	3141.0611



Peak Flow Hydrologic Analysis

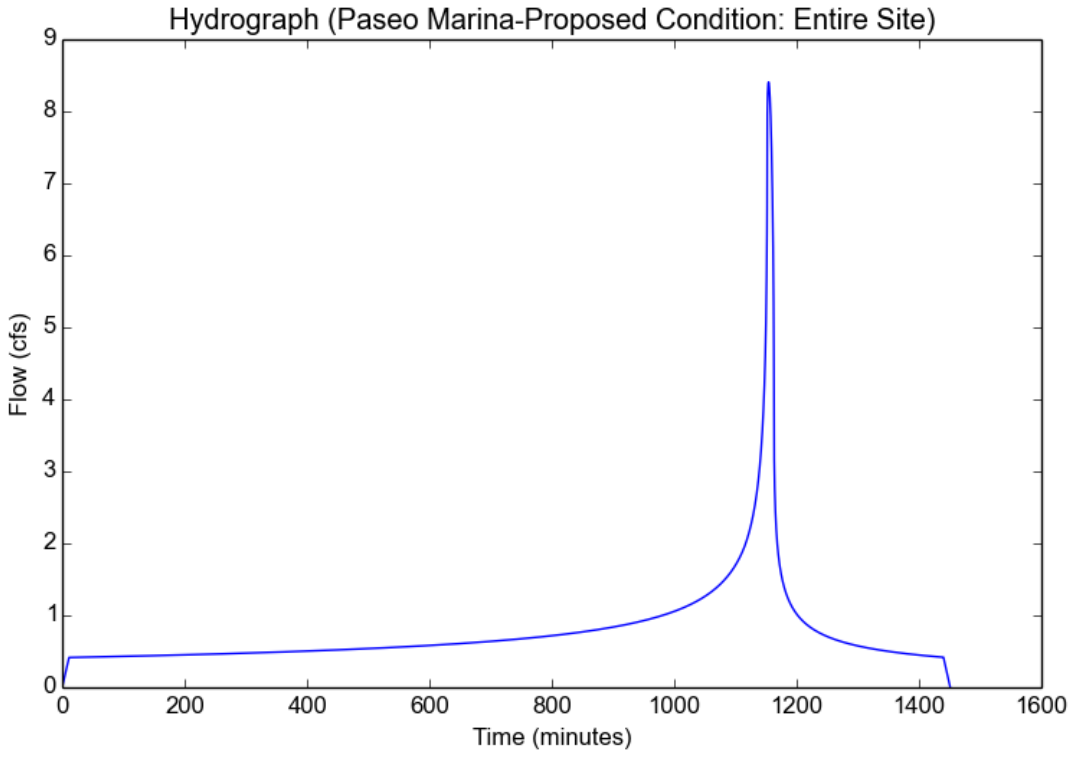
File location: C:/Users/Susan Williams/Desktop/Paseo Marina-Proposed Condition - Entire Site.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Paseo Marina-Proposed Condition
Subarea ID	Entire Site
Area (ac)	6.05
Flow Path Length (ft)	500.0
Flow Path Slope (vft/hft)	0.005
50-yr Rainfall Depth (in)	5.4
Percent Impervious	0.88
Soil Type	16
Design Storm Frequency	10-yr
Fire Factor	0
LID	False

Output Results

Modeled (10-yr) Rainfall Depth (in)	3.8556
Peak Intensity (in/hr)	1.588
Undeveloped Runoff Coefficient (Cu)	0.6918
Developed Runoff Coefficient (Cd)	0.875
Time of Concentration (min)	11.0
Clear Peak Flow Rate (cfs)	8.4067
Burned Peak Flow Rate (cfs)	8.4067
24-Hr Clear Runoff Volume (ac-ft)	1.5634
24-Hr Clear Runoff Volume (cu-ft)	68101.1989



Peak Flow Hydrologic Analysis

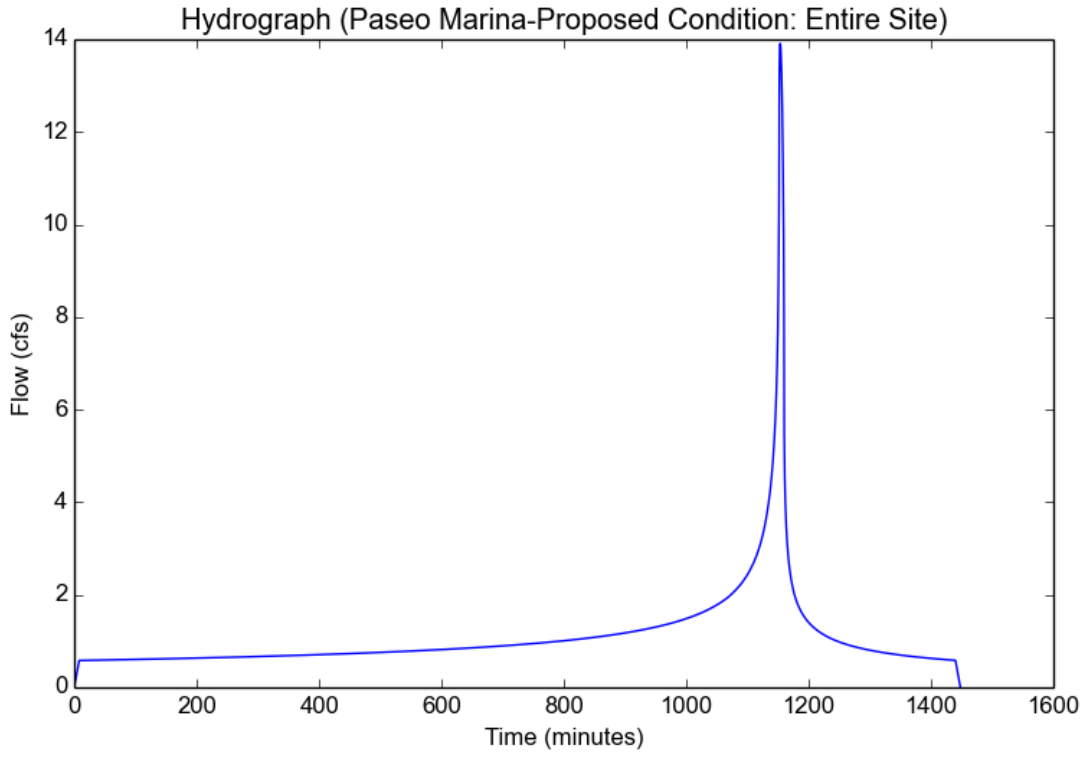
File location: C:/Users/Susan Williams/Desktop/Paseo Marina-Proposed Condition - Entire Site.pdf
Version: HydroCalc 1.0.2

Input Parameters

Project Name	Paseo Marina-Proposed Condition
Subarea ID	Entire Site
Area (ac)	6.05
Flow Path Length (ft)	500.0
Flow Path Slope (vft/hft)	0.005
50-yr Rainfall Depth (in)	5.4
Percent Impervious	0.88
Soil Type	16
Design Storm Frequency	50-yr
Fire Factor	0
LID	False

Output Results

Modeled (50-yr) Rainfall Depth (in)	5.4
Peak Intensity (in/hr)	2.5832
Undeveloped Runoff Coefficient (Cu)	0.8172
Developed Runoff Coefficient (Cd)	0.8901
Time of Concentration (min)	8.0
Clear Peak Flow Rate (cfs)	13.9103
Burned Peak Flow Rate (cfs)	13.9103
24-Hr Clear Runoff Volume (ac-ft)	2.1991
24-Hr Clear Runoff Volume (cu-ft)	95793.5626



APPENDIX C

WATER QUALITY CALCULATIONS

Peak Flow Hydrologic Analysis

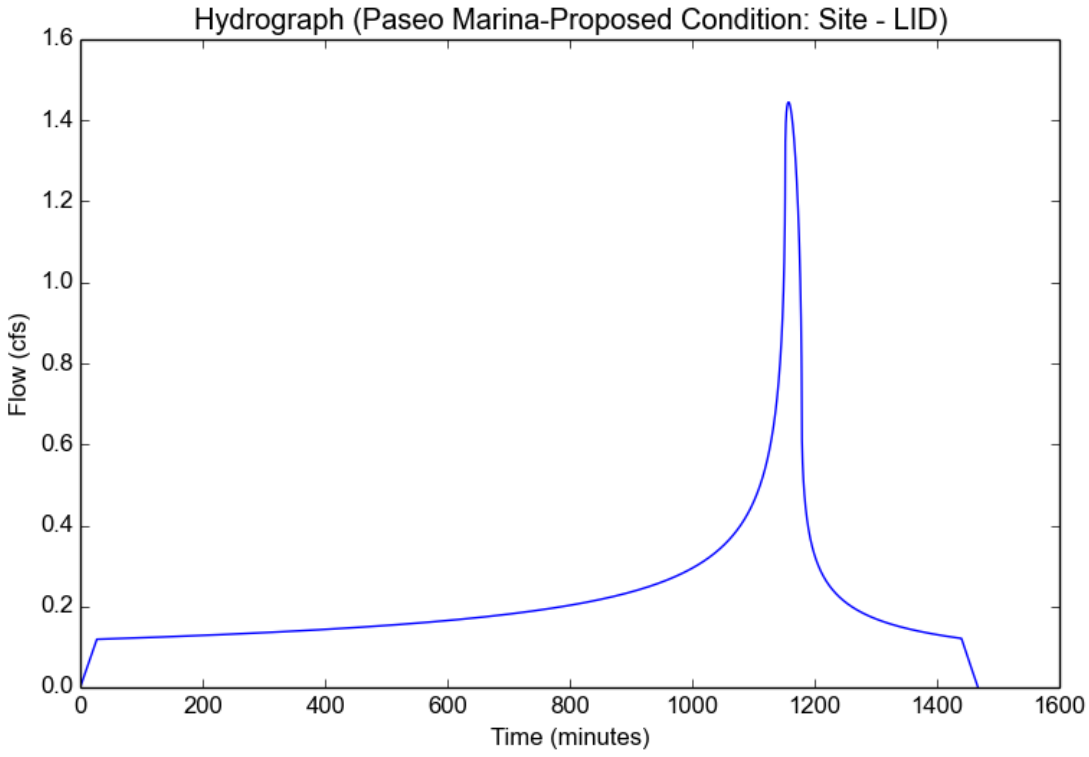
File location: C:/Users/Susan Williams/Desktop/Paseo Marina-Proposed Condition - Site - LID.pdf
Version: HydroCalc 1.0.2

Input Parameters

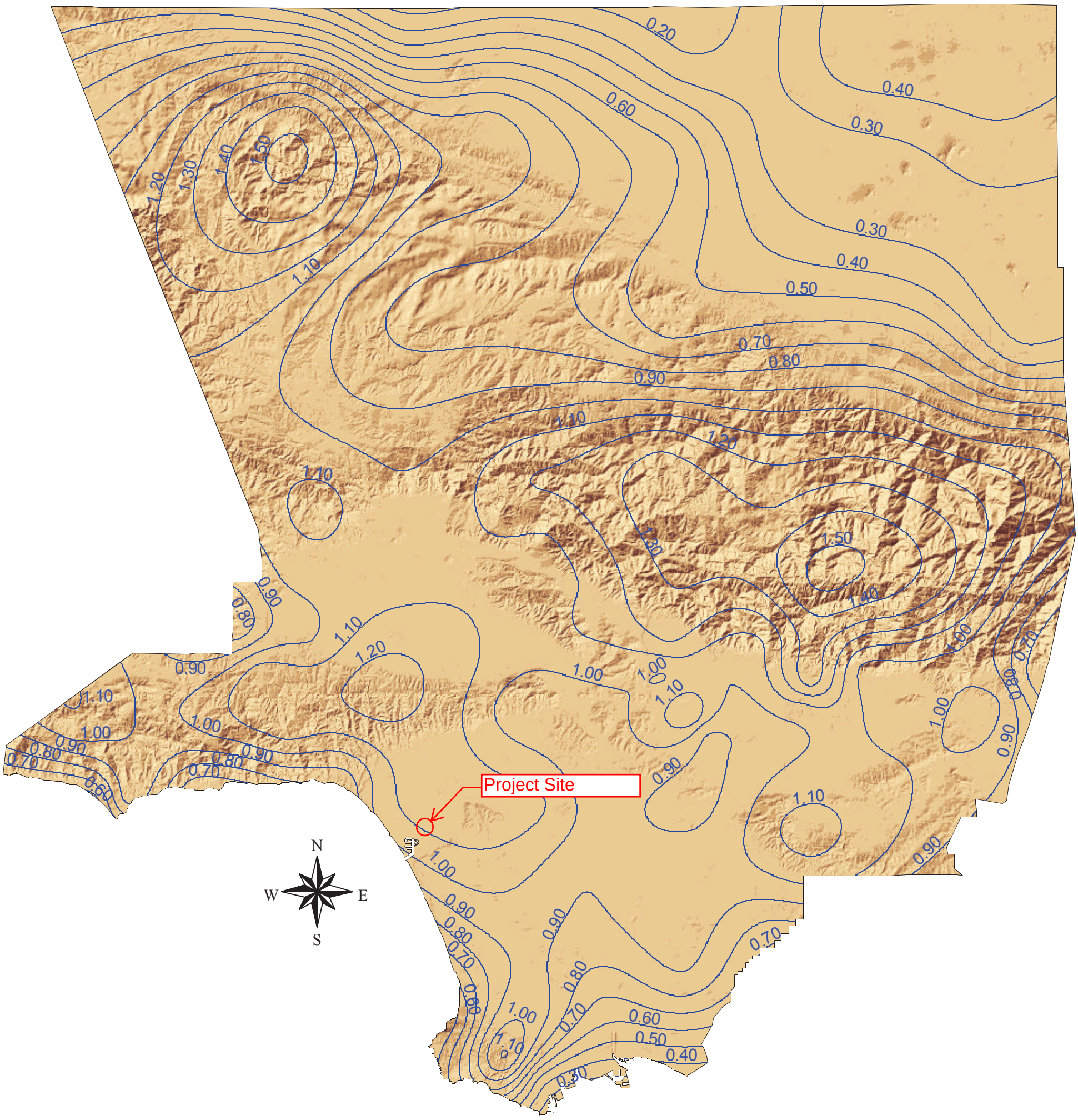
Project Name	Paseo Marina-Proposed Condition
Subarea ID	Site - LID
Area (ac)	6.05
Flow Path Length (ft)	500.0
Flow Path Slope (vft/hft)	0.005
85th Percentile Rainfall Depth (in)	1.1
Percent Impervious	0.88
Soil Type	16
Design Storm Frequency	85th percentile storm
Fire Factor	0
LID	True

Output Results

Modeled (85th percentile storm) Rainfall Depth (in)	1.1
Peak Intensity (in/hr)	0.2971
Undeveloped Runoff Coefficient (Cu)	0.1
Developed Runoff Coefficient (Cd)	0.804
Time of Concentration (min)	27.0
Clear Peak Flow Rate (cfs)	1.445
Burned Peak Flow Rate (cfs)	1.445
24-Hr Clear Runoff Volume (ac-ft)	0.4422
24-Hr Clear Runoff Volume (cu-ft)	19262.4108



85th Percentile 24-hr Rainfall Isohyetal Map



APPENDIX D

GEOTECHNICAL AND INFILTRATION FINDINGS

September 17, 2019

Sares Regis Group
140 Pine Street, Suite 300
Long Beach, California 90802

Attention: Mr. Tom Guiteras
Vice President, Development

Subject: Results of Percolation/Infiltration Testing
Proposed Paseo Marina Mixed-Use Development
13450 W. Maxella Avenue (Maxella and Glencoe Avenues)
Marina del Rey District, Los Angeles, California
GPI Project No. 2962.I

Dear Mr.Guiteras:

As requested, this report presents the results of percolation testing and infiltration rates determined by Geotechnical Professionals Inc. (GPI) for the design of stormwater disposal systems for the subject site. The testing was performed in accordance with the County of Los Angeles requirements (COLA, 2017). We have been provided with a feasibility-level geotechnical investigation report that was prepared for a prior, similar project at the site by others (Golder, 2015). GPI previously performed a geotechnical investigation for the adjacent Vons Pavilion, which included cone penetration tests and borings (GPI 2005). The information obtained from these previous reports was referenced when planning this investigation.

Based on the results of the percolation testing, the subsurface soils at the proposed location are not suitable for stormwater infiltration based on the measured field permeability. The design infiltration rates are less than 0.3 inches/hour, which is the minimum usable rate per County guidelines.

PROJECT DESCRIPTION AND BACKGROUND

We understand that Sares Regis Group is planning to construct a mixed-use development at the suject project site. The development will be a podium style project with two levels of subterranean parking, at grade retail and parking, and multiple levels of apartments above.

Based on preliminary information provided by Fuscoe Engineering Inc., the Project Civil Engineer, we understand that a new stormwater infiltration system is being considered in a proposed park/green area off the southeast side of the proposed building, along Glencoe Avenue. Fuscoe has provided us with the general area of the planned system and suggested infiltration test locations. Additional details of the proposed stormwater infiltration system have not yet been established.

5736 Corporate Avenue • Cypress, CA 90630 • (714) 220-2211 • FAX (714) 220-2122

According to the infiltration guidelines established by the County of Los Angeles, stormwater infiltration is not allowed within 10 feet of the seasonal high groundwater elevation. However, we understand that the City of Los Angles has indicated that infiltration can be performed within 5 feet of the measured groundwater level for this project.

A prior infiltration test by others (Golder, 2015) was performed at a different area of the site and at a depth of 12 feet below grade. Their field testing resulted in a measured infiltration rate of 0.8 inches per hour (without required reduction factored).

SCOPE OF SERVICES

Our scope of services for the current percolation/infiltration testing consisted of a review of prior explorations, limited field investigation, installation of test wells, field percolation testing, laboratory testing, and the preparation of this letter report.

Our field investigation consisted of one exploratory boring and the installation of two field infiltration test wells. The boring was performed to a depth of 31.5 feet below the existing grade and the wells were installed to depths of 10.2 and 11.4 feet below the existing ground surface. The exploratory boring and wells were located at the east side of the proposed building within the proposed park/green area. The locations of the explorations and wells are shown on the Proposed and Existing Site Plans, Figures 2 and 3 respectively. Detailed summaries of the soil conditions encountered in the exploratory boring are presented in the Log of Boring in the Appendix.

SUBSURFACE CONDITIONS

The soils encountered in the exploratory boring consisted of predominately very stiff clay to a depth of 16 feet with two interbedded layers of loose to medium dense silty sands at approximate depths of 5 and 7 feet below the ground surface. Below 16 feet, we encountered medium dense to dense sand with silt and gravel to the 31½-foot depth explored. The natural clay soils were generally moist to very moist, the upper sandy soils were moist to wet, and the deeper sands were wet.

Groundwater was encountered at a depth of approximately 16.5 feet below the existing ground surface. Based on data from the State of California (CDMG, 1998), the historical shallowest depth to groundwater within the site vicinity is approximately 6 feet below existing grades.

RESULTS OF LABORATORY TESTING

We performed laboratory tests to determine the moisture content, percent fines (silts and clays), as well as the potential for collapse (hydroconsolidation) for select samples of the on-site soils. For determination of fines contents, selected soil samples were dried, weighed, soaked in water until individual soil particles were separated, and then washed on the No. 200 sieve. That portion of the material retained on the No. 200 sieve was oven-dried and weighed to determine the percentage of the material passing the No. 200 sieve. The results of the tests are shown in the table below:

Fines Content of Selected Samples

BORING NO.	DEPTH (ft)	SOIL DESCRIPTION	PERCENT PASSING No. 200 SIEVE
B-1	5	Silty Sand (SM)	31
B-1	10	Sandy Clay (CL)	51
B-1	20	Sand with Silt (SP-SM)	6

A collapse (hydroconsolidation) test was performed on a select, undisturbed ring sample in accordance with ASTM D 5333. The sample was trimmed, placed in a consolidometer, and loaded to 0.4 kips per square foot (ksf). Thereafter, the samples were incrementally loaded to 1.6 ksf and then saturated. Sample deformation was measured to 0.0001 inch. The amount of collapse is shown below as a percent compression of the sample.

Collapse Potential of Selected Samples

BORING NO.	DEPTH (ft)	SOIL DESCRIPTION	SURCHARGE (PSF)	TOTAL COMPRESSION (%)	
				BEFORE SATURATION	AFTER SATURATION
B-1	12	Clay (CL)	1600	4.02	4.05

Moisture contents were determined for a number of samples. The samples were weighed and then dried in accordance with ASTM D 2216. After drying, the weight of each sample was measured, and moisture content was calculated. Moisture content values are presented on the boring log in the appendix.

RESULTS OF PERCOLATION TESTING

To evaluate the infiltration characteristics for the proposed infiltration system, we performed two field infiltration tests in the existing asphalt parking area east of the existing retail building along Glencoe Avenue. Based on the groundwater conditions encountered in our exploration (approximately 16½ feet below ground surface), the test wells P-1 and P-2 were installed to approximate depths of 10 and 11½ feet.

The test wells were installed in boreholes drilled using truck-mounted, 8-inch diameter hollow-stem auger drill equipment. The wells consisted of 2-inch diameter PVC casing installed in an 8-inch diameter borehole and the annular space was backfilled with well sand to maintain an open hole.

Prior to testing, the holes were presoaked in accordance with the requirements of the County. Evaluation of the infiltration rate began during the initial soak. However, the final preadjusted rate did not take the initial readings into consideration as they occurred during the soak period. We performed our infiltration tests over 30-minute intervals.

The test wells were filled with at least 2-feet of water at the initiation of the test. The tests were repeated at least 6 times and until a stabilized rate of drop was determined. A stabilized rate is defined as three or more consecutive readings in which the highest and lowest readings are within 10 percent of each other.

Once the stabilized field flowrate (volume per unit time) or drop is determined, we calculated the raw percolation rate by dividing the volume of water discharged by the wetted surface area of the test section in a given amount of time. The wetted area is composed of the sidewalls and bottom of the boring. The average of the stabilized raw percolation rate over the last three consecutive readings is the *measured percolation rate* at the test location and is typically expressed in units of inches per hour.

A summary of the measured percolation rates is provided below:

WELL NO.	Approximate Depth (feet)	Measured Percolation Rate (inches/hour)
P-1	10	0.00
P-2	11½	0.01

The above measured percolation rates must be reduced to determine the design infiltration rate for the proposed infiltration BMP. Reduction factors (RF) account for the test method, site variability, and long-term siltation of the proposed system should be determined during the design phase of the project. Typical values for these reduction factors are provided in the following table:

DESCRIPTION	REDUCTION FACTORS (RF)*
Boring Percolation	$RF_t = 2$
Site variability and thoroughness of subsurface investigation	$RF_v = 1$ to 3
Long-term siltation and maintenance	$RF_s = 1$ to 3

* Range of values provided in "Guidelines for Geotechnical Investigation and Reporting Low Impact Development Stormwater Infiltration", GS200.2, dated June 30, 2017

The reduction factor for test method, RF_t, should equal 2 because the boring percolation test method was used. Based on the number of borings performed and the uniformity of the subsurface conditions, it is our opinion that a reduction factor for site variability, RF_v, of 1 may be used. The reduction factor for long-term siltation and maintenance, RF_s, should be selected by the system designer.

Well No. and Approximate Depth	**P-1 (10 ft)**	**P-2 (11½ ft)**
Measured Percolation Rate (in/hr)	0.00	0.01
Test Method: $\mathbf{RF_t}$	2	2
Site Variability and Thoroughness of Subsurface Investigation: $\mathbf{RF_v}$	1	1
Long-term Siltation and Maintenance: $\mathbf{RF_s}$	1 – 3	1 – 3
Design Infiltration Rate Range (inches/hour)	0.00	0.00

The results of the infiltration tests are presented in Table 1, Borehole Infiltration Test Results.

CONCLUSIONS AND RECOMMENDATIONS

Based on our recent exploration and field testing, the sandy clay and clay soils encountered between 10 and 16 feet below grade are not considered conducive to infiltration due to the low infiltration rates. The silty sand soils layers encountered at depths of 5 and 7.5 feet in the boring are also not considered to be conducive to infiltration due the potential for mounding in relatively thin layers of potentially permeable soils overlying practically impermeable layers or groundwater. In addition, infiltration at shallower depths would require that hydrostatic pressures be considered for the subterranean levels of the adjacent structures.

Based on County guidelines, it is recommended that the corrected infiltration rate be equal to or greater than 0.3 inches per hour. As noted above, the measured rates (without further correction) ranged between 0.00 and 0.01 inches per hour. Additionally, the volume of water applied during our testing was relatively low as compared to the planned stormwater system.

The natural clayey soils beneath the proposed infiltration elevation were found to exhibit a low potential for collapse when wetted (approximately 0.03 percent of the thickness of the clay). Based on the subsurface soils encountered, the collapse potential would likely result in a hydroconsolidation settlement of less than ¼-inch if inundated.

LIMITATIONS

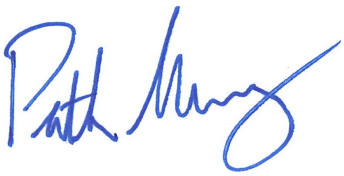
The report, exploration logs, and other materials resulting from GPI's efforts were prepared exclusively for use by Sares Regis Group and their consultants in designing the proposed development. The report is not suitable for a project other than the currently proposed development.

Soil deposits may vary in type, strength, and many other important properties between points of exploration due to non-uniformity of the geologic formations or to man-made cut and fill operations. While we cannot evaluate the consistency of the properties of materials in areas not explored, the conclusions drawn in this report are based on the assumption that the data obtained in the field and laboratory are reasonably representative of field conditions and are conducive to interpolation and extrapolation.

Furthermore, our recommendations were developed with the assumption that a proper level of field observation and construction review will be provided during grading, excavation, and construction by GPI. If field conditions during construction appear to be different than is indicated in this report, we should be notified immediately so that we may assess the impact of such conditions on our recommendations. If construction phase services are performed by others, they must accept full responsibility for geotechnical aspects of the project, including this report.

Our investigation and evaluations were performed using generally accepted engineering approaches and principles available at this time and the degree of care and skill ordinarily exercised under similar circumstances by reputable Geotechnical Engineers practicing in this area. No other representation, either expressed or implied, is included or intended in our report.

Respectfully submitted,
Geotechnical Professionals Inc.



Patrick I.F. McGervey, P.E.
Staff Engineer

Paul R. Schade, G.E
Principal

Enclosures: Reference
- Figure 1 - Site Location Map
- Figure 2 - Existing Site Plan
- Figure 3 - Proposed Site Plan
- Table 1 - Borehole Infiltration Test Results
- Appendix - Exploratory Boring
  - Figure A-1 Logs of Borings

REFERENCES

California Department of Conservation, Division of Mines and Geology (1998), "Seismic Hazard Zone Report for the Venice 7.5-Minute Quadrangle, Los Angeles County, California", Seismic Hazard Zone Report 036".

Geotechnical Professionals Inc. (2005), "Geotechnical Investigation, Proposed Building Expansion, Existing Vons Store #2105,4365 Glencoe Avenue, Los Angeles, California," GPI Project No. 2072.I, dated December 21, 2005.

Golder Associates (2015), "Geotechnical Feasibility Report, Marina Marketplace Phase III, 13450 W. Maxella Avenue, Marina Del Rey, California," dated January 16, 2015.

County of Los Angeles (2017), "Guidelines for Geotechnical Investigation and Reporting, Low Impact Development Stormwater Infiltration," Geotechnical and Materials Engineering Division Administrative Manual, GS200.2, dated June 30, 2017.

0 2000 4000 FEET

BASE MAP REPRODUCED FROM USGS 7.5' TOPO MAPS © CALTOPO

GEOTECHNICAL PROFESSIONALS, INC.

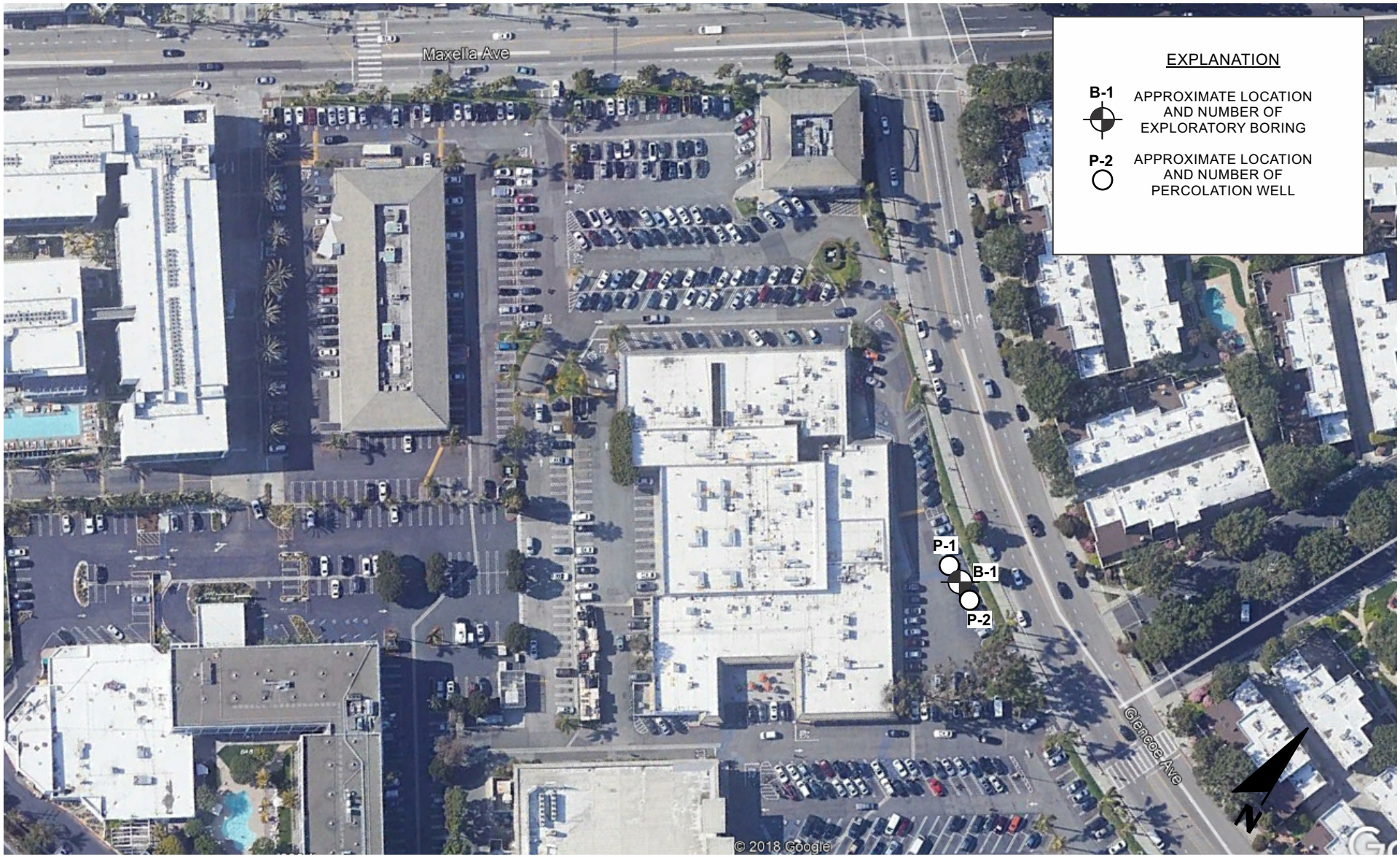
SITE LOCATION MAP

PASEO MARINA

GPI PROJECT NO.: 2962.I

SCALE: 1" = 2000'

FIGURE 1



0 120 240 FEET

BASE MAP REPRODUCED FROM GOOGLE EARTH © 2018

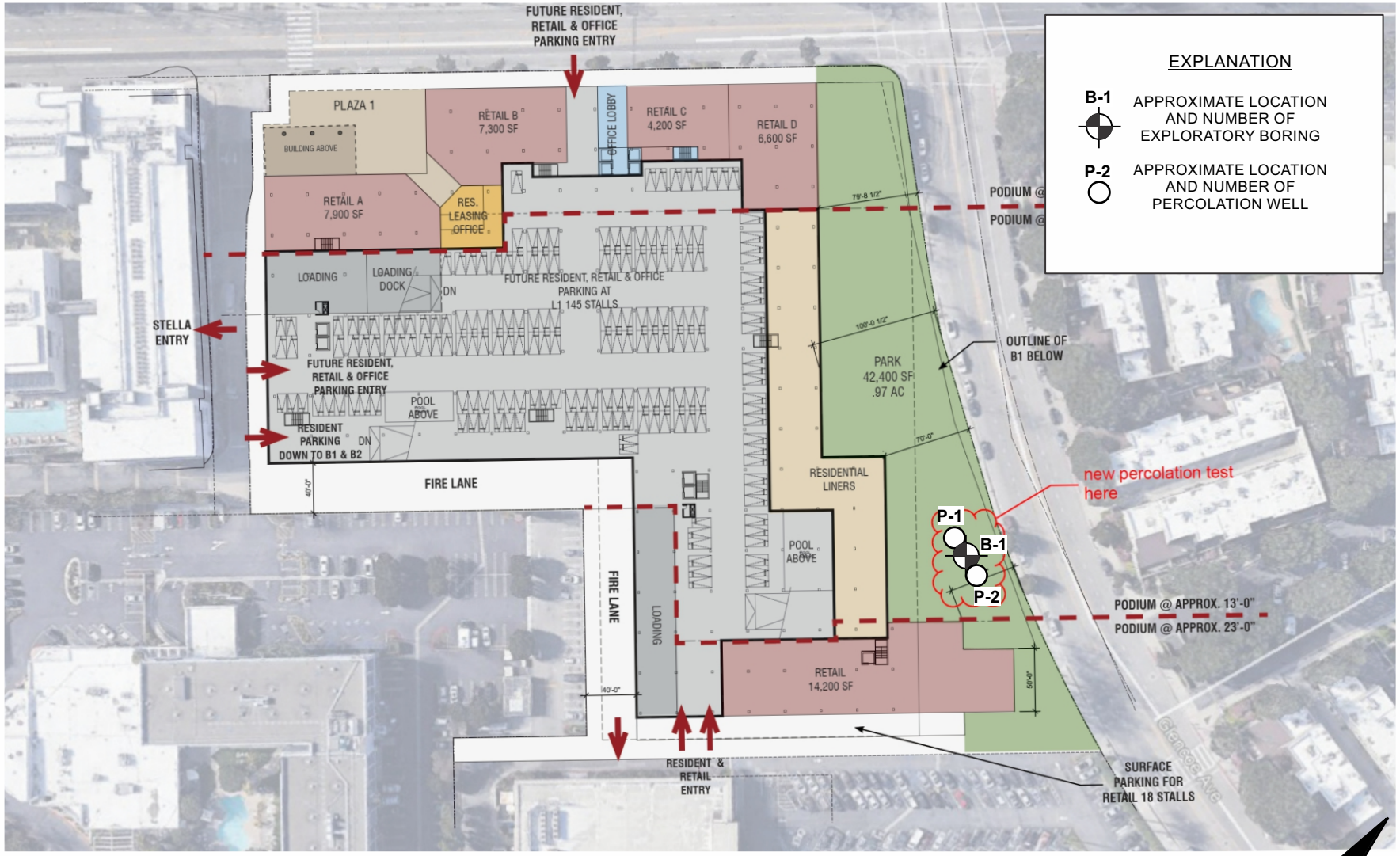
GPI GEOTECHNICAL PROFESSIONALS, INC.

PASEO MARINA

GPI PROJECT NO.: 2962.I | SCALE: 1" = 120'

EXISTING SITE PLAN

FIGURE 2



BASE MAP REPRODUCED FROM YIELD STUDY_OFFICE, RETAIL & RES. OPTION 5 PLAN BY TCA ARCHITECTS, DATED JULY 30, 2019

GPI GEOTECHNICAL PROFESSIONALS, INC.

PASEO MARINA

GPI PROJECT NO.: 2962.I | SCALE: 1" = 120'

PROPOSED SITE PLAN

FIGURE 3

TABLE 1 (Continued)

BOREHOLE INFILTRATION TEST RESULTS
- Boring Percolation Test Method
Los Angeles County Guidelines - Low Impact Design (GS200.2, 06/30/17)

Project Name: Paseo Marina
Project No: 2962.I
Technician: JA

Date: 9/17/2019
Test Date: 9/4/2019

Test Well (west)	Test Duration (min)	Depth of Well (ft)	Depth to Water Initial* (ft)	Depth to Water Final (ft)	Initial Water Depth (ft)	Final Water Depth (ft)	Water Level Drop (ft)	Hole Diameter (inches)	Volume of Water Discharged (in^3)	Wetted Area (in^2)	**Measured Percolation Rate** (in/hr)**
	Δt				d_1	d_f	Δd	*DIA*			
P-2	30.00	11.35	3.73	3.86	7.62	7.50	0.13	8	75.4	2310.7	**0.07**
P-2	30.00	11.35	3.98	4.04	7.37	7.32	0.05	8	33.2	2256.4	**0.03**
P-2	30.00	11.35	4.09	4.15	7.26	7.20	0.06	8	36.2	2221.7	**0.03**
P-2	30.00	11.35	4.21	4.29	7.14	7.07	0.08	8	45.2	2181.0	**0.04**
P-2	30.00	11.35	4.36	4.38	6.99	6.97	0.02	8	12.1	2152.4	**0.01**
P-2	30.00	11.35	4.40	4.45	6.95	6.91	0.04	8	27.1	2132.8	**0.03**
P-2	30.00	11.35	4.49	4.54	6.86	6.82	0.04	8	27.1	2105.6	**0.03**
P-2	30.00	11.35	4.58	4.63	6.77	6.72	0.05	8	30.2	2077.0	**0.03**

* Test well pipe may be higher than ground surface

** Must be reduced to determine design infiltration rate. Recommended reduction factors (RF_t, RF_v, RF_s) included in report.

TABLE 1

BOREHOLE INFILTRATION TEST RESULTS
- Boring Percolation Test Method
Los Angeles County Guidelines - Low Impact Design (GS200.2, 06/30/17)

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	Δt				d_1	d_f	Δd	*DIA*			
P-1	60.00	10.23	9.05	9.06	1.18	1.18	0.00	8	3.0	404.6	**0.01**
P-1	30.00	10.23	8.95	8.97	1.28	1.27	0.02	8	9.0	431.8	**0.04**
P-1	30.00	10.23	8.98	9.01	1.25	1.23	0.03	8	15.1	419.7	**0.07**
P-1	30.00	10.23	8.87	8.87	1.36	1.36	0.00	8	0.0	460.4	**0.00**
P-1	30.00	10.23	8.87	8.88	1.36	1.36	0.00	8	3.0	458.9	**0.01**
P-1	30.00	10.23	8.88	8.88	1.35	1.35	0.00	8	0.0	457.4	**0.00**
P-1	30.00	10.23	8.88	8.89	1.35	1.35	0.01	8	3.0	455.9	**0.01**

* Test well pipe may be higher than ground surface

** Must be reduced to determine design infiltration rate. Recommended reduction factors (RF_t, RF_v, RF_s) included in report.

APPENDIX

APPENDIX

EXPLORATORY BORING

The subsurface conditions at the site were investigated by drilling and sampling one exploratory boring. The boring was advanced to a depth of 31½ feet below the existing ground surface. The location of the exploration is shown on the Proposed and Existing Site Plans, Figures 2 and 3 respectively.

The boring was drilled using truck-mounted hollow-stem auger and hand auger drill equipment. Relatively undisturbed samples were obtained using a brass-ring lined sampler (ASTM D 3550). The brass-rings have an inside diameter of 2.42 inches. The ring samples were driven into the soil by a 140-pound hammer dropping 30 inches. The number of blows needed to drive the sampler into the soil was recorded as the penetration resistance.

At selected locations, disturbed samples were obtained using a split-spoon sampler by means of the Standard Penetration Test (SPT, ASTM D 6066). The spoon sampler was driven into the soil by a 140-pound hammer dropping 30 inches, employing the “free-fall” hammer described above. After an initial seating drive of 6 inches, the number of blows needed to drive the sampler into the soil a depth of 12 inches was recorded as the penetration resistance. These values are the raw uncorrected blowcounts.

The field explorations for the investigation were performed under the continuous technical supervision of GPI's representative, who visually inspected the site, maintained detailed logs of the borings, classified the soils encountered, and obtained relatively undisturbed samples for examination and laboratory testing. The soils encountered in the borings were classified in the field and through further examination in the laboratory in accordance with the Unified Soils Classification System. A detailed log of the boring is presented in Figure A-1 in this appendix.

The boring location was laid out in the field by measuring from existing site features. Ground surface elevations at the exploration locations were estimated from internet sources and should be considered approximate.

MOISTURE (%)	DRY DENSITY (PCF)	PENETRATION RESISTANCE (BLOWS/FOOT)	SAMPLE TYPE	DEPTH (FEET)	DESCRIPTION OF SUBSURFACE MATERIALS This summary applies only at the location of this boring and at the time of drilling. Subsurface conditions may differ at other locations and may change at this location with the passage of time. The data presented is a simplification of actual conditions encountered.	ELEVATION (FEET)
				0	3.5-Inch AC over 3.5-Inch BASE	
14.2	113	43	D		Natural: **CLAY (CL)** dark grey, moist, very stiff, trace sand, trace gypsum	20
10.6	112	15	D	5	**SILTY SAND (SM)** brown, moist, medium dense, trace gravel	
18.8	105	14	D		**CLAY (CL)** brown, moist to very moist, stiff	
					SILTY SAND (SM) brown, wet, loose, with gravel	15
19.9	105	13	D	10	**SANDY CLAY (CL)** brown, very moist, stiff	
20.5	100	11	D		**CLAY (CL)** brown, very moist, firm	10
19.0	107	26	D	15	@ 15 feet, very stiff	
					SAND WITH SILT (SP-SM) light brown, wet, medium dense, with gravel	5
10.8		14	S	20	@ 20 feet, very moist	
						0
8.7		45	S	25	@ 25 feet, dense	
						-5
16.6		73/11"	S	30	@ 30 feet, wet	
					Total Depth 31.5 feet	

SAMPLE TYPES
- C Rock Core
- S Standard Split Spoon
- D Drive Sample
- B Bulk Sample
- T Tube Sample

DATE DRILLED: 9-4-19

EQUIPMENT USED: 8 " HOLLOW STEM AUGER

GROUNDWATER LEVEL (ft): 17

GPI

PROJECT NO.: 2962.I

PASEO MARINA

LOG OF BORING NO. B-1

FIGURE A-1

Carlin Environmental Consulting, Inc.

Assessment > Remediation > Mitigation Design

February 13, 2017

Prepared for:
Sares-Regis Group
18825 Bardeen Ave.
Irvine, CA 92612

Attn: Tom Guiteras
(Transmitted via email to
tguiteras@sare-regis.com)

Subject: **Methane Investigation Report – Report on Methane Investigation conducted at 13400 Maxella Ave. Marina Del Rey, California.**

Introduction:

Carlin Environmental Consulting, Inc. (CEC) is pleased to prepare this report regarding the methane investigation conducted at 13400 Maxella Avenue in the City of Marina Del Ray, Los Angeles County, California, 90292, hereafter referred to as the Site. The property identified for this investigation consists of two parcels (APN: 4212-004-015 and 4212-004-021). A previous Phase I Environmental Site Assessment Report conducted by California Environmental and published in September 2016 was reviewed by CEC for relevant information regarding this methane investigation.

The Site consists of approximately 6.81 acres combined over two parcels located at the intersection of Maxella Ave and Glencoe Ave. Currently, the Site is occupied with three commercial use buildings, and one building contains multiple tenants. The remainder of the site is covered with asphalt for parking, sidewalks, or landscaping planters.

Methane Probe Installations and Sampling:

On February 3rd, 2017, CEC personnel installed 11 soil vapor probes to depths of approximately 5 feet below ground surface throughout the Site (Figure 1). Borings were hand augured. Probes were placed according to the LADBS Site Testing Standards for Methane (Figure 2).

Soil gas measurements were taken from an RKI Instruments Eagle Series multi-gas detector. This instrument was utilized to determine the methane concentrations from the probes. The rental company, Geotechnical Services of Tustin, California, which is certified by the manufacturer of the instrument to conduct calibration, calibrated it prior to the days of usage. The instrument was

calibrated by the rental company to 25,000 ppm and thus has a +/- accuracy range of 250 ppm. Soil gas measurements were taken on February 8th and 9th.

The field instrument was connected to the probe and allowed to measure methane concentrations continuously as vapor was extracted from the probe. It has been CEC's experience over the last 10+ years that field instrument readings provide equal or better accuracy than laboratory results when measuring methane concentrations. Thus, we recommend no laboratory analysis.

The recorded readings are presented on Table 1 were the highest readings shown by the instrument on each probe. That is some of the values reached a steady state that was slightly lower than the peak value. Nevertheless, we consider the values shown, as indicating that methane in this area of the site needs to be address at the appropriate level.

Investigation Results:

This section provides the results of each of the 11 probes. Each probe was tested twice with at least 24 hours in between. Probe #4 was disturbed and removed between installations and first testing, thus no readings are available.

Table 1 – Methane Probe Readings

Methane Probe Readings (ppm)										
	#1	#2	#3	#5	#6	#7	#8	#9	#10	#11
First Reading 2-8-17	1000	630	15	10	80	460*	440*	n/a*	220*	20
Second Reading 2-9-17	700	1050	40	110	15	300*	230*	290*	380*	120

*Immediate water in tube and unable to acquire reading or immediate water with initial recording.

Conclusions and Recommendations:

The Site is located in a Methane Buffer Zone, as designated by the LADBS. Based on the LADBS Standard Plan for Methane Hazard Mitigation, the Site would be categorized as a Level III Site Design as a result of the highest methane readings being between 1,001 and 5,000 ppm (high of 1,050 ppm) and Design Methane Pressure (inches of water column) ≤ 2".

Under these qualifications, the Site would require, under LADBS Methane Code, no methane mitigation requirements. See the attached Table 1B – Mitigation Requirements for Methane Buffer Zone from Sheet 4 of the LADBS Standard Plan for Methane Hazard Mitigation.

Attachments

Figure 1 – Probe Map
Figure 2 – Soil Gas Probe Set Up
Table 1 – Methane Probe Results
Figure 3 – Table 1B from LADBS Methane Code
Figure 4 – LADBS Form 1 – Certificate of Compliance for Methane Test Data

We appreciate the opportunity to be of service. Please contact us if there are any further questions or comments.

Sincerely,
Carlin Environmental Consulting, Inc.

Gary Carlin
President
Senior Environmental Scientist

Don Terres
P.G. #4349, C.E.G. #1362

Justin Allen
Staff Environmental Scientist

Carlin Environmental Consulting, Inc.

Assessment > Remediation > Mitigation Design

Paseo Marina Probe Location Map

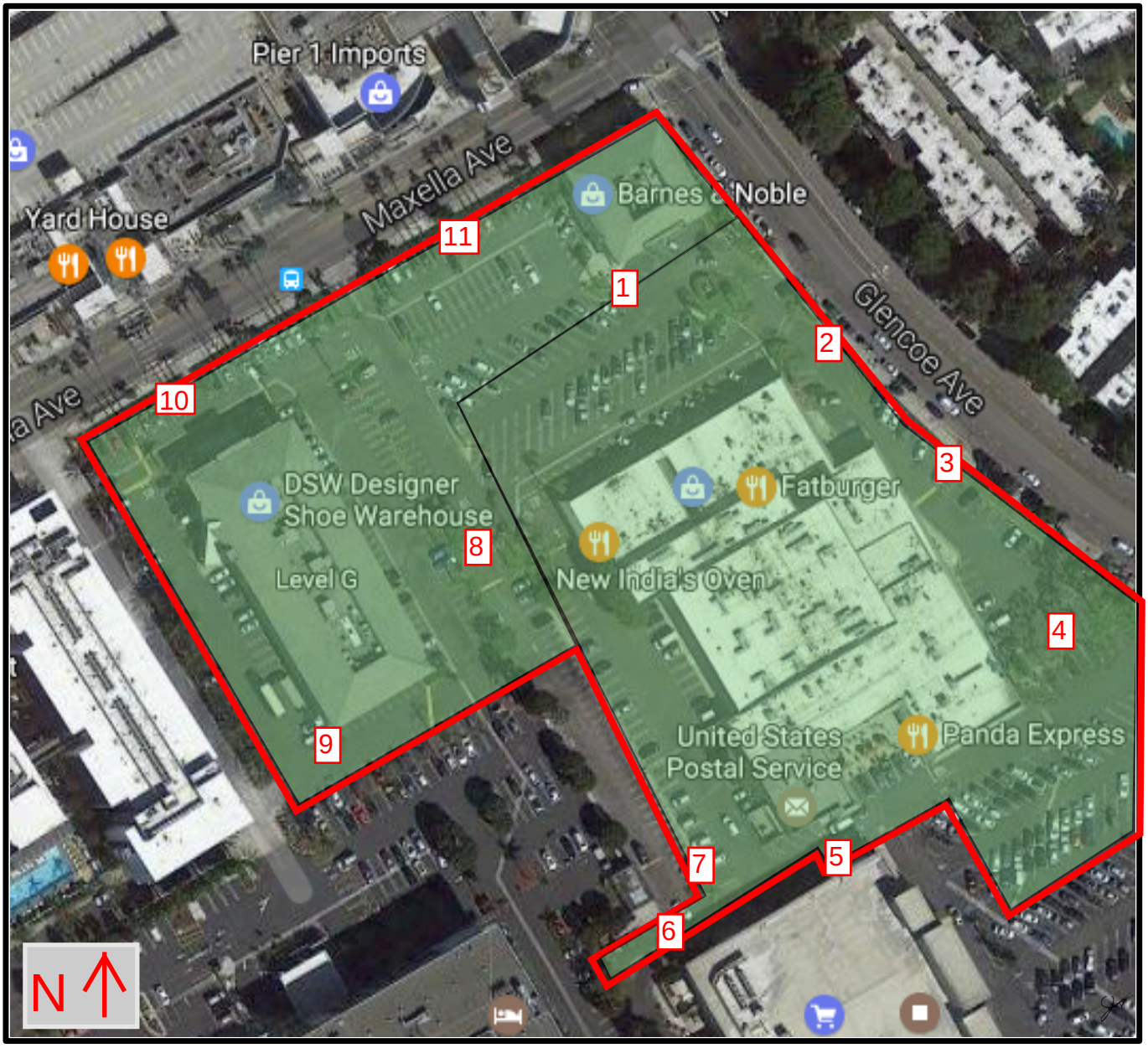


Image taken from Google Maps. 2-9-17

Legend

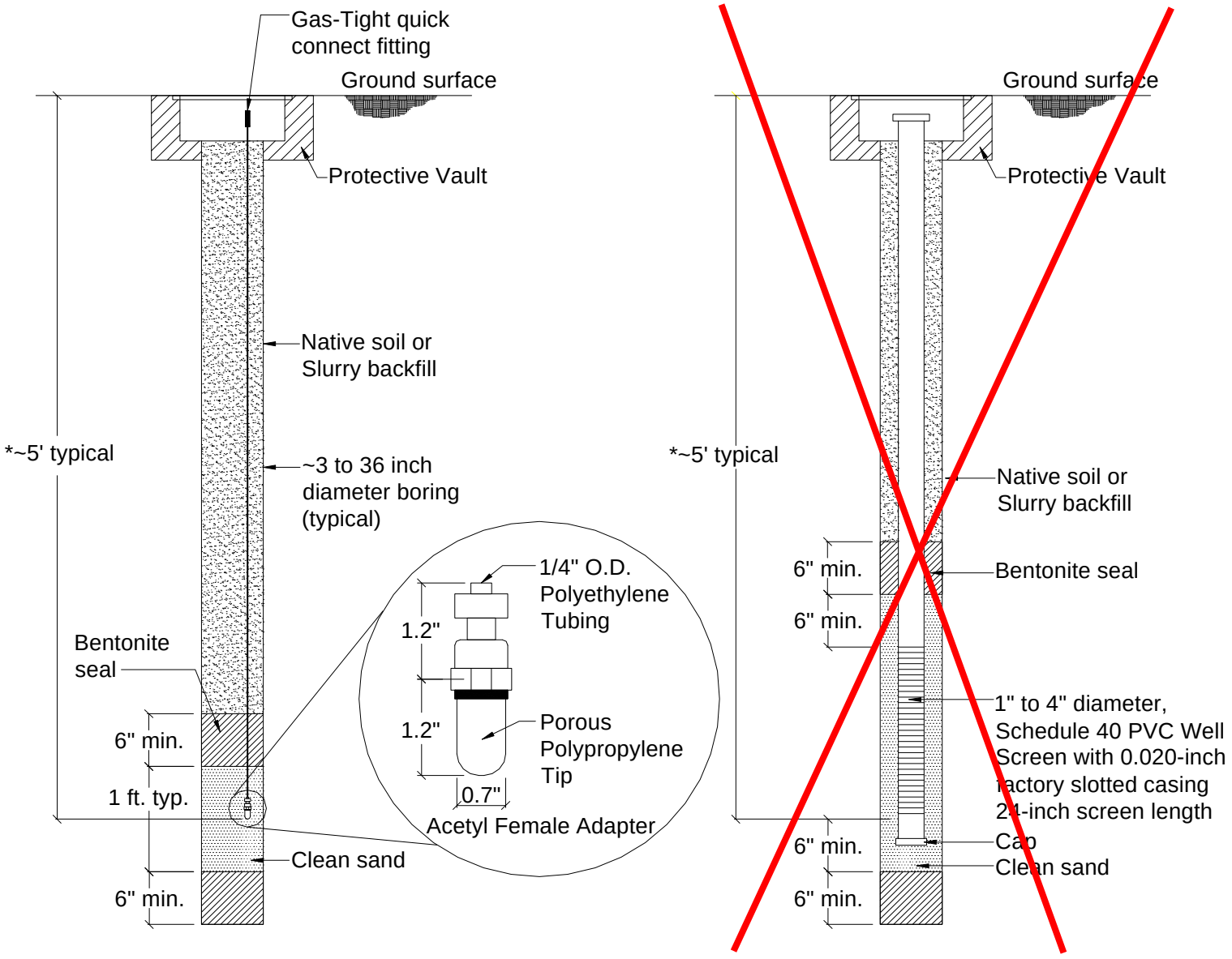
1 Probe Locations with #

Parcel Boundary

Approximate Site Boundary

2522 Chambers Road # 100 Tustin, CA 92780
Phone: 714-508-1111

SHALLOW SOIL GAS TEST EQUIPMENT SET-UP



*Note: Measurement from Shallow Soil Gas Test shall be taken above ground water level.

As a covered entity under Title II of the Americans with Disabilities Act, the City of Los Angeles does not discriminate on the basis of disability and, upon request, will provide reasonable accommodation to ensure equal access to its programs, services and activities. For efficient handling of information internally and in the internet, conversion to this new format of code related and administrative information bulletins including MGD and RGA that were previously issued will allow flexibility and timely distribution of information to the public.

Table 1 - Methane Probe Readings

Sares Regis - Paseo Marina - 13400 Maxella Ave, Marina Del Rey

	2/8/17		2/9/17		Notes	Probe Location
Probe Number	CH4 (ppm)	Time	CH4 (ppm)	Time		
1	1000	8:05 AM	700	2:00 PM		Near Barnes & Noble
2	630	8:10 AM	1050	2:05 PM		In front of Coffee Bean
3	15	8:12 AM	40	2:08 PM		In front of AMC & Fatburger
4	N/A	-	N/A	-	Removed before testing	In front of O' My Sole
5	10	8:16 AM	110	1:35 PM		Side of Pavillions
6	80	8:18 AM	15	1:40 PM		Side of Pavillions
7	460	8:22 AM	300	1:37 PM	Water	Side of Pavillions, further out
8	440	8:27 AM	230	1:43 PM	Water	East side of DSW
9	N/A	8:30 AM	290	1:48 PM	Water	SW side of DSW
10	220	8:35 AM	380	1:52 PM	Water	NW side of DSW
11	20	8:40 AM	120	1:55 PM		West of Barnes & Noble

* Pressure readings for all probes were less than 0.1 inches

CH4 = Methane ppm = parts per million

2-14-17

Table 1B - MITIGATION REQUIREMENTS FOR METHANE BUFFER ZONE (See notes)

Site Design Level			Level I		Level II		Level III		Level IV		Level V
Design Methane Concentration (ppmv)			0 - 100		101 - 1,000		1,001 - 5,000		5,001 - 12,500		> 12,500
Design Methane Pressure (See note 1) (Inches of water column)			≤ 2"	> 2"	≤ 2"	> 2"	≤ 2"	> 2"	≤ 2"	> 2"	All Pressure
PASSIVE SYSTEM	De-watering System			X		X		X	X	X	X
	Sub-Slab Vent System	Perforated Horizontal Pipes		X		X		X	X	X	X
		Gravel Blanket Thickness Under Impervious Membrane		2"		3"		3"	2"	4"	4"
		Gravel Thickness Surrounding Perforated Horizontal Pipes		2"		3"		3"	2"	4"	4"
		Vent Risers		X		X		X	X	X	X
	Impervious Membrane			X		X		X	X	X	X
ACTIVE SYSTEM	Sub-Slab System	Mechanical Extraction System (See note 2)								X	X
	Lowest Occupied Space System	Gas Detection System (See note 3)		X		X		X	X	X	X
		Mechanical Ventilation (See Notes 3, 4, 5)		X		X		X	X	X	X
		Alarm System		X		X		X	X	X	X
	Control Panel			X		X		X	X	X	X
MISC. SYSTEM	Trench Dam			X		X		X	X	X	X
	Conduit or Cable Seal Fitting			X		X		X	X	X	X
	Additional Vent Risers (See note 5)										X

Produced from Sheet 4 of the LADBS Methane Code

2-16-17

FORM 1 - CERTIFICATE OF COMPLIANCE FOR METHANE TEST DATA

Part 1: Certification Sheet

Site Address: 13400 Maxella Ave Marina Del Rey, CA 90292

Legal Description: Tract: Lot: Block:

Building Use: Commercial

Architect's, Engineer's or Geologist's Stamp:

CERTIFIED ENGINEERING GEOLOGIST
DONALD A. TERRES
No. CEG 1362
Exp. 1-31-19
STATE OF CALIFORNIA

Name of Architect, Engineer, or Geologist:
Carlin Environmental Consulting, Inc.
Mailing Address:
2572 Chambers Rd #100
Tustin, CA 92780
Telephone: (714) 508-1111

Name of Testing Laboratory:
GeoTracer
City Test Lab License #: TA 10234
Telephone: (714) 508-1111

I hereby certify that I have tested the above site for the purpose of methane mitigation and that all procedures were conducted by a City of Los Angeles licensed testing agency in conformity with the requirements of the LADBS Information Bulletin P/BC 2002-101. Where the inspection and testing of all or part of the work above is delegated, full responsibility shall be assumed by the architect, engineer or geologist whose signature is affixed thereon.

Signed: _____ date 2-15-2017

Required Data:

- Project is in the (Methane Zone) or (Methane Buffer Zone) (Tidal influence)
- Depth of ground water observed during testing: 6-8' feet below the Impervious Membrane.
- Depth of Historical High Ground Water Table Elevation*: 15' feet below the Impervious Membrane.
- Design Methane Concentration**: 1050 parts per million in volume (ppmv).
- Design Methane Pressure***: <2" inches of water column.
- Site Design Level: (Level I, Level II, (Level III) Level IV, Level V) with ≤2" inches of water column.

De-watering:

- De-watering (is) (is not) required per Section 91.7104.3.7.
- Pump discharge rate N/A cubic feet per minute per reference geology or soil report: N/A dated N/A.

Additional Investigation:

- Additional investigation (was) ((was not)) conducted.

Latest Grading on Site:

- Date of last grading on site (was) (was not) more than 30 days before Site Testing.
- See Attached explanation of the effect on soil gas survey results by grading operations.

Notes:

* Historical High Ground Water Table Elevation shall mean the highest recorded elevation of ground water table based on historical records and field investigations as determined by the engineer for the methane mitigation system.

** Design Methane Concentration shall mean the highest recorded measured methane concentration from either Shallow Soil Gas Test or any Gas Probe Set on the site.

*** Design Methane Pressure shall mean the highest total pressure measured from any Gas Probe Set on the site.

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FORM 1 (CONTINUED) - CERTIFICATE OF COMPLIANCE FOR METHANE TEST DATA

Part 2: Test Data - Shallow Soil Gas Test and Gas Probe Test

Site Address: 13400 Maxella Ave

Description of Gas Analysis Instrument(s):

Instrument Name and Model: RKI Eagle Instrument Accuracy: ± 250 ppmv.

City of Los Angeles Testing License #: TA 10234

Date	Time	Probe Set #	Concentration (ppmv)	Pressure (inches water column)	Probe Depth (feet)	Description / Probe Location
2-8-17	8:05	1	1000	<2"	5'	See map
	8:10	2	630			See map
	8:12	3	15			probe removed
	-	4	-			See map
	8:16	5	10			"
	8:18	6	80			"
	8:22	7	460			"
	8:27	8	440			"
	8:30	9	-			"
	8:35	10	220			"
	8:40	11	20			"
2-9-17	2:00	1	700			"
	2:05	2	1050			"
	2:08	3	40			"
	-	4	-			probe removed
	1:35	5	110			See map
	1:40	6	15			"
	1:37	7	300			"
	1:43	8	230			"
	1:48	9	290			"
	1:52	10	380			"
	1:55	11	120			"

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